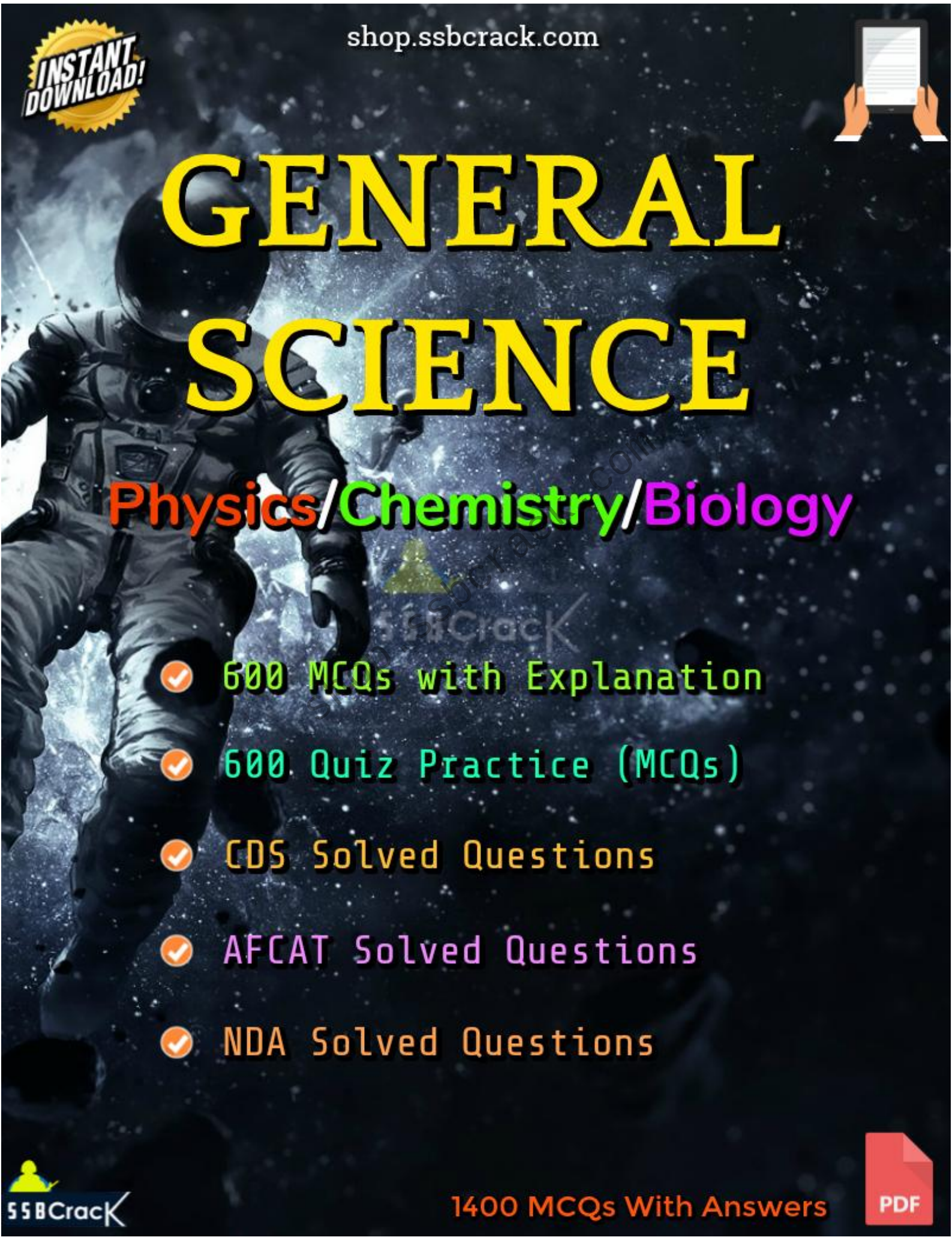

CONTENTS

A Brief Overview of Science

Science in a broad sense existed before the modern era and in many historical civilizations. Modern science is distinct in its approach and successful in its results, so it now defines what science is in the strictest sense of the term.

Science in its original sense was a word for a type of knowledge rather than a specialized word for the pursuit of such knowledge. In particular, it was the type of knowledge which people can communicate to each other and share. For example, knowledge about the working of natural things was gathered long before recorded history and led to the development of complex abstract thought. This is shown by the construction of complex calendars, techniques for making poisonous plants edible, public works at national scale, such which those which harnessed the floodplain of the Yangtse with reservoirs, dams, and dikes, and buildings such as the Pyramids. However, no consistent conscientious distinction was made between knowledge of such things, which are true in every community, and other types of communal knowledge, such as mythologies and legal systems.

The word Science comes from Latin word "scientia" meaning "knowledge" and in broadest sense it is any systematic knowledge-base or prescriptive practice being capable of resulting in prediction. Science is a branch of knowledge or systematic study of various operations, structure and behaviour of physical and natural world through observations and experiments. It plays an important role for Exams like IAS, CDS, NDA, AFCAT, State PSC, SSC and other similar competitive exams. The questions in different competitive examination are such that to test the aspirants general awareness of a variety of disciplines.

GENERAL SCIENCE AT A GLANCE

3.1 DIFFERENCE BETWEEN THE LIVING AND NON-LIVING

- Life is a distinguishing characteristic of physical entities having biological processes from those that do not have such processes.
- Living things are a complex organization of physical molecules, that perform various biological and chemical reactions in metabolism, reproduction etc., constituting an organism.
- Non-living things, on the other hand, does not show any of such characteristics.

Characteristics of non-living things:

- Non-living things are made up of atoms.
- Non-living things do not show growth or reproduce.
- Non-living things do not respond to external stimuli.
- Non-living things are all around as like a chair, a pen, a book etc.,

Characteristics of living things:

- The basic units of living things are cells. These cells contain a nucleus, protoplasm and cell membranes. They from the basic and most important characteristics of living beings.
- They obtain and use energy in ways like photosynthesis, metabolisms etc.,
- Living things grow and develop.
- Living things reproduce.
- Living things interact with the external environment and respond to external stimuli.
- Living things adapt to their environment.

3.2 BASIS OF LIFE - CELLS, PROTOPLASM AND TISSUES

- The cell is the fundamental unit of life. It is the basic structural and functional unit of all living things.
- Cells from the basic life unit irrespective of the nature of the organism – either unicellular or multicellular and either plant or animal cell.
- The cells of common structure and function combine to form a tissue.
- Tissues form organs and cooperation of organs constructs an organism.

Cell Structure:

- Cells can be of any shape and size predetermined to perform specific functions.
- The major constituents of a cell can be classified into two – Cell wall and protoplasm.

Cell wall:

- The cell wall is a thick layer surrounding the cells, giving rigidity and protection to the cells.
- It is found only in plant and bacterial cells. Animal cells are devoid of cell walls.
- It is a non-living physical layer, only when the cell wall is in contact with the living protoplast which formed it, it is capable of growth.
- The cell wall is made of 3 layers
  - **Primary wall** – It is the first layer formed by the cell. It is made completely cellulose.
  - **Secondary wall** – It is formed in some cells when the cells have stopped growing. Secondary wall is laid inner in the primary wall by accretion or deposition of materials over the surface of existing structure. It is thick (3— 10 µm) and made up of at least three layers, sometimes more. They are named as S_1, S_2, S_3, S_x etc. Along with cellulose, it contains other lignin, suberin, and cutin etc.
  - **Middle lamella –** It is a thin intercellular structure. It holds the primary walls of adjacent cells together. It is made up of calcium and magnesium pectates.
  - **Plasma membrane –** It is a thin membrane surrounding the protoplasm of a cell. It is found in both plant and animal cell. It is a semipermeable membrane, allowing certain liquids to pass through it. It is made up of proteins and lipids.

Protoplasm

- Protoplasm is the living physical basis of life. All the functions of living beings are functions of protoplasm.
- It is a clear, colourless, jelly-like gelatinous substance. It may contain water ranging from 75 to 90 %
- The solid material of protoplasm contains - proteins— 40-60%, fatty substances - 12-14%; carbohydrates-12-14% and inorganic salts 5-7%
- Protoplasm has two main parts –Cytoplasm and Nucleus.

Cytoplasm

- The plasma membrane forms the outer layer of cytoplasm.
- It is the jelly-like structure of protoplasm excluding the nucleus.
- It contains all other cellular organelles like mitochondria, Golgi apparatus, ribosomes etc.
- The main functions of the cytoplasm are,
  - It holds all the cell organelles.
  - The cell organelles exchange materials through the cytoplasmic matrix.
  - The raw materials necessary for the cell organelles are provided by cytoplasm.

Endoplasmic reticulum:

- It forms most of the volume of the protoplasm.
- It was discovered independently by Porter (1945) and Thompson (1945).
- It is 3-dimensional interconnected system membranes that run along the cytoplasm from the plasma membrane to outer nuclear membrane.
- They can be classified as,
  - Rough or granular endoplasmic reticulum – They are rough due to the presence of Ribosomes. Their main function is protein synthesis.
  - Smooth or a granular endoplasmic reticulum – They are smooth due to the absence of Ribosomes. They are involved in synthesis of lipids and steroid hormones.

Golgi apparatus:

- Also known as the Golgi complex or Golgi bodies.
- It is a sac-like flattened structure.
- It is a packing organelle like the endoplasmic reticulum. It absorbs simple molecules and combines them into complex molecules.

Ribosomes:

- Ribosomes are the sites of protein synthesis present inside the rough endoplasmic reticulum. The synthesized protein is transported by endoplasmic reticulum. They also occur in chloroplasts and mitochondria.
- These are non-membranous and are formed of RNA molecules.
- Based on molecular weight they are classified into,
  - 80 S – found in prokaryotes
  - 70 S – found in Eukaryotes

Lysosomes:

- These are vacuole like bodies that secrete enzymes to digest food substances.
- They are centers for cellular digestion.
- Sometimes, they can even digest cellular organelles, resulting in the death of the cell.

Centrioles:

- It is a microtubular structure; centrioles are concerned with cell division.
- It initiates cell division.
- A pair of centrioles forms centrosomes.

Mitochondria:

- Also known as the powerhouse of the cells.
- Mitochondria are a double membranous structure varies in diameter between 0.5 and 1.0 µm and 7 µm long.
- Mitochondria are the sites of cellular respiration. They release energy in the form of ATP (Adenosine triphosphate); in mitochondria.

Plastids:

- These are distinguishing features of plant cells and are present only in them.
- They are of three types-
  - **Chloroplasts –** They contain chlorophyll. They synthesize sugar from carbon dioxide and water in the presence of sunlight.

- **Chromoplasts –** These are yellow or reddish, due to the presence of carotenoid pigments. Chromoplasts are formed either from leucoplasts or chloroplasts. Colour change in plants, for example, during ripening of fruits, is due to the transformation into chromoplasts.
- **Leucoplasts** – These are colourless pigment cells. They occur near the nucleus in non-green cells.

Vacuoles:

- Vacuoles are non-cytoplasmic areas present in the cytoplasm which is separated from the latter by specific membranes.
- Depending upon the contents and functions, vacuoles are of four types-sap vacuoles, contractile vacuoles, food vacuoles and air vacuoles.
- They are more common in plants than in animals.

Nucleus:

- A cellular nucleus is first discovered by Robert Brown in 1831.
- The nucleus is the most important part of any cell.
- It controls various metabolic activities and carries the genetic material.
- Prokaryotic (unicellular) lack nucleus.
- Genetic information in the form of DNA is stored in a threadlike structures called chromatin within the nucleus.
- The chromatic is composed of nucleoproteins that are combinations of proteins and nucleic acids i.e. DNA (deoxyribonucleic acid) and RNA (ribonucleic acid).
- The nucleus consists of – a nuclear membrane, nucleoplasm, and nucleolus.

Nuclear membrane:

- It bounds the nucleus on the outside and separates the nucleus from the cytoplasm.
- The inner membrane is smooth whereas the outer membrane may be smooth or rough due to the presence of ribosomes.
- The nuclear envelope is perforated by nuclear pores which help in transport of material between nucleus and cytoplasm.

Nucleoplasm:

- It is a transparent, semi-fluid and colloidal substance which fills the nucleus.
- It is similar to the cytoplasm, but inside the nucleus.
- It contains nucleosides and a number of enzymes required for the synthesis and functioning of DNA, RNA, nucleoproteins, etc.

Nucleolus:

- The nucleolus is an irregular shaped membrane less structure found within the nucleus.
- It is connected to the Chromatin present in the nucleoplasm.
- The size of the nucleolus depends on the shape and size of the nucleus.

Chromosomes:

- The chromosomes are the unit of inheritance.
- They are thread-like structures found in the nucleoplasm.
- They contain genes, which are made up of DNA and RNA, and carries hereditary information from generation to generation.

Nucleic acids:

- The genes are made up of nucleic acids, which form the basis of heredity.
- These are long polymers made of repeating units called nucleotides.
- Each nucleotide consists of a nucleoside and a phosphate base, joined together by phosphate diester bond.
- The nucleic acids are of two types-

DNA:

- Acronym – Deoxyribose Nucleic Acid.
- It has 4 bases – Adenine, Guanine, Cytosine, and Thymine.
- Adenine and Guanine are purine bases and Cytosine and Thymine are pyrimidine bases.
- DNA generally has a double stranded structure
- They are the basic genetic materials, except in some viruses.
- DNA can replicate to form two DNA molecules.
- DNA controls heredity, evolution, metabolism, structure and differentiation.

RNA:

- Acronym – Ribose Nucleic Acid.
- RNA is the genetic material of only certain viruses.
- RNA generally has a single-stranded structure.
- It is made up of 4 bases – Adenine, Guanine, Cytosine and Uracil.
- RNA cannot replicate itself to form two RNAs.
- RNA cannot control heredity, it controls only protein synthesis.
- There are 3 types of RNA-
  - mRNA – messenger RNA
  - tRNA – transfer RNA
  - rRNA – ribosomal RNA

Classification of cells:

- Based on the number of cells.

Prokaryotes	Eukaryotes
These are unicellular organisms without a well-defined nucleus. Some prokaryotes are multi cellular. Eg- bacterial cell	These cells have a well-defined nucleus and internal cell organelles. Eg – plant and animal cell
They are primitive and simple cells.	They are developed and complex cells.
Nucleus is absent	Nucleus is present
Membrane bound organelles are absent	Membrane bound organelles are present
Simple cell division	Cell division occurs by mitosis and meiosis

- Cells can also be classified as – Plant and animal cells.

Plant cells	Animal cells
The cell is enclosed by a plasma membrane and a rigid cell wall.	The cell is enclosed by an only plasma membrane. The cell wall is absent
Plastids are present	Plastids are absent
They are usually large in size	They are usually smaller in size
Big vacuoles are present	Vacuoles are absent or are present only in smaller sizes.

Cell Division:

- The growth and development of all organisms depend upon the growth and division of cells.
- Cell division occurs in two stages
  - Karyokinesis – Division of nucleus
  - Cytokinesis – Division of cytoplasm
- There are two types of cell division – **Mitosis** and **Meiosis.**
  - **Mitosis:** It is the only form of cellular reproduction in single-cell organisms. Mitosis yields two genetically identical cells. This type of cell division occurs in asexual reproduction.
  - **Meiosis:** It occurs in reproductive cells. It results in the formation of four haploid cells from a single diploid cell. Hence, it is known as reduction division.

Tissues

- For complex living things cells work together, organized into groups, each of which has its own task.
- Tissue is a group of identical cells that performs the same task. For example, Bone.
- The tissues join to complete a task; such group tissue is called an organ. For example, the Human hand is an organ – made up of muscle, bone and nerve tissues.

3.3 GROWTH AND REPRODUCTION IN PLANTS AND ANIMALS

Growth in Plants:

- Growth in living organisms is not uniform throughout the life span.
- Growth takes Heredity place at a faster rate till the plants or animals attain maturity.
- Then it slows down and at a particular time, it stops. Later in life, death occurs.
- All these changes that occur in an organism, starting from its beginning till its death may collectively be termed as development.
- The development occurs in two stages,
  - Morphogenesis - process of development of shape and structure of an organism.
  - Differentiation – the process of change in cells, tissues or organs carry out different functions.

Cellular Growth

- The growth of an organism is always associated with growth in size and number of cells.
- Cellular growth occurs in three stages,
  - **Cell division**: The number of cells increases due to mitosis.

- **Cell enlargement**: The size of individual cell increases after cell division due to increase in the volume of its protoplasm.
- **Cell differentiation**: In this stage, the structure of the cell changes to perform specific functions. And a similar type of cells having the same functions forms a group, which is known as tissue.

- In lower level organisms like bacteria and fungi, the cells along the entire body length grow.
- But in higher organisms, growth is restricted to the cells present only in the growing regions, like stem apex and root tip or along the lateral sides of the stem and root.
- Growth at the tips leads to elongation of body parts and grow at the lateral sides leads to increase in the thickness of the stem and root.

Factors affecting plant growth:

- Various factors affect the growth of plants,
- **External factors:** Light, Temperature, Water, Minerals and Nutrients
- **Internal Factors:** There are some substances produced in the plant body itself, which affects the growth of the plant. These are called plant hormones or **phytohormones** or growth hormones.
- The naturally produced growth hormones are broadly grouped into five major classes. They are,

(i) Auxin:

- Auxin is a growth promoter, generally produced by the growing apex of the stem and root of the plants. It helps in the elongation of the shoot and root tips behind apical meristem.
- The naturally produced auxins are **Indole-3-Acetic Acid (IAA).**

Functions of Auxin:

- It promotes cell elongation.
- It suppresses the growth of lateral bud. If the tip of a plant is removed, the lateral branches begin to grow. In most of the plants, apical bud suppresses the development of lateral buds. This is called **apical dominance**.

(ii) Gibberellin:

- Gibberellin or Gibberellic Acid (GA) was initially isolated from a fungus **Gibberella fujikuroi**.
- In plants, it is produced in embryos, roots, and young leaves and it enhances growth.

Functions of Gibberellins:

- It helps in elongation of stems of genetically dwarf plants. By using gibberellin the height of the dwarf plants can be increased.
- It induces parthenocarpy. (Formation of seedless fruits without fertilization).

(iii) Cytokinins:

- Cytokinins are synthesized in root the apex, endosperm of seeds, and young fruits where cell division takes place continuously.

Functions of Cytokinins:

- They stimulate cell division, cell enlargement, and cell differentiation.
- They prevent aging of plant parts.
- They inhibit apical dominance and help in the growth of lateral buds into branches.

(iv) Ethylene:

- Ethylene is a gaseous hormone. It is found in ripening fruits, young flowers, and young leaves.

Functions of Ethylene:

- It induces ripening of fruits.
- It promotes senescence and abscission of leaf and flowers.
- In cells, it only increases the width not the length.

(v) Abscisic acid:

- Abscisic acid also known as **Dormin** is a naturally occurring growth inhibitor found in a wide variety of plants. It is synthesized in leaves.

Functions of Abscisic acid:

- It induces dormancy of buds and seeds as opposed to Gibberellin, which breaks dormancy.
- It promotes the senescence of leaf i.e., the fall of leaves happens due to abscissic acid.
- It inhibits seed germination and development.
- It causes the closing of Stomata.

Germination of seeds:

- Seed germination is the return of metabolic activities and growth of the seed tissue to give rise to a new plant by the development of the embryo.
- There are two types of seed germination
  - **Epigeal germination -** In epigeal germination hypocotyl (the region below cotyledons) elongates and cotyledons come out above the soil surface. Examples: seeds of pumpkin, mustard, tamarind, and french bean.
  - **Hypogeal Germination** - In hypogeal germination the epicotyl (the region above cotyledons) elongates and cotyledons remain below the soil surface. Examples: Most monocots seed like rice, wheat, maize, and coconut.
- Five factors affect the seed germination - water, temperature, oxygen, light and growth hormones.

Photoperiodism:

- The effect of duration of light on the growth of plants is known as photoperiodism.
- On the basis of light required by the plants for flowering, the plants are classified into the following three categories:
  - **Short-day Plants -** Some plants produce flowers when exposed to a light for a shorter period than usual. These are called Short-day Plants. Cosmos, Dahlia, Soyabean, are short-day plants.
  - **Long-day Plants** – Some plants, flowers when exposed to a light for a period longer than usual. Gulmohar, radish, spinach, are long-day plants.

- **Day-neutral Plants** – Flowering in these plants are not affected by a light period. Cucumber, Tomato, and Sunflower, are day-neutral plants.

Vernalisation:

- Vernalisation is the process of accelerating the process of flowering by subjecting or exposing the plant to low temperature.
- For example, by applying a temperature ranging between 1-10° C to certain variety of wheat, rice and cotton, growth of seedlings is accelerated and flowering occurs earlier
- Plants whose life cycle are completed in two seasons (biennials) can produce flowers in one season if their seeds are pre-treated to a low temperature.

Plant movements

Tropic Movement:

- Growth of plants towards or away from environmental factors is called tropic movements.
- **Phototropism**: Induced by light i.e., bending of branches and stems towards the light.
- **Geotropism**: Induced by gravity, e.g. growth of roots towards gravity.
- **Thigmotropism**: Movement caused by contact.
- **Hydrotropism**: Induced by water, i.e., growth of roots towards source of water.

Turgor Movements:

- It is the movement due to the change in volume of water inside a cell.
- When more water is present in the cell, it expands and becomes rigid or hard. Such a cell is said to be turgid.
- When the cell retains less water, it is not fully expanded and remains soft. This is called flaccid condition.

Reproduction in plants:

- Reproduction is the process by which individuals produce their offsprings and pass on genetic information to the next generation.
- Plants reproduce both sexually and asexually.

Asexual reproduction in plants:

- Asexual reproduction occurs when a single parent is involved in the process.
- The different means of asexual reproduction in plants are,
  - **Budding –** This is the method of reproduction of unicellular plant species like yeast. The unicellular organism produces a protrude on its cell wall called Bud. The bud gets its own nucleus replicated from parent nucleus. The bud then gets detached and develops into a new plant.
  - **Fragmentation –** When some plants fragment into certain smaller pieces. Each piece develops into a new plant. This method of reproduction is called fragmentation. Example – Spirogyra.

- **Spore Formation:** Special spore-bearing organs are present in some plants; especially in fungi and algae, called sporangiophores. The sporangiophore bears spores. The spores germinate to develop a new plant.
- **Vegetative propagation –** In certain plants, a new plant can develop from a vegetative part such as a stem, root or a leaf.

Sexual reproduction in plants:

- In sexual reproduction, two parents are involved. Hence two gametes are produced in these plants - male and female gametes.
- The fusion of male and female gametes is called fertilization.
- A Zygote is formed after fertilization.
- The zygote develops into an embryo and finally into a new individual.

Flower:

- Flower is the sexual reproductive organ of a plant.
- A typical angiospermic flower consists of four whorls of floral appendages: calyx, corolla, androecium and gynoecium.
- **Calyx**: It is the outermost whorl of the flower. It is composed of leaflike green sepals. The sepals are essentially green in colour, but in some cases, they are coloured like petals.
- **Corolla:** This is the second whorl of the flower and consists of a number of petals. Petals are generally brightly coloured and sometimes fragrant which make the flower to become attractive.
- **Androecium:** It is the third whorl of the flower and is the male reproductive organ consisting of stamens. Each stamen is made of filament and anther. The filament supports the anther at its tip.
- **Gynoecium**: This is the last and the fourth whorl of flower and is the female reproductive organ of the flower. It is composed of ovary, style and stigma.

Microsporogenesis:

- It is a process of the formation and differentiation of microspores (pollen grains) from microspore mother cells (MMC).
- As development occurs in the anther, the sporogenous cells undergo meiosis to form microspore tetrad.
- Each cell of the sporogenous tissue has ability to give rise to a tetrad.
- As anther matures, the microspores get detached from each other and forms pollen grain.

Macrosporogenesis:

- The process of formation of megaspore from the megaspore mother cell by meiotic division is known as megasporogenesis. This process takes place in ovule.
- The megaspore mother cell is large and contains dense cytoplasm and a prominent nucleus. It undergoes meiosis to form 4 megaspores.
- In most plants, only one megaspore functions and the other three degenerates.
- The single functional megaspore develops into a female gametophyte.

Pollination:

- Pollination is the process of transfer of pollen grains from the anther to the stigma of the same flower or between the different flowers.
- Self-pollination: This process involves the transfer of pollen grains from the anthers to the stigma of the same flower or of another flower of the same plant.
- Cross-pollination: Cross pollination involves the transfer of pollen grains from the flower of one plant to the stigma of the flower of another plant. It is also known as xenogamy.

Fertilization:

- The fusion of a male and a female reproductive unit is called fertilization.
- **After pollination,** Pollen grains get attached.

Male Reproductive Organs

- The male reproductive organs include a pair of testes (singular, testis), two sperm ducts and a penis.
- The testis produces the male gametes called sperms.
- Millions of sperms are produced by the testes.
- Each sperm is a single cell with all the usual cell components.

Female Reproductive Organs:

- The female reproductive organs are a pair of ovaries, oviducts (fallopian tubes) and the uterus.
- Ovary produces female gametes called ova (eggs).
- Uterus is the part where the development of the baby takes place.

Fertilization:

- When sperms come in contact with an egg, one of the sperms may fuse with the egg.
- Such fusion of the egg and the sperm is called fertilization.
- During fertilization, the nuclei of the sperm and the egg fuse to form a single nucleus. This results in the formation of a fertilized egg or zygote.
- **Internal fertilization** - Fertilization which takes place inside the female body is called internal fertilization. Internal fertilization occurs in many animals including humans, cows, dogs and hens.
- **External fertilization** -. Type of fertilization in which the fusion of a male and a female gamete takes place outside the body of the female is called external fertilization. It is very common in aquatic animals such as fish, starfish, etc.

Development of Embryo

- Fertilization results in the formation of a zygote which begins to develop into an embryo. The zygote divides repeatedly to give rise to a ball of cells.

- The cells then begin to form groups that develop into different tissues and organs of the body.
- This developing structure is termed an embryo.
- The embryo gradually develops the body parts such as hands, legs, head, eyes, ears, etc. The stage of the embryo in which all the body parts can be identified is called a foetus.
- When the development of the foetus is complete, the mother gives birth to the baby.
- In animals which undergo external fertilization, development of the embryo takes place outside the female body. The embryos continue to grow within their egg coverings. After the embryos develop, the eggs hatch.
- Viviparous animals – gives birth.
- Oviparous animals – lays eggs.

Asexual Reproduction

- In asexual reproduction, only one parent is involved
- It mostly happens in primitive microscopic animals.
- In hydra, reproduction occurs by budding. A bud is developed and detached which develops into a new organism.
  Another type of asexual reproduction is found in unicellular amoeba called Binary Fission. The nucleus first divides into two, followed by the division of the body into two each part receiving a nucleus.

3.4 ELEMENTARY KNOWLEDGE OF HUMAN BODY AND ITS IMPORTANT ORGANS

Musculoskeletal system:

- The skeletal system includes the bones of the skeleton and the cartilages, ligaments, and other connective tissue that stabilize or connect the bones.

Bones:

- There are 206 bones in the adult body.
- Longest bone – Femur (thigh bone). And smallest bone – Stapes (in the ear).
- The bones of the body perform five main functions-
  - **provides support for the body**
  - **Stores minerals and lipids**
  - **Produce blood cells**
  - Protect body organs
  - Provide leverage and movement
- Each bone in the skeleton contains two forms of tissue: compact bone that is relatively solid and spongy bone. Compact bone is found on the external surface of the bone. Spongy bone is located inside the bone.
- **Joints -** Connects two bones together.
- **Ligaments –**They connect different bones.
- **Tendons –** They connect tissue with bones. They are made of collagen.

- **Cartilage** — It is a type of connective tissue. It is a firm gel-like substance. The body contains three major types of cartilage: hyaline cartilage, elastic cartilage, and fibrocartilage.

Muscular system:

- Maintains posture and produces movement.
- Produces heat.
- The muscular system consists of Skeletal, smooth and cardiac muscles.
- Largest muscle – Gluteus Maximus (buttock) and smallest muscle – Stapedius (in the ear).

Digestive system:

- The human digestive system is a complex process to break down complex food particles into smaller ones that can be absorbed by our body.
- The human digestive system consists of the alimentary canal and the associated glands.
- **Alimentary Canal**: The alimentary canal begins at the mouth and ends in the anus. Mouth is situated in the anterior part and anus is situated at the posterior part of the body. The alimentary canal can be divided into five main parts, viz. mouth, oesophagus, stomach, small intestine and large intestine.
- **Buccal Cavity**: The mouth opens into the buccal cavity or oral cavity. A muscular tongue and a number of teeth are present in the buccal cavity.
- **Tongue**: Tongue is a freely movable muscular organ. It is attached to the floor of the buccal cavity.
- **Pharynx**: The oral cavity leads into the pharynx. The pharynx serves as a common passage for food and air.
- **Oesophagus**: The oesophagus is a long tube which connects the buccal cavity to the stomach. A muscular sphincter; called gastro-oesophageal sphincter regulates the opening of the oesophagus into the stomach. Epiglottis prevents the entry of food into the lungs during swallowing.
- **Stomach**: Stomach is a J-shaped bag-like structure. It is situated in the upper left portion of the abdominal cavity. There are three major parts of the stomach, viz. the cardiac, fundic and pyloric regions.
- **Small Intestine**: Small intestine is a long and highly coiled structure. It is divided into three regions, viz. duodenum, jejunum and ileum. The duodenum is U-shaped, jejunum is somewhat coiled and the ileum is highly coiled. The opening of the stomach into the duodenum is guarded by the pyloric sphincter.
- **Large Intestine**: Ileum opens into the large intestine. The large intestine is somewhat shorter than the small intestine but has a larger diameter. The large intestine consists of caecum, colon and rectum. The caecum is a blind sac which hosts some symbiotic microorganisms.
- **Appendix**: This is a narrow finger-like tubular projection situated at the junction of small and large intestines.

- **Colon**: Colon is divided into three parts, i.e. an ascending, a transverse and a descending part. The descending colon opens into the rectum. The rectum; in turn; opens out through the anus.

Digestive glands

Salivary Glands

- There are three pairs of salivary glands, viz. parotids, sub-maxillary/submandibular and sublingual.
- The parotids are present in the cheek. The sub-maxillary/sub-mandibular is present in the jaws. The sublinguals are present below the tongue.
- The salivary glands secrete salivary juice into the buccal cavity.

Liver

- The liver is situated in the abdominal cavity, just below the diaphragm.
- The Liver secretes bile and is stored and concentrated in the gall bladder.
- The gall bladder is a thin muscular sac, situated above the liver.
- The duct of the gall bladder (cystic duct); along with the hepatic duct forms the common bile duct.
- The bile duct and the pancreatic duct open into the duodenum as the common hepato-pancreatic duct.
- The hepato-pancreatic duct is guarded by a sphincter called the sphincter of Oddi.

Pancreas

- The pancreas is both exocrine and endocrine.
- It is an elongated organ. This is situated between the limbs of the U-shaped duodenum.
- The exocrine portion of the pancreas secretes and alkaline pancreatic juice, which contains various enzymes.
- The endocrine portion of the pancreas secretes hormones; insulin and glucagon.

Respiratory system

- The process of releasing energy from food is called respiration.
- Respiration involves taking in oxygen into the blood, which is used to breakdown, fuel and release energy and releasing carbon dioxide out.

Nose

- The respiratory system of humans begins with the nose.
- Hairs and hair like **cilia** trap dust particles and purify the air.

Pharynx

- The nasal chambers open into a cavity at the rear of the mouth called the **pharynx** (throat).
- From the pharynx, two tubes called the *Eustachian tubes* open to the middle ear to equalize air pressure there.
- The pharynx also contains tonsils and *adenoids,* which traps and filter microorganisms.

Trachea

- After passing through the pharynx, air passes into the **trachea or the windpipe.**
- The opening to the trachea is a slit-like structure called the **glottis.** A thin flap of tissue called the **epiglottis** folds over the opening during swallowing and prevents food from entering the trachea.
- At its lower end, the trachea branches into two large **bronchi**.
- The bronchi branch into smaller **bronchioles,** forming a bronchial "tree."
- The bronchioles terminate in the alveoli.

Lungs

- Human **lungs** are composed of approximately 300 million alveoli.
- Oxygen from each alveolus enters the red blood cells and binds to the haemoglobin.
- In addition, carbon dioxide contained in the plasma and red blood cells leaves the capillaries and enters the alveoli.
- When a person inhales, the rib muscles and diaphragm contract, thereby increasing the volume of the chest cavity. This increase leads to reduced air pressure in the chest cavity, and air rushes into the alveoli, forcing them to expand and fill.
- During exhalation, the rib muscles and the diaphragm relax, the chest cavity volume diminishes, and the internal air pressure increases. The air flows out.

Excretory System

- The human excretory system functions to remove waste from the human body.
- The human excretory system includes the kidneys and their functional unit, the **nephron**.

Kidneys

- They are bean-shaped organs located on either side of the backbone at about the level of the stomach and liver.
- Blood enters the kidneys through the **renal arteries** and leaves through **renal veins.**
- **Ureters** carry waste products from the kidneys to the **urinary bladder**, where it is temporarily stored.
- Kidneys perform a number of homeostatic functions:
  - Maintain volume of extracellular fluid
  - Maintain ionic balance in extracellular fluid
  - Maintain pH and osmotic concentration of the extracellular fluid.
  - Excrete toxic metabolic by-products such as urea, ammonia, and uric acid.

Control of kidney function:

- The activity of the nephron in the kidney is controlled by a person's choice and environment as well as hormones.
- Humans produce a hormone called *antidiuretic hormone* (*ADH*), also known as *vasopressin,* which is secreted by the posterior lobe of the **pituitary gland.**
- It regulates the amount of urine by controlling the rate of water absorption in the nephron tubules.

- Hormones from the **cortex** of the adrenal glands also control the content of urine.

Reproductive system (Male)

- The male reproductive organs include the testes, seminal vesicles, penis and some associated glands such as the prostate gland.

Testis

- The most important male reproductive organ is the testis
- It produces sperms. There are two oval testes, each contained in a protective bag called the scrotum (or scrotal sac), lying outside the abdominal cavity.
- The scrotal sac can elongate and contract depending upon the body temperature and external temperature.
- Sperms from the testis pass through the sperm duct, known as **vas deferens.**
- The vas deferens runs interiorly up to the urinary bladder, from where it leads downward and is joined by a duct from the seminal vesicle.
- The seminal vesicle is an elongated sac at the base of the urinary bladder. For each testis, there is one vas deferens and one seminal vesicle.
- The functions of a seminal vesicle are to store the sperms that have come from the testis and to secrete seminal fluid, or semen, in which the sperms float.

Prostate gland

- The sperm ducts from both sides join near the base of the urinary bladder, opening into a single tube called urethra. This junction occurs inside the prostate gland.
- The prostate gland adds its secretion to the seminal fluid. The urethra leads to the outside of the body through an organ called a penis.
- It carries both urine and seminal fluid.

Penis

- The penis is a muscular, tubular organ made up of loose tissue with spaces in between.
- On being stimulated, the penis fills with blood, making the penis erect and firm, so that it may enter the vagina of the female and discharge the sperms.

Sperm

- The sperm is the male gamete.
- It has a head and a long tail, which helps it swim towards the ovum (egg).

Reproductive system (Female)

- The female reproductive organs include the ovaries. Fallopian tubes, uterus and vagina.

Ovary

- The ovaries are a pair of small, oval organs in the lower part of the abdominal cavity.
- They produce ova. The ova start maturing when the female reaches puberty.

- Every 28 days, one of the ovaries releases an ovum. When an ovum is released from the ovary, it is taken up by a thin Fallopian tube (also called oviduct) through its funnel-shaped opening.
- The ovum is passed down the duct and into the uterus, which passes it out of the body through the vagina. The ovum is very small and, therefore, hardly noticeable.

Fallopian tube

- The Fallopian tubes, or oviducts, are a pair of thin tubes that lead from the ovaries to the uterus.
- Each Fallopian tube has a funnel-shaped opening near the ovary. It is lined by cilia.
- The cilia help conduct the ovum down the Fallopian tube and into the uterus.

Uterus

- The uterus (womb) is a hollow, pear-shaped, elastic muscular structure. Its upper portion, into which the Fallopian tubes enter, is broader.
- The narrow, lower portion, called cervix, consists of a ring of muscles. The uterus opens into the vagina through the cervix.
- A fertilized ovum (zygote) develops into a baby inside the uterus.

Vagina

- The vagina is a tube leading to the outside of the body through an opening called vulva.
- The vagina is the organ where sperm is discharged. It is also the passage through which the fully developed baby is born.

Fertilization

- When semen is discharged in the vagina during sexual intercourse, the sperms begin moving up the vagina and uterus, finally reaching the Fallopian tubes.
- Only one sperm enters the ovum. Most of the sperms die while climbing up the Fallopian tubes. A sperm can remain alive in the Fallopian tube for about 12 hours.
- In this span of time, if it meets the ovum, it is likely to enter the ovum. This is called fertilization.

Circulatory system

- The human circulatory system consists of:
  - Blood vessels
  - Heart
  - Blood

Blood vessels

- **Arteries**: blood vessels that carry blood away from the heart in pulses. It has a thick wall and small lumen.

- **Veins**: Blood vessels that carry blood towards the heart in an even flow. They have thin walls, a large lumen and valves.
- **Capillaries**: blood vessels with walls one cell thick that carries blood from arterioles to venules through tissues, releasing nutrients and taking away waste.
- Blood circuit in Human is of two types,
  - The **systemic circuit** carries blood to all the major organs of the body, except the lungs.
  - The **Pulmonary circuit** carries blood to and from the lungs.

Heart:

- **Left atrium**: upper left chamber of the heart that receives blood from the lungs and contracts pumping blood into the left ventricle.
- **Right atrium**: upper right chamber of the heart that receives blood from the vena cava and contracts pumping blood into the right ventricle.
- **Left ventricle**: strongest of the four heart chambers and pumps blood into the aorta.
- **Right ventricle**: Pumps deoxygenated blood to the lungs via the pulmonary artery.
- **Aorta**: largest artery in the body carrying oxygenated blood *away* from the left side of the heart to all the major organs of the body (except the lungs).
- **Pulmonary artery**: carries deoxygenated blood *away* from the right side of the heart to the lungs to excrete carbon dioxide and absorb more oxygen.
- **Pulmonary vein**: carries oxygenated blood *towards* the right-hand side of the heart from the lungs.
- **Superior vena cava**: carries deoxygenated blood from the upper half of the body back to the heart.
- **Inferior vena cava**: carries deoxygenated blood from the lower half of the body back to the heart.
- **Bicuspid valve**: allows one-way flow of blood from the left atrium into the left ventricle - prevents back-flow of blood.
- **Tricuspid valve**: allows one-way flow of blood from the right atrium to the right ventricle - preventing back-flow of blood.
- **Chordae tendineae**: connective tissue holding the heart valves in position.
- **Septum**: divides the heart into two separate pumps.
- **Papillary muscle**: contracts preventing the heart valves prolapsing backwards.
- **Semilunar valves**: allow one-way flow of blood out of the heart - prevent back-flow of blood into the heart.

The Cardiac Cycle

- The cardiac cycle is controlled by two pacemakers in the heart:
  - The sinoatrial node (SA node) located in the top wall of the right atrium

- The atrioventricular node (AV node) located in between the right atrium and ventricle.

Atrial systole and ventricular diastole:

- Atria receive blood from the major veins (vena cava and pulmonary veins).
- The SA node sends an electrical signal to the cardiac muscle of the atria.
- The atria contract (**systole**).
- The bicuspid and tricuspid valves open.
- Blood flows into the ventricles and the ventricles remain relaxed (**diastole**)

Ventricular systole and atrial diastole:

- Electrical signal reaches the AV node, which relays the signal onto the cardiac muscle of the ventricles.
- The ventricles contract (systole).
- The bicuspid and tricuspid valves close and the semilunar valves open.
- Blood flows out of the heart via the aorta and pulmonary artery.

Nervous system

- The Human nervous system consists of the following major parts-
  - Central Nervous system – it includes the brain and spinal cord
  - Peripheral nervous system – Includes cranial and spinal nerves.

Central Nervous System (CNS)

Brain:

- The brain lies in the cranium inside the human skull.
- The brain consists of the following parts-

Forebrain

- Cerebrum – Largest part of human brain. It is made up of two cerebral hemispheres joined together by the corpus callosum. It controls consciousness and control of memory.
- Thalamus - The **thalamus** is a small structure within the brain located just above the brain stem between the cerebral cortex and the midbrain and has extensive nerve connections to both. The main function of the **thalamus** is to relay motor and sensory signals to the cerebral cortex.
- Hypothalamus – It lies at the base of the thalamus. It controls homeostasis, equilibrium, body temperature, controls respiration and heartbeat.

Midbrain

- It is a small stem which serves as a path between forebrain and hindbrain.
- It is associated with vision, hearing, motor control, sleep/wake, alertness, and temperature regulation.

Hindbrain

- Cerebellum – It is part of hindbrain and is usually smaller than cerebrum in most vertebrates. It is responsible for accurate movement and balance.
- **Medulla Oblongata** – It is the hindmost part of the brain. It connects brain with the spinal cord. It controls all the involuntary movements (uncontrolled movements) like breathing, saliva secretion, heartbeat and reflex actions.
- **Ventricles of brain-** Ventricles are the cavities in the brain. All these cavities contain cerebrospinal fluid (CSF). The fluid protects the brain from shock.

Spinal cord

- It is the reflex center of the brain.
- It controls all the reflex actions, both natural and acquired.
- It is made up of butterfly shapes, grey matter covered by white matter.

Peripheral nervous system

- It forms the nervous system other than the CNS.
- These constitute the nerves that run along the body.
- Cranial nerves – These are 12 pair of nerves that connect with the brain.
- Spinal nerves – These are 31 pairs in number. They connect with the spinal cord.
- Each spinal nerve connects with the spinal cord at two points – Dorsal root and a ventral root.
- The peripheral nervous system is differentiated into –
  - Somatic nervous system – governs voluntary action and body reflexes.
  - Autonomous nervous system – regulates involuntary actions like breathing and heartbeat.

Endocrine system

- The endocrine system is a set of hormone secreting glands within the body.
- The human endocrine system watches over and coordinates all the systems of the body with the use of hormones.

Pituitary gland

- The **pituitary gland** is located at the base of the human brain.
- It is made of two parts-
  - **Anterior pituitary lobe**:
    - GROWTH HORMONE - GH – controls growth and development
    - PROLACTIN – develops breast tissue, stimulates production of milk after childbirth.
    - THYROID-STIMULATING HORMONE – TSH - controls thyroid gland.

- ADRENOCORTICOTROPIC HORMONE – ACTH – stimulates adrenal cortex.
- FOLLICLE-STIMULATING HORMONE – FSH - stimulates growth of graafian follicle and production of oestrogen in females, sperm in males.
- LUTEINIZING HORMONE – LH – stimulates ovulation and formation of corpus luteum, which produces progesterone in females.

➢ **Posterior pituitary globe**:

- VASOPRESSIN – converts to ADH (antidiuretic hormone) in the bloodstream, acts of kidney to concentrate urine and preserve H2O in the body.
- OXYTOCIN – released during childbirth causing contractions of the uterus.
- Thyroid Gland:
- The **thyroid gland** lies against the pharynx at the base of the neck.
- It consists of two lateral lobes connected by an isthmus.
- It produces two hormones,

➢ **Thyroxine -** regulates the rate of metabolism in the body.

➢ **Calcitonin -** regulates the level of calcium in the blood.

Parathyroid gland:

- The **parathyroid glands** are located on the posterior surfaces of the thyroid gland.
- They produce a hormone called *parathormone.*
- It helps to control calcium level in the blood and prevent hypocalcemia.

Adrenal gland:

- The **adrenal glands** are two pyramid-shaped glands lying atop the kidneys.
- They produce steroids called corticosteroids.
- There are two main types of corticosteroids –
  - ➢ Glucocorticoids – controls glucose metabolism.
  - ➢ Mineralocorticoids – Controls mineral metabolism.
- The adrenal medulla secretes two hormones – epinephrine (adrenaline) and norepinephrine (non-adrenaline).

Pancreas:

- The pancreas is located just behind the stomach. Its endocrine portion consists of cell clusters called the **islets of Langerhans.**
- **It** produces two hormones: insulin and glucagon.
- **Insulin – Promotes conversion of glucose into glycogen and store it in the body.**
- **Glucagon – promotes the breakdown of glucagon into glucose.**

Other endocrine glands:

- The **ovaries** secrete o**estrogens -** encourage the development of secondary female characteristics.
- The **testes** secrete **androgens -** which promote secondary male characteristics.
- **Thymus gland secretes Thymosin-** which influences the development of the T-lymphocytes

Sensory organs:

Human Eye:

- The human eye is a spherical structure which fits in the eye socket in the skull bone. There are following main parts in the human eye.
- **Pupil**: Pupil is the round black spot in front of the eye. It regulates the amount of light entering the eyes. Pupil works like the aperture of a camera. In case of dim light, pupil dilates to allow more light to enter the eyes. In case of strong light pupil constrict allowing less light to enter.
- **Irish**: Irish is made of muscles. They control the size of opening of pupil.
- **Lens**: Lens lies just behind the pupil. Lens becomes thin to increase its focal length. This enables us to see distant objects clearly. To focus on nearer objects, the lens becomes thick to decrease its focal length. But there is a limit. The minimum distance of clear vision is 25 cm. Below this distance, we cannot see things clearly.
- **Retina**: Retina works like a screen or camera film. Retina is full of light and colour sensitive cells. These cells, upon receiving image send electrical signals to the brain, which processes this information to make a mental image of what we see. The photoreceptor cells in the eye are of two types, viz. Rod cells and cone cells. The rod cells are sensitive to dim light. The cone cells are sensitive to bright light and colour.

Human Ear:

External Ear:

- The external or outer ear consists of three parts, the pinna, the auditory canal or meatus, and the ear drum.
- The pinna collects the sound waves which travel through a small air-filled duct, called the auditory canal to the eardrum.
- The eardrum is a thin membrane located at the end of the canal and it makes the inner boundary of the external ear.

Middle Ear

- The middle ear consists of three tiny bones called the ossicles. These bones are connected like a series of levers.
- The energy is mechanically transmitted and the amplification takes place through the middle ear.

- The three bones of the middle ear, Which are collectively called ossicles are Malleus (hammer), Incus (anvil) and Stapes (stirrup).
- The malleus, or hammer, is connected to the eardrum. It moves the incus or anvil, which in turn, moves the stapes or stirrup. The stakes are attached to the oval window.
- The Eustachian tube connects the middle year it with the mouth cavity.

Inner Ear

- The inner ear is the most complicated of the three major parts of the ear.
- It consists of two kinds of sensory organs. One is concerned with the sense of balance and the other with hearing.
- The organs for the balance are called vestibular sense organs.
- The sense organs for hearing are located in a bony structure called the Cochlea.
- Cochlea contains three liquid- filled canals lying one on top of the other. These three canals are the vestibular canal, the cochlea canal and the tympanic canal.
- Hearing mechanism - When a sound wave reaches the ears, it will pass through the outer ear, go down to auditory canal, and get into tympanic membrane. Sound wave vibrates the tympanic membrane, hammer bone, stapes, and finally goes into the oval window. As a result, it vibrates the cochlea fluid and stimulates hearing nerve. The nerve beginning sends impulses to the cerebrum and interpreted it.

Nose

- The nose is the sense of smell.
- Smell is produced by chemical stimulation in the form of gas.
- Gas goes into nose cavity, diffuses into mucus layers and binds with a receptor in the dendrite.
- The gas will stimulate olfactory cell, so that the impulses from olfactory nerves move toward the brain. The impulse will be interpreted as smell.
- **Tongue**
- Taste is produced from chemical stimulation in the form of solution.
- At the tip of waste verves there are taste papillae (Gemma gustatory).
- The taste papillae have a bottle-like (pumpkin) shape which lies in front, back, and along the tongue edge.
- It is composed of support cell and taste cell containing microvillus.
- In microvillus, there is a protein molecule receptor that enables the brain to detect the taste of sweet, bitter, salty, or sour.

Skin

- Skin comprise of five receptors, namely receptor of **touch** (Meissner nerve and Merkel disc), **pressure** (Paccini nerve), **pain** (nerve without membrane), **heat** (Ruffini nerve or Mazzoni golgi), and **cold** (Krause nerve).

- Sensory nerves on skin are scattered unevenly and can be found in different depth.

3.5 COMMON EPIDEMICS, THEIR CAUSES AND PREVENTION:

- Epidemics – Diseases that are infectious and spread to a large number of people.
- Any condition which interferes with the normal functioning of the body is called a disease.
- **Congenital diseases –** These are diseases that are present from birth. They may be due to genetic disorder or metabolic malfunctioning.
- **Acquired diseases –** These are diseases that one may acquire during his lifetime.
- Acquired diseases are being classified into two
  - Communicable diseases: The diseases which can be transmitted from an infected person to a healthy person.
  - Non-communicable diseases: These diseases do not spread from an affected person to a healthy person.

Communicable Diseases

TUBERCULOSIS

- **Pathogen**: Mycobacterium tuberculosis.
- **Mode of Transmission**: airborne-discharged through a cough and sneeze, of the infected person.
- **Incubation period**: 2-10 weeks during which the bacteria produce a toxin, **tuberculin**.

Symptoms

- Persistent fever and coughing.
- Chest pain and blood come out with the sputum.
- General weakness.

Prevention and Cure

- Isolation of patients to avoid the spread of infection.
- **BCG** vaccination is given to children as a preventive measure.

TYPHOID

- **Pathogen**: Salmonella typhi.
- **Mode of transmission**: Through contaminated food and water.
- **Incubation period**: About 1-3 weeks.

Symptoms:

- Continuous fever, headache, slow pulse rate.
- Reddish rashes appear on the belly.
- In extreme cases, ulcers may rupture, resulting in the death of the patient.

Prevention and Cure:

- Anti-typhoid inoculation should be given.
- Avoid taking exposed food and drinks.
- Proper sanitation and cleanliness should be maintained.
- Proper disposal of excreta of the patient.
- Antibiotics should be administered.

CHOLERA

- Common in areas with poor sanitary conditions.
- **Pathogen**: Vibrio cholera.
- **Mode of transmission**: Contaminated food and water.
- **Incubation period:** 6 hours to 2-3 days.

Symptoms

- Acute diarrhoea and watery stool.
- Muscular cramps.
- Loss of minerals through urine.
- Dehydration leads to death.

Prevention and cure

- Cholera vaccination should be given.
- Electrolytes (Na, K, sugar) dissolved in water should be given to the patient to check dehydration.
- Proper washing and cooking of food.

MALARIA:

- **Pathogen**: Malaria parasite (different species of **Plasmodium**).
- **Mode of transmission**: By bite of female Anopheles mosquitoes.
- Incubation period: Approximately 12 days.

Symptoms

- Headache, nausea and muscular pain.
- Feeling of chilliness and shivering followed by a fever, which becomes normal along with sweat after some time.
- The patient becomes weak and anaemic.
- If not treated properly secondary complications may lead to death.

Prevention and cure

- Use of mosquito net and mosquito repellents.

- No water should be allowed to collect in ditches or other open spaces to prevent mosquito breeding.
- Sprinkling of kerosene oil in ditches or other open spaces where water gets collected.
- Anti-malarial drugs to be administered.

HEPATITIS

- **Pathogen**: Hepatitis B virus.
- **Mode of Transmission**: Mainly through contaminated water.
- Incubation Period: Generally 15-160 days.

Symptoms

- Body ache.
- Loss of appetite and nausea.
- Eyes and skin become yellowish, urine deep yellow in colour (due to bile pigments). E
- Enlarged liver.

Prevention and Cure

- Hepatitis B vaccine
- Proper hygiene is to be observed.
- Avoid taking fat rich substances

POLIOMYELITIS

- **Pathogen**: Polio Virus
- **Mode of transmissions:** Virus enters inside the body through food or water.
- **Incubation period**: 7-14 days

Symptoms

- The virus multiplies in intestinal cells and then reaches the brain through blood.
- It damages the brain and nerves and causes infantile paralysis.
- Stiffness of neck, fever, loss of head support.

Prevention and Cure

- Polio vaccine drop (oral polio vaccine, OPV) is given to children at certain intervals.

PNEUMONIA

- **Pathogen –** diplococcus pneumoniae.
- **Incubation period –** 1 to 3 days.

Symptoms

- Collection lymph and mucus in bronchioles and alveoli.
- Decrease in the respiratory efficiency of the lungs

- Other symptoms like fever, coughing, headache and chills.
- Lips and finger nails become grey to bluish colour.
- Severe cases, it leads to death.

Prevention and cures:

- Isolation of the affected person.
- Antibiotics like penicillin and flucloxacillin are administered.

Non- Communicable Diseases

DIABETES MELLITUS:

- It is caused due to the less secretion of insulin hormone from the pancreas.
- It may be either hereditary or acquired.
- Damage to the beta cells of pancreas that secrete insulin.
- The disease can be diagnosed by blood test or urine test.

Symptoms

- More glucose in blood.
- Excessive and frequent passing of urine – **poly urea**.
- Feeling thirsty– **polydipsia**
- Frequent hunger - **polyphagia**
- Reduced healing capacity of injury.
- General weakness of the body.

Prevention and cure

- Control the excessive weight of the body.
- A regulated and controlled diet is to be taken.
- The food should not contain sugar and much carbohydrates.
- Injection of insulin before meals, if required.

CANCER

- Cancer is the uncontrolled and unwanted growth of cells.
- Cancer can arise out of a lot of causes like smoking, chewing tobacco etc.,
- Cancer results in tumour growth.
- These tumours can be of two types,
  - **Benign tumour -** It remains confined to the place of origin and does not spread to other body parts. It is relatively harmless.
  - **Malignant tumour** - It spreads to other parts of the body and growth is rapid. This is serious and may cause death of the patient.

- Some of the symptoms of cancer are,
- Continuous bleeding and loss of body weight.
- Bleeding in menses.
- Persistent indigestion and persistent changes in bowel movement.

Causes of cancer

- Oncogenic transformation, eg – radiation, chemicals.
- Tumour promoters – eg excessive growth hormones
- Tumour viruses.

Detection and diagnosis of cancer:

- Biopsy
- Radiography
- Endoscopy
- Nuclear medicine scans

Treatment:

- Surgery
- Radiotherapy
- Chemotherapy
- Immunotherapy

Sexually Transmitted Diseases

AIDS

- **AIDS** Is an acronym for Acquired Immune Deficiency Virus.
- The virus affects the immune system of the body. Thus making it weak.
- Damages to or destruction of lymphocytes lead to the development of a cellular immune deficiency which makes the patient susceptible to a wide variety of infections.
- As a result, the body catches all possible diseases and results in death.
- There is no cure for AIDS.

Mode of transmission:

- Sexual contact with the affected person.
- Using the same syringe that was used for the affected person.
- Blood transfusion which contains human immunodeficiency virus.
- Organ transplantation of the affected person.
- Artificial insemination.

- From mother to newborn baby during the process of giving birth.
- **Incubation period**: The average period is 28 months though it may range from 15 to 57 months.

Symptoms:

- A type of lung disease develops (tuberculosis).
- A skin cancer may be observed.
- Nerves are affected.
- Brain is badly damaged with the loss of memory, ability to speak and to think.
- In severe cases, the patient shows swollen lymph nodes, fever and loss of weight. A full blown (disease at its peak) AIDS patient, may die within three years.

Prevention

- There should not be any sexual contact with the person who has HIV infection or STI.
- Use disposable syringe and needle.
- The blood to be transfused should be free from HIV germ.

3.6 FOOD SOURCE OF ENERGY FOR MAN

- Food is any substance consumed to provide nutritional support for an organism. It is usually of plant or animal origin and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals.
- Food is ingested by an organism and assimilated by the organism's cells to provide energy, maintain life, or stimulate growth.

Photosynthesis:

- Food is initially produced by plants in the process of photosynthesis.
- It is a chemical process that uses sunlight to turn carbon dioxide into sugars the cell can use as energy.
- As well as plants, many kinds of algae, protists and bacteria use it to get food. Photosynthesis is very important for life on Earth.
- Photosynthesis has two main sets of reactions. Light-dependent reactions need light to work; and light-independent reactions, which do not need light to work.

Light-dependent reactions:

- The sunlight hits chloroplasts in the plant, causing an enzyme to break apart the water. Water, when broken, makes oxygen, hydrogen, and electrons.
- Hydrogen, along with electrons energized by light, converts NADP into NADPH which is then used in the light-independent reactions.
- Oxygen diffuses out of the plant as a waste product of photosynthesis, and ATP is synthesized from ADP and inorganic phosphate. This all happens in the grana of chloroplasts.

Light-independent reactions

- During this reaction, sugars are built up using carbon dioxide and the products of the light-dependent reactions (ATP and NADPH) and various other chemicals found in the plant in the process called Calvin Cycle.
- The light-independent reaction cannot happen without the light-dependent reaction.
- Glucose is made and finally, transported around the plant by translocation.
- Food produced by plants is stored in parts of plants like fruits, roots etc.,

3.7 CONSTITUENTS OF FOOD – BALANCED DIET

Constituents of Food

- The main components of food are Carbohydrates, Proteins, Fats, Vitamins and Minerals.

CARBOHYDRATES

- Carbohydrates are the polyhydroxy organic compounds made up of carbon, hydrogen and oxygen.
- The main sources of carbohydrates are plants, e.g., starch (storage forms carbohydrate of chlorophyll containing plants), sugars, cereals, potatoes, legumes, millets, roots and other vegetables. Sugars are found in fruits, juice, cane, honey, palm, milk, etc.
- Carbohydrates may be classified into the following four major groups -
  - **Monosaccharides**: Simplest form of carbohydrates. All carbohydrates are reduced to this state before absorption and utilization. They contain three to six carbon atoms.
  - **Disaccharide**: Consist of two covalently joined monosaccharide units. They are produced as two molecules of the same or different monosaccharides on hydrolysis. e.g., lactose, sucrose, maltose etc.
  - **Oligosaccharides**: Consist of few numbers (2-6) of monosaccharide units e.g., glycoproteins.
  - **Polysaccharides**: Composed of many molecules of monosaccharides linked together. e.g., Glycerol.

Significance of carbohydrates:

- Starch and glycogen serve as temporary stores of glucose in plants and animals respectively.
- Monosaccharides are important constitute of nucleotides and nucleic acids.
- Glucose act as energy yielding compounds and is the major fuel of the tissue.
- Act as intermediates in respiration and carbohydrates metabolism e.g., (trioses).
- Participate in lipid synthesis.

Deficiency diseases:

- Hyperglycemia
- Galactosemia

- Diarrhea and flatulence
- Ketone
- Underweight.

PROTEINS

- Proteins are complex organic compounds. They are macromolecules or bio molecules composed of amino acids linked by peptide bond.
- The constituent elements of proteins are carbon (54%), hydrogen (7%), nitrogen (16%), oxygen (22%) and some may contain sulpher (1%) or phosphorus (0.6%).
- E.g., hemoglobin, albumin, globulin, enzymes, etc.

Function of proteins:

- Proteins as enzymes, hormones, growth factors, hormone receptors and transporters.
- Act as the defense against infections in the form of antibodies, form blood clots through thrombin, fibrinogen and other protein factors, absorb or refract light and transport substances from one part of the body to another.
- Maintain colloidal osmotic pressure of blood.
- They perform hereditary transmission by nucleoproteins of the cell nucleus.

Deficiency diseases:

- Kwashiorkor (Protein malnutrition)
- Marasmic
- Nephrosis

VITAMINS

- Vitamins may be defined as organic compounds occurring in small quantities in different natural foods and necessary for the growth and maintenance of good health in human beings and certain experimental animals.
- They cannot be synthesized in the body, but supplied by the diet to the human body.
- Vitamins are classified into two groups.
  - **Fat-soluble vitamins** are soluble in fats and fat solvents. They are insoluble in water. So these are utilized only if there is enough fat in the body, e.g., vitamin A, D, E and K.
  - **Water-soluble** vitamins are soluble in water and so they cannot be stored in the body. 11 types of vitamins are included in this class, e.g., thiamine, riboflavin, pyridoxine, cyanocobalamin.

Vitamin Deficiency:

- A Deficiency of one or more nutrients can cause diseases or disorders in our body. Diseases that occur due to lack of nutrients over a long period are called deficiency diseases.
  - Vitamin A - Night blindness

- Vitamin B1 - Beriberi
- Vitamin B2 - Ariboflavinosis
- Vitamin B3 - Pellagra
- Vitamin B5 - Paresthesia
- Vitamin B6 - Anemia
- Vitamin B7 - Dermatitis, enteritis
- Vitamin B9 & Vitamin B12 – Megaloblastic, anemia
- Vitamin C - Scurvy, Swelling of Gums
- Vitamin D - Rickets & Osteomalacia
- Vitamin E - Less Fertility
- Vitamin K - Non-Clotting of Blood.

MINERALS:

- Minerals are inorganic substances that serve a variety of functions.
- Each mineral is required in specific amounts. Some of the more important of these are calcium, phosphorus, sodium, potassium and iron.
- Minerals may be divided arbitrarily into 2 groups.
  - Macro minerals: The minerals, which are required in amounts greater than 100 mg/ day.
  - Micro minerals: The minerals, which are required in amounts less than 100 mg/ day.

MACRO MINERALS:

- **Calcium**: Milk, egg, leafy green vegetable, fish, meat soybeans etc. Formation of bones and teeth structure. Activates ATP during muscular contraction, helps in blood clotting and capillary permeability.
- **Phosphorus**: Milk, peas, meat, fish, eggs, cottage, cheese, almonds, wheat germ, soybeans, black beans etc. Synthesis of nucleic acid, ATP and some protein. Helps in calcification of bones, maintain a buffer system in body and bone formation.
- **Potassium**: Spinach, butter, beans, oranges, milk, peas, meat, fruits nuts, and vegetables. Involves the transmission of nervous impulses chemical reactions and acid base balance in the body.
- **Sodium**: Table salt, eggs, meat, milk, cheese, butter, margarine, bacon, etc. Form part of tissue fluids inducing blood, involves kidney functioning and transmission of nervous impulses, acid-base balance in the body.
- **Sulphur**: meat, fish and milk. In synthesis of proteins e.g., Keratin and many other organic compounds e.g., coenzymes A. **Micro minerals** :
- **Iron**: Liver, eggs, meat, dark and green vegetables, lentils, potatoes, soybeans, chick peas, black beans, spinach, etc. Forms part of haemoglobin, helps in electron transport in biochemical reactions.

- **Fluorine**: Water, milk etc. Needed for strong enamel on teeth, as calcium deposit in bone.
- **Nitrogen**: Protein e.g., meat, fish and milk, Synthesis of protein NA and many other organic compounds, e.g., coenzymes and chlorophyll.
- **Manganese**: Vegetables and most other foods; Bone development (a growth factor).
- **Cobalt**: Liver and red meat; Red blood cell development
- **Copper**: Most foods; Melanin production
- **Zinc**: Most foods; CO2 transport in vertebrate blood.
- **Molybdenum**: Most foods; Hydrolysis of peptide bonds in protein digestion.

Mineral deficiency diseases:

- Nitrogen-kwashiorkor.
- Sodium-muscular cramps, giddiness, anorexia, scanty urine, dry mouth, inelastic skin and disorientation.
- Chlorine-muscular cramps, renal disease etc.
- Calcium-poor skeletal growth, rickets in children, osteomalacea in adults.
- Manganese-poor bone development
- Iron-anaemia, weakness, lethargy, brittle nails, koilonychia, palpitations, breathlessness etc.
- Zinc-poor appetite, mental lethargy and delayed wound healing etc.
- Cobalt-pernicious anaemia,
- Fluorine-dental caries
- Iodine-goitre, cretinism in children
- Potassium-muscular weakness, paralysis, mental confusion, loss of appetite, nausea, abdominal distension.
- Phosphorus-rickets in children, osteomalacia in adults.

Balanced Diet

- A Balanced diet can be defined as one which contains different types of foods in such quantities and proportions that the need for calories, minerals, vitamins and other nutrients is adequately met.
- The balanced diet varies in accordance with the requirements of age, sex, the constitution of the body, the type of work and climatic conditions.
- Generally, a person requires about 3000 calories of heat energy in order to maintain the proper function of the body.
- These calories should be given by a proper combination of food elements.
- Most often proteins, fats and carbohydrates are of the proportion of 1: 1: 3.

Significance of Balanced diet:

- Prevent heart disease, high blood pressure, type 2 diabetes and many types of cancer.
- Eating a balanced diet also can help humans feel healthier and have more energy.
- It boosts the immune system too.

3.8 SOLAR SYSTEM – METEORS, COMETS

Solar system

- A solar system is a name given to the system of a star and planets revolving around it.
- Our own solar system, with the sun at its center, has 8 planets, asteroids and a minor planet belt.
- They all move in elliptical orbits around the sun due to its force of gravitational attraction.

The Sun:

- The sun lies in the center of the Solar System.
- It is a yellow dwarf star with a surface temperature of approximately 6000°C.
- Diameter – 865,000 miles.
- By mass, the sun is made up of 71% Hydrogen, 28% Helium and the remaining 1% mass comprising heavier atoms such as Carbon, Nitrogen, Oxygen, Silicon and Iron and its total mass accounts for 99% mass of our solar system.

The planets:

- The planets are divided into the two groups - Inner planets and Outer planets.
- Inner planets - Mercury, Venus, Earth, Mars. These are also known as terrestrial planets or rocky planets.
- Outer planets - Jupiter, Saturn, Uranus, Neptune. These are also known as Gas Giants or Gaseous planets.

Mercury:

- Closest planet to the sun
- Smallest of all planets
- Diameter – 3000 miles.
- Rotation – 59 days
- Revolution – 88 days.

Venus:

- Hottest planet of solar system – average 460^{o}C.
- Diameter – 12100 km
- Rotation – 243 days

- Revolution- 225 days.

Earth:

- Only planet that carries life.
- Diameter – 12756 Km
- Revolution – 365.25 days

Mars:

- Red planet.
- Two moons – Phobos and Deimos.
- Diameter – 6800 Km
- Revolution – 687 days
- Rotation – 24 hours 39 minutes.'
- Has the largest known volcano (and second tallest mountain) in the solar system – Mons Olympus.

Jupiter:

- Largest planet in the solar system
- An asteroid belt lies between Mars and Jupiter.
- Have 67 moons. Notable – Ganymede (largest moon), Europa, Io, Callisto.
- Diameter – 143,000 km
- Rotation – 9 hours 55 min
- Revolution – 11.9 years.
- It is huge gaseous planet mainly composed of hydrogen and helium.

Saturn:

- Second largest planet in solar system.
- Diameter – 120,500 Km
- Revolution – 30 years.
- Rotation – 10.8 hours.
- Saturn's most famous feature is its ring system.
- It has 50 moons.

Uranus:

- 3rd largest planet.
- Diameter – 51,000 km
- Rotation – 17 hours

- Revolution – 84 years.
- It has 27 moons.

Neptune:

- Neptune is the eighth and farthest most planets from the sun and cannot be seen by the unaided eye.
- Diameter – 50000 Km
- Revolution – 146 years.
- Rotation – 16 hours.
- Its atmosphere mainly comprises of hydrogen and helium with methane (2%)
- Methane gives a blue colour to the planet.
- 6 narrow rings
- It has 13 moons.

Asteroids:

- These are rocky substances like planets but much smaller in size.
- They revolve around the sun, mainly in the asteroid belt.
- Largest asteroid – Ceres.

Pluto:

- Was initially a planet – 9^{th} planet.
- But was changed status to dwarf planet.
- Inspite of its size, it has 5 moons.

Meteorites:

- Meteors are formed due to the collisions between asteroids.
- They are fragments of rocks floating about in space.
- Sometimes they come across the earth and fall into the earth's atmosphere. That's when they become meteors or "shooting stars".
- Most of these meteors can't reach the earth's surface and burn up in the atmosphere due to the friction with the air.
- The meteors that do reach the earth's surface are known as meteorites.

Comets:

- Comets are tiny icy and rocky bodies that travel in highly elliptical orbits around the sun.
- When they pass close to the sun, the water in them gets heated up.
- This leads to the vapourisation and the formation of a tail behind the rocky core in the direction opposite to the sun.

- The most famous comet is Halley's Comet which reappears every 75-76 years.

3.9 ACHIEVEMENTS OF EMINENT SCIENTISTS

- **Archimedes (287 BCE– 212 BCE):** Archimedes of Syracuse was an ancient Greek mathematician, physicist, engineer, inventor, and astronomer. Amongst other things he calculated pi and developed the Archimedes law and a screw for lifting up water from mines or wells.
- **Galileo (1564–1642):** Italian scientist. Galileo developed a powerful telescope and confirmed revolutionary theories about the nature of the world. Also developed an improved compass.
- **Sir Isaac Newton (1642–1726):** English scientist. Newton invented the reflecting telescope. This greatly improved the capacity of telescopes and reduced optical distortion. Newton was also a great physicist and astronomer.
- **Benjamin Franklin (1705–1790)**: American polymath who discovered electricity and invented the Franklin stove, the lightning rod and bifocals.
- **James Watt (1736–1819)** Scottish inventor of the steam engine, which was suitable for use in trains. His invention of a separate condensing chamber greatly improved the efficiency of steam. It enabled the steam engine to be used for a greater range of purpose than just pumping water.
- **Charles Babbage (1791–1871**) English mathematician and inventor. Babbage created the first mechanical computer, which proved to be the prototype for future computers. Considered to be the 'Father of Computers'.
- **Thomas Edison (1847–1931)** American inventor who filed over 1,000 patents. He developed and innovated a wide range of products from the electric light bulb to the phonograph and motion picture camera. One of the greatest inventors of all time.
- **Marie Curie (1867–1934)** Polish born French chemist and physicist. Curie discovered Radium and helped make use of radiation and X-rays.
- **Alexander Fleming (1881–1955)**, Scottish scientist. Fleming discovered the antibiotic penicillin by accident from the mould Penicillium notatum in 1928.
- **Antonie van Leeuwenhoek** – known as the father of microbiology (1632–1723). Leeuwenhoek is well known for his contributions to microscopy, and how he applied this to the field of biology. He revolutionised a technique for creating powerful lenses, which some speculate were able to magnify up to 500 times
- **Carl Linnaeus (1707–1775),** known as the father of modern taxonomy. A botanist, physician and zoologist all at the same time, Linnaeus came up with the system of naming, ranking, and classifying organisms that we still use today.
- **Gregor Mendel ((1822–1884) –** the founder of modern genetics. Mendel used peas to discover and demonstrate the laws of genetic inheritance, coining the terms dominant and recessive genes in the process.

Eminent Indian Scientists

- **Srinivasa Ramanujan (1887–1920):** Mathematician known for his brilliant contributions to contributions to mathematical analysis, number theory, infinite series and continued fractions.
- **C.V. Raman (1888 – 1970)** - Physicist who won Nobel Prize in 1930 for his Raman Effect
- **Jagadish Chandra Bose (1858 to 1937) -** Physicist, biologist and archaeologist who pioneered the investigation of radio and microwave optics.
- **Har Gobind Khorana (1922–2011)** - Biochemist who won the Nobel Prize in 1968 for demonstrating how the nucleotides in nucleic acids control the synthesis of proteins.
- **Subrahmanyan Chandrasekhar (1910– 1995)** - Astrophysicist won the Nobel Prize in 1983 for his research on the evolutionary stages of massive stars.

Facts Table

- Living things – Complex organisation of molecules that perform biological functions.
- Non-living things – Made up of atoms and do not perform biological functions.
- Cell wall and Plastids are found only in plant cell.
- Plasma membrane – A semi-permeable membrane surrounding the protoplasm of cell. It is found in both plant and animal cells.
- Mitochondria is the organ of respiration in cells. It is also known as powerhouse of cells
- Prokaryotes – Primitive single celled organism. Eukaryotes – well developed and complex organisms mostly multicellular.
- Protoplasm is the living physical basis of life. They are living parts of a cell.
- DNA is the genetic material of most organisms. RNA is the genetic material of some viruses.
- Epigeal germination – cotyledons rise above the soil surface. Hypogeal germination – Cotyledons remain below the soil surface.
- Vernalisation is the acceleration of flowering in plants by subjecting them to low temperatures.
- Mitosis occurs in asexual reproduction. Meiosis is concerned with sexual reproduction.
- Internal Fertilization – Fertilisation of gametes occur inside the female body.
- External fertilisation – Fertilisation of gametes occur outside female body.
- Appendix is a narrow finger-like tubular projection at the junction of small and large intestines.
- Endocrine glands secrete various hormones and controls various functions of the body.
- The pituitary gland is called the master Endocrine gland because it controls other endocrine glands.
- Nephrons are the functional units of the kidney. Neurons are the functional units of the brain.
- When the heart contracts, it is called systole. When it relaxes it is called Diastole.
- The heart beats are controlled by two pacemakers: Sino auricular node and Sino ventricular node.
- A balanced diet is one which contains all the necessary nutrients in the correct proportion.
- Jupiter has most moon – 67 moon. Ganymede - largest moon.
- Mercury, Venus, Earth and Mars are terrestrial planets (Earth like – rocky).
- Jupiter, Saturn, Uranus and Neptune are Jovian planets (Jupiter like – gaseous).
- Most of the asteroids in our solar system are found in the asteroid belt between Mars and Jupiter.
- Haley's comet is the most famous comet that appears every 75 to 76 years.

GENERAL SCIENCE: MULTIPLE CHOICE QUESTIONS WITH ANSWER AND EXPLANATION

GENERAL SCIENCE - PHYSICS

1. Which of the following measurements is not a unit of distance?
[A] Ammeter
[B] Cubit
[C] Parsec
[D] Angstrom
Answer: [A] Ammeter

2. Which one of the following remains constant while throwing a ball upward?
[A] Displacement
[B] Kinetic energy
[C] Acceleration
[D] Velocity
Answer: [C] Acceleration

3. Pure water freezes at what temperature?
[A] 47 F
[B] 32 F
[C] 0 F
[D] 19 F
Answer: B. 32 F

4. Which vitamin is abundant in citrus fruits?
[A]. Vitamin A
[B]. Vitamin B
[C]. Vitamin C
[D]. Vitamin D
Answer: [C]. Vitamin C

5. Zinc Oxide is
A. Acidic
B. Basic
C. Neutral
D. Amphoteric
Answer: D. Amphoteric

6. Which of the following statements is not true regarding LASER?
[A] A LASER is a device that emits light through a process of optical amplification .
[B] LASER beams can be focused to very tiny spots, achieving a very high irradiance.
[C] The emitted LASER light is notable for its high degree of dispersive power unattainable using other technologies.

[D] LASER light is used in bar-code scanners
Answer: C [The emitted LASER light is notable for its high degree of dispersive power unattainable using other technologies.]- The emitted laser light is notable for its high degree of spatial and temporal coherence, unattainable using other technologies.

7. If a moving body turns its speed to 1.5 times, what will be the impact on its kinetic energy?
[A] will become 1.5 times
[B] will become 3 times
[C] will become 2.25 times
[D] will become 6 times
Answer: C [will become 2.25 times]- Kinetic Energy is a product of half the Mass times Velocity Squared. When the velocity is doubled, the Kinetic energy would go up four times. If velocity is tripled, kinetic energy would go up nine times. If velocity is increased by 1.5 times the Kinetic energy would go up by 1.5×1.5=2.25 times.

8. Two Flat mirrors are placed at an angle of 60° from each other. How many images will be formed of a Candle placed in between them?
[A] 3
[B] 4
[C] 5
[D] 6
Answer: C [5]

9. A tourist, who plans to visit a hill station located at very high altitude also wishes to take along his Television Set. In this context, consider the following:
LCD TV
Plasma TV
Cathode Ray Tube TV
Which among the above are expected to work properly at very high altitudes?
[A] Only 1
[B] 1 & 2
[C] 1 & 3
[D] 2 & 3
Answer: C [1 & 3]

10. If an egg with shell is placed in a microwave oven, which among the following would most likely happen?
[A] The egg will not get warmed
[B] The egg will get cooked slowly similar to a boiled egg
[C] The egg shell will explode
[D] The egg shell becomes yellow
Answer: C [The egg shell will explode]

11. Which among the following is the SI physical unit of dynamic viscosity?
[A] Poise
[B] Pascal-second

[C] Newton-second
[D] Poise-second
Answer: B [Pascal-second]

12. Which among the following phenomena of the optics makes the Endoscopy capable of examining the internal organs such as Abdomen?
[A] Interference
[B] Total Internal Reflection
[C] Diffraction
[D] Scattering
Answer: B [Total Internal Reflection]

13. An antenna in a Geostationary satellite should have a minimum beam width of which among the following values to cover the entire earth?
[A] 8.56°
[B] 17.34°
[C] 22.16°
[D] 23.25°
Answer: B [17.34°]- The Geosynchronous satellite is located at 35865 kilometers away from earth. The global or earth coverage antenna should have a beam width of 17.34° to cover the entire earth.

14. A piece of Ice was tied with a string to a water bucket's bottom, and the water bucket was filled with water with ice fully submerged in it. What would be the impact on the level of water when the ice melts away completely?
[A] The level of water will go up
[B] The level of water will go down
[C] The level of water will remain unchanged
[D] The level of water will first increase then come to the previous on
Answer: B [The level of water will go down]- There are two dimensions of this experiment. One is when Ice floats in water and another is as mentioned in the question. When Ice floats in water, the level of water will remain unchanged when the ice melts away because in this situation, Ice replaced water which is `equal to its weight`. But when the floating ice is taken down in the bottom of the bucket and tied over there with a string, and let melt away, the level of water will come down because now the ice was replacing the water `equal to its volume `and Ice has a lower density of water. So The answer of this question is -The level of water will go down.

15. A "Charge-coupled device" in the modern Digital Cameras has replaced which among the following in the traditional Cameras?
[A] Lens
[B] Shutter
[C] Photographic film
[D] Flash equipment
Answer: C [Photographic film]

16. An instrument called “Theodolite” is used in which among the following ?
[A] Measuring distances, elevations, bearings etc.
[B] Measuring rotational speed of a shaft
[C] Measuring horizontal and vertical angles in triangular networks
[D] Measuring acidity or alkalinity of solutions
Answer: C [Measuring horizontal and vertical angles in triangular networks]

17. A person is standing in front of a wall and makes a sound. What should be the normal minimum distance between the person and the wall , so that the person hears echo?
[A] 6 meters
[B] 13 meters
[C] 20 meters
[D] 17 meters
Answer: D [17 meters]

18. A long Rail (approximately 700 meters) made up of steel is struck to produce a sound. The person standing on the other end of the rail would hear in which among the following pattern?
[A] He listens the sound waves once propagated via steel
[B] He listens the sound waves once propagated via air
[C] He listens the sound waves twice, first propagated via steel and second propagated via air
[D] He listens the sound waves twice, first propagated via air and second propagated via steel
Answer: C [He listens the sound waves twice, first propagated via steel and second propagated via air]

19. Which among the following is studied under ” fulminology”?
[A] Sudden changes in atmosphere
[B] Lightning
[C] Cloudbursts
[D] Volcanic Eruptions
Answer: B [Lightning]

20. Which among the following has the **lowest** frequency Range?
[A] L-Band
[B] S-Band
[C] C-Band
[D] X-Band
Answer: A [L-Band]

21. How does the Isotope of Iodine, **Iodine-135** plays an important role in Nuclear Power Generation?
[A] It is used as a fuel supplement in some of the modern Nuclear Reactors
[B] It is a bi-product of Nuclear Reaction which kills the neutrons and this inhibits the power formation
[C] It is a moderator used actively in the Nuclear Reactors
[D] It is an experimental substance for Nuclear Fusion

Answer: B [It is a bi-product of Nuclear Reaction which kills the neutrons and this inhibits the power formation]

22. Which among the following is the correct statement about **Black Ice**?
[A] It is the product of the freezing of water droplets in highly polluted air
[B] It is the thin transparent layer of ice made up usually on roads and pavement
[C] It is the solid Carbon Dioxide
[D] It is the frozen water of a highly polluted river
Answer: B [It is the thin transparent layer of ice made up usually on roads and pavement]

23. In many countries with cold climates, the municipalities often sprinkle salt on icy roads in winter.
Which among the following is the correct reason for this?
[A] The Salt inhibits the formation of Ice Crystals
[B] The Salt lowers the Freezing Point of water
[C] The Salt raises the freezing Point of water
[D] The salt provides necessary friction to the tires of the vehicles
Answer: B [The Salt lowers the Freezing Point of water]

24. Consider the following:
1. Near Infrared
2. Mid Infrared
3. Far Infrared
Which among the following is the correct order of increasing wavelength of the above?
[A] 1,2,3
[B] 3,2,1
[C] 2,1,3
[D] 3,1,2
Answer: A [1,2,3]

25. Which among the following is measured by an **Odometer**?
[A] Pressure
[B] Height
[C] Distance
[D] Velocity
Answer: C [Distance]

26. The term “Isopycnic” is most closely defined by which among the following?
[A] Two places with same atmospheric pressure
[B] Two liquids with same viscosity
[C] Two liquids with same density
[D] Two places with same temperature
Answer: C [Two liquids with same density]

27. Which among the following property of the matter is studied in “Rheology”?
[A] Gravitation
[B] Viscosity
[C] Magnetic Properties
[D] Entropy
Answer: B [Viscosity]

28. “Fermi” is a unit of which among the following?
[A] Mass
[B] Length
[C] Velocity
[D] Frequency
Answer: B [Length]

29. Which among the following correctly represents a Parsec?
[A] 0.326 Light Years
[B] 3.261 Light Years
[C] 32.61 Light Years
[D] 3.026 Light Years
Answer: B [3.261 Light Years]

30. Consider the following:
1. Submarine Communications
2. AM Radio
3. Short Wave Radio
4. Radar

Arrange the above in increasing frequency of the waves used in their applications.
[A] 4 3 2 1
[B] 1 2 3 4
[C] 2 1 4 3
[D] 2 3 4 1
Answer: B [1 2 3 4]

31. Consider the following advantages of the Optic Fibers and the Copper wires:
Optic Fibers are NOT susceptible to the electrical interference
Optic Fibers can be used to transmit more signals that Copper Wires
Optic Fibers can carry a signal over a single fiber, unlike the electricity which requires a pair of Copper wires.
Which among the above stand correct ?
[A] Only 1 is correct
[B] Only 1 & 2 are correct
[C] All 1, 2 & 3 are correct
[D] Only 3 is correct
Answer: C [All 1, 2 & 3 are correct]

32. The power we use at Home has a frequency of 60Hz. What would be the period of the sine wave?
[A] 0.116 seconds
[B] 0.0116 seconds
[C] 0.00116 secon
[D] 0.0016 Microseconds
Answer: B [0.0116 seconds]

33. What do we call the part of the "DTH Satellite dish" that converts the signals from electromagnetic or radio waves to electrical signals ?
[A] Orthomode transducer (OMT)
[B] Low-noise block converter (LNB)
[C] Block upconverter (BUC)
[D] Parabolic Dish
Answer: B [Low-noise block converter (LNB)]

34. Which among the following waves are used in the gemstone industry to change white topaz into blue topaz?
[A] X-Rays
[B] Gamma Rays
[C] Alpha Radiation
[D] Beta Radiation
Answer: B [Gamma Rays]

35. Which among the following waves are most commonly used in the Night Vision Devices?
[A] Microwaves
[B] Infra Red Waves
[C] Ultra Violet Waves
[D] Radio Waves
Answer: B [Infra Red Waves]

36. Which among the following strictly works on the principle of dipole movement of the water molecules?
[A] Refrigerator
[B] Microwave Oven
[C] Air Conditioner
[D] Electric Geyser
Answer: B [Microwave Oven]

37. Which among the following is the most common cause of Sunburn?
[A] Ultraviolet Radiation
[B] Visible Radiation
[C] Infrared Radiation
[D] Microwave Radiation
Answer: A [Ultraviolet Radiation]

38. One Torr is equivalent to how many mm of Mercury?
[A] 1 mm
[B] 10 mm
[C] 100 mm
[D] 0.1 mm
Answer: A [1 mm]

39. "Svedberg Unit" is a unit of _____?
[A] Concentration
[B] Size
[C] Density
[D] Time
Answer: D [Time]

40. A vehicle moving on a circular path experiences _____?
[A] centripetal force
[B] centrifugal force
[C] gravitational force
[D] None of the above
Answer: A [centripetal force]

41. At which of the following places water shall boil at the lowest temperature?
[A] Kochi
[B] ooty
[C] Mount Abu
[D] New Delhi
Answer: B [ooty]- This question is related to Antoine equation. Water to get boil, its vapour pressure must reach to its surrounding pressure. In a pressure cooker, it boils at the highest temperature. Elevation of Kochi is 0 m, ooty is 2,486 m, Mount Abu is 1,200 m, New Delhi is 216 m, Shimla is 2,205 m. So comparing all of them, water will boil at lowest temperature at ooty, followed by Shimla, Mount Abu , New Delhi and Kochi. This is because , higher we go lower is the atmospheric pressure and lower is the point where water`s vapour pressure gets equal to the atmospheric pressure.

42. In which year, Sir Chandrasekhara Venkata Raman was awarded Nobel Prize for Raman effect?
[A] 1927
[B] 1929
[C] 1930
[D] 1932
Answer: C [1930]

43. Which among the following are used in Computed tomography (CT) Scan?
[A] X-Rays
[B] Ultrasound
[C] Infrared waves
[D] Radio Waves

Answer: A [X-Rays]

44. Which among the following instruments used in Forensic Sciences is popular as Lie detector?
[A] SmartWater
[B] Culpascope
[C] Polygraph
[D] Bio Sensor
Answer: C [Polygraph]

45. Which among the following component of a fluorescent lamp contributes maximum in making them costly?
[A] Mercury vapor
[B] Light-emitting phosphors
[C] Ballast
[D] Filament
Answer: C [Ballast]

46. An electrical fuse is used to interrupt excessive_____?
[A] Voltage
[B] Current
[C] Resistance
[D] Inductance
Answer: B [Current]

47. In context with electromagnetism, which among the following is a correct definition of Permeability?
[A] Ability of a material to repel magnetic field within itself
[B] Ability of a material to support the formation of a magnetic field within another body
[C] Ability of a material to support the formation of a magnetic field within itself
[D] Ability of a material to create magnetic dipoles
Answer: C [Ability of a material to support the formation of a magnetic field within itself]

48. The following is measured in tonne of oil equivalent (toe) ?
[A] Volume of Oil
[B] Energy released by burning of oil
[C] Demand of Crude oil at a point of time
[D] Oil production capacity of a country
Answer: B [Energy released by burning of oil]- amount of energy released by burning one tonne of crude oil, approximately 42 GJ

49. Who among the following coined the term “cosmic rays” ?
[A] Henri Becquerel
[B] Theodor Wulf
[C] Robert Millikan
[D] Bruno Rossi

Answer: C [Robert Millikan]

50. Which among the following is the most acceptable range of LEO (Low Earth orbit)?
[A] 350 – 2,600 kms
[B] 200-2000 kms
[C] 160 – 2,000 kms
[D] 160-1600 kms
Answer: C [160 – 2,000 kms]

51. Which among the following is a Beyond-visual-range air-to-air missile
[A] Agni
[B] Prithvi
[C] Astra
[D] Nag
Answer: C [Astra]- Agni is family of Medium to Intercontinental range ballistic missiles, Prithvi is tactical surface-to-surface, short-range ballistic missile (SRBM), Akash is medium range surface-to-air missile, Nag is a third generation"Fire-and-forget" anti-tank missile

52. Who was the first scientist to be awarded two Nobel Prizes?
[A] Linus Pauling
[B] Frederick Sanger
[C] Marie Curie
[D] John Bardeen
Answer: C [Marie Curie]

53. A small quantity of water is placed in a small cavity made in a block of Ice at 0 degree centigrade. Which of the following will happen?
[A] the temperature of water will become zero and it will freeze
[B] the temperature of water will become zero but it will not freeze
[C] the temperature of the water will become zero and it will come out of the cavity
[D] the temperature of the water will become zero and ice will melt to merge with water
Answer: B [the temperature of water will become zero but it will not freeze]

54. Ultrasound which is upper limit of human hearing is characterized by which of the following frequencies?
[A] Above 20 KHz
[B] Above 200 KHz
[C] Above 2 KHz
[D] Below 20 KHz
Answer: A [Above 20 KHz]

55. What is the normal temperature of human being on Kelvin scale?
[A] 290
[B] 300
[C] 310
[D] 320

Answer: C [310]

56. Which among the following is known as first electronic amplification device?
[A] Diode
[B] Triode Vaccum Tubes
[C] Vacuum Tubes
[D] bipolar transistors
Answer: B [Triode Vaccum Tubes]

57. Which among the following temperature scale is based upon absolute zero?
[A] Celsius
[B] Fahrenheit
[C] Kelvin
[D] Rankine
Answer: C [Kelvin]

58. Which of the following is an instrument for measuring electric charge or electrical potential difference?
[A] Ammeter
[B] Voltmeter
[C] Electrometer
[D] ohmmeter
Answer: C [Electrometer]

59. Edwin Howard Armstrong was an inventor of which of the following technologies?
[A] Television
[B] Compact Discs
[C] FM Radio
[D] Broadband
Answer: C [FM Radio]

60. Parallax of one arc second" is a unit of which of the following?
[A] Time
[B] Volume
[C] Length
[D] Speed
Answer: C [Length]- Its is parsec which is a unit of length, equal to some 31 trillion kilometers, used in astronomical distances.

61. Which among the following comes under the study area of Psychrometrics?
[A] Relative Humidity
[B] physical and thermodynamic properties of gas-vapor mixtures
[C] theory and technique of educational and psychological measurement
[D] Atmospheric Pressure at Colder Regions of the World
Answer: B [physical and thermodynamic properties of gas-vapor mixtures]

62. Ballistics is a branch of science that deals with which of the following?
[A] Geologic study of the behavior of soil and rock
[B] Motion of multibody systems subjected to unilateral contacts and friction
[C] Flight, behavior, and effects of projectiles
[D] Kinetic energy of a system
Answer: C [Flight, behavior, and effects of projectiles]

63. SOFAR is a phenomenon which plays an important role in submarine warfare & also known as deep sound channel. Which of the following is correct full form of SOFAR?
[A] Sound Field Radio Ranging
[B] Sound Fixing and Altering Range
[C] Sound Fixing and Ranging channel
[D] Sound Fixing and Auto Reflection
Answer: C [Sound Fixing and Ranging channel]

64. By which of the following process some stars which are of the size of Sun or smaller convert hydrogen to helium?
[A] Triple-alpha process
[B] Proton Proton Chain Reaction
[C] CNO Cycle
[D] R process
Answer: B [Proton Proton Chain Reaction]

65. Fermi-Kurie plot is used for the study of which of the following?
[A] Alpha Decay
[B] Beta Decay
[C] Internal Conversion
[D] Cluster Decay
Answer: B [Beta Decay]

66. Which among the following denotes the correct usage of an instrument called “Theodolite”?
[A] Measures distances, elevations, bearings etc
[B] Measures rotational speed of a shaft
[C] Measures horizontal and vertical angles in triangular networks
[D] Measures acidity or alkalinity of solutions
Answer: C [Measures horizontal and vertical angles in triangular networks]

67. Which among the following is the science dealing with Colors?
[A] Optics
[B] Chromatics
[C] Ophthalmology
[D] Otology
Answer: B [Chromatics]

68. Thermonuclear Experimental Reactor (ITER) project is located at?
[A] Italy

[B] France
[C] Germany
[D] China
Answer: B [France]

69. Mach number" is a measure of which of the following?
[A] Speed
[B] Heat Transfer
[C] Static Pressure
[D] Volume
Answer: A [Speed]

70. Radiation hardening is used in design of artificial satellites, spacecraft, military aircraft, nuclear power stations, and nuclear weapons for which of the following purposes?
[A] Protection from radiation damage
[B] trace element analysis
[C] use radiation energy
[D] Increase resistance
Answer: A [Protection from radiation damage]

71. Newton-meters per second is represented as follows?
[A] Ohm
[B] Volt
[C] Watt
[D] Calorie
Answer: C [Watt]- one watt is the rate at which work is done when an object is moved at a speed of one meter per second against a force of one Newton.

72. Most part of the Cosmic rays that impinge on earth's atmosphere are __?
[A] Electrons
[B] Protons
[C] Neutrons
[D] Gamma rays
Answer: B [Protons]- Almost 90% of all the incoming cosmic ray particles are protons, almost 10% are helium nuclei (alpha particles), and slightly under 1% are heavier elements and electrons (beta minus particles)

73. Which among the following statement is correct about Fluorescence?
[A] High Energy Photon is absorbed and low energy photon is emitted
[B] Low Energy Photon is absorbed and high energy photon is emitted
[C] High Energy Photon is absorbed and electron is emitted
[D] Low Energy Photon is absorbed and electron is emitted
Answer: C [High Energy Photon is absorbed and electron is emitted]

74. The combination of a Red Glass Plate and a Blue Glass plate will transmit which of the following light?
[A] Red light
[B] Blue Light
[C] Green Light
[D] No Light
Answer: D [No Light]

75. VIBGYOR (Violet Indigo Blue Green Yellow Orange Red) are the rainbow colors in which of the following order?
[A] Increasing wavelength
[B] Decreasing wavelength
[C] Increasing polarization
[D] Increasing Speed
Answer: A [Increasing wavelength]

76. Moon Mineralogy Mapper (M3) is an instruments providing the first high-resolution spatial and spectral map of the entire lunar surface to India's first mission to the Moon Chandrayan -1 launched 22 October 2008. It was contributed by __?
[A] National Aeronautics and Space Administration (NASA)
[B] Soviet space program
[C] Israel Space Agency
[D] National Aerospace Laboratory, US
Answer: A [National Aeronautics and Space Administration (NASA)]

77. RLV-TD are a series of technology demonstration missions that have been conceived by ISRO as a first step towards realizing a Two Stage To Orbit (TSTO) fully re-usable launch vehicle. What is full form of RLV-TD?
[A] Reusable Launch Vehicle-Technology Demonstration
[B] Remote Launch Vehicle-Technology Demonstration
[C] Return Launch Vehicle-Technology Demonstration
[D] Reusable Launch Vehicle-Technology Device
Answer: A [Reusable Launch Vehicle-Technology Demonstration]

78. On which of the following Inertia of an object depends ?
[A] Bulk
[B] Size
[C] Shape
[D] Mass
Answer: D [Mass]

79. A person who is pulling a bucket filled with water falls behind with the sudden break of the rope. Which of the following laws of Newton comes into action?
[A] First Law
[B] Second law
[C] Third law
[D] First and third law
Answer: C [Third law]

80. In which of the following situations the force applied by the weight of a person becomes zero in a lift
[A] Lift moves up with an acceleration of 9.8 meter per sq. second
[B] Lift moves down with an acceleration of 9.8 meter per sq. second
[C] Lift moves up with an speed of 9.8 meter per second
[D] Lift moves up with down speed of 9.8 meter per second
Answer: B [Lift moves down with an acceleration of 9.8 meter per sq. second]

81. On which of the following the jet Engine works?
[A] Conservation of energy
[B] Conservation of Linear Momentum
[C] Conservation of Mass
[D] Conservation of Angular momentum
Answer: B [Conservation of Linear Momentum]- Conservation of Linear Momentum law says that if no external force acts on a system, then its total linear momentum remains conserved. In equation form, Momentum=mass*velocity. To increase the momentum of an object, we need to either increase its mass or velocity or both.
Rockets work on law of conservation of momentum. As momentum in one direction is given to the rocket's exhaust gases, momentum in the other direction is given to the rocket itself.

82. Which among the following is in action in the process of a liquid rising in the syringe when the piston is pulled up?
[A] Capillary action
[B] surface tension
[C] atmospheric pressure
[D] cohesive forces
Answer: C [atmospheric pressure]

83. Which among the following character of mercury makes it suitable to use in barometers instead of water?
[A] Low density and low vapor pressure
[B] High density and high vapor pressure
[C] Low density and good conductor of heat
[D] High density and low vapor pressure
Answer: D [High density and low vapor pressure]

84. When a barometer is taken down in a coal mine , which of the following happens with the Mercury level in the tube?
[A] rises
[B] falls
[C] falls then rises
[D] remains unaltered
Answer: A [rises]- Notes:The density of the air rises as we go below sea level

85. what happens when a ship enters a Sea from a river ?
[A] It rises

[B] It remains at the same level
[C] sinks a little
[D] None of the above
Answer: A [It rises]- When a ship enters a sea from a river ,the ship is elevated or uplifted due to the density of sea water and during the buoyant motion of the ship, as it would gain both potential and kinetic energy when rising in the fluid.

86. A transition from the solid to gas phase with no intermediate liquid stage is called?
[A] Evaporation
[B] Sublimation
[C] Adsorption
[D] Solid Phase extraction
Answer: B [Sublimation]

87. Which among the following works while we wipe with a towel.?
[A] evaporation
[B] osmosis
[C] capillary action
[D] surface tension
Answer: C [capillary action]

88. If water is heated , it vapor pressure will _____?
[A] Increase
[B] decrease
[C] first increase and then decrease
[D] nothing happens to vapor pressure
Answer: A [Increase]

89. When two mercury drops are brought into contact they form a single bigger drop to get which of the following?
[A] Minimum volume
[B] Minimum surface area
[C] Maximum size
[D] Maximum surface area
Answer: B [Minimum surface area]

90. On a smooth glass surface , the drop of water spreads while the drop of mercury remains almost spherical. This proves that _____?
[A] Cohesive forces of mercury is more than adhesive forces with glass
[B] Cohesive force of water is less than cohesive forces of mercury
[C] mercury is a metal
[D] 1 & 2
Answer: A [Cohesive forces of mercury is more than adhesive forces with glass]

91. Which of the following causes the drop of water to be in spherical shape?
[A] Viscosity

[B] Air resistance
[C] Surface tension
[D] Temperature
Answer: C [Surface tension]

92. kalpana-1 was first exclusive satellite built by ISRO in which of the following satellite systems?
[A] INSAT
[B] METSAT
[C] GSAT
[D] EDUSAT
Answer: B [METSAT]

93. First Indian Satellite Aryabhatta was launched in which year ?
[A] 1970
[B] 1972
[C] 1975
[D] 1980
Answer: C [1975]- India's first satellite Aryabhatta was launched by India on 19 April 1975 from Russian space station using Kosmos-3M launch vehicle.

94. What is TERLS?
[A] A rocket launching Station
[B] A Space Science & Technology Center
[C] A satellite launched by India
[D] A satellite launched by USA
Answer: A [A rocket launching Station]- TERL-Thumba Equatorial Rocket Launching Station. TERLS established in 1962

95. Which among the following is known for a FBTR (fast Breeder Test Reactor) ?
[A] Naror
[B] Trombay
[C] Kalpakam
[D] None of the above
Answer: C [Kalpakam]

96. Which among the following is the property of Tungsten which makes it eligible to use in the bulbs?
[A] highest melting point
[B] highest resistance
[C] Highest malleability
[D] All are correct
Answer: A [highest melting point]- The electric heating is also used to produce light, as in an electric bulb. Here, the filament must retain as much of the heat generated as is possible, so that it gets very hot and emits light. It must not melt at such high temperature. A strong metal with high melting point such as tungsten (melting point 3380°C) is used for making bulb

filaments. The filament should be thermally isolated as much as possible, using insulating support, etc. The bulbs are usually filled with chemically inactive nitrogen and argon gases to prolong the life of filament. Most of the power consumed by the filament appears as heat, but a small part of it is in the form of light radiated.

97. Who among the following is considered by the Indian scientific community to be the father of experimental fluid dynamics research in India and one of the most eminent researchers in the field of turbulence and boundary layers?
[A] Suhas V. Patankar
[B] Satish Dhawan
[C] M O Smith
[D] JC Bose
Answer: B [Satish Dhawan]

98. The speed of Sound is maximum in which of the following ?
[A] Air at zero degree C
[B] Air at 100 degree C
[C] Water
[D] At all places it is maximum
Answer: C [Water]- In a given ideal gas the speed of sound depends only on its temperature. The speed of sound in still air at 0 degrees Celsius is 331.5 m / s. It depends on the temperature and material. Since sound is transferred easily through densely packed molecules, it is faster in denser substances. Thus the speed of sound increases with the stiffness of the material.

99. Steam at 100 degree centigrade causes more severe burns. Which of the following phenomena will you use to explain this?
[A] Specific heat
[B] Latent heat
[C] Fusion
[D] Fission
Answer: B [Latent heat]

100. Which of the following waves can be used to measure the speed of a approaching car?
[A] Light waves
[B] Micro waves
[C] Radio waves
[D] Sound waves
Answer: C [Radio waves]

101. Which among the following sentence is correct reason behind the blue color of ocean water?
[A] Water molecules absorb all other colors except blue
[B] Impurities in Sea water reflect the blue light
[C] Water molecules scatter the blue light
[D] None of the above
Answer: C [Water molecules scatter the blue light]

102. The Helium atoms that have lost two electrons are called _____?
[A] Alpha rays
[B] Beta rays
[C] Gamma rays
[D] None of the above
Answer: A [Alpha rays]

103. What is the approximate height of a Geostationary satellite ?
[A] 981 km
[B] 15000 kms
[C] 35000 kms
[D] 5000 kms
Answer: C [35000 kms]

104. The inability of a body to change its state of rest or its uniform motion in a straight line is called as _____?
[A] Mass
[B] weight
[C] Inertia
[D] Friction
Answer: C [Inertia]

105. Ohm is a unit of measuring _____?
[A] Resistance
[B] Voltage
[C] Current
[D] None of the above
Answer: A [Resistance]

106. Equal volumes of all gases contain equal number of molecules under similar conditions of temperature and pressure. Which law says this ?
[A] Boyle's law
[B] Charles law
[C] Avogadro's Law
[D] Bhor's law
Answer: C [Avogadro's Law]

107. Which among the following is a property of Insulator?
[A] The electrons of the outer orbits are loosely bound to the nucleus , however can not flow through them
[B] The electrons of the outer orbits are tightly bound to the nucleus and can not flow through them
[C] The electrons of the outer orbits are loosely bound to the nucleus , and can flow through them
[D] None of the above

Answer: B [The electrons of the outer orbits are tightly bound to the nucleus and can not flow through them]

108. Which among the following is true about latent heat ?
[A] It causes change in temperature as well as change in state or phase
[B] It causes change in temperature only
[C] It causes change in state or phase but not in temperature
[D] It causes change in Pressure
Answer: C [It causes change in state or phase but not in temperature]
109. When light from some sources enters to the earth's atmosphere, it gets scattered. Which among the following is a reason behind scattering?
[A] Various wavelengths of light
[B] dust, smoke and gas molecules
[C] atmospheric pressure
[D] None of the above
Answer: B [dust, smoke and gas molecules]

110. Which among the following is true about Total Internal Reflection?
[A] A ray passing from rarer to denser medium and not able to pass to denser medium at an angle greater than critical angle
[B] A ray passing from denser to rarer medium and not able to pass to rarer medium at an angle greater than critical angle
[C] A ray passing from either denser to rarer medium or rarer to denser medium and not able to pass any medium at an angle smaller than critical angle
[D] None of the above
Answer: B [A ray passing from denser to rarer medium and not able to pass to rarer medium at an angle greater than critical angle]

111. Which among the following principle is used by Bats?
[A] RADAR (Radio Detective & Ranging
[B] SONAR (Sound Navigation & Ranging
[C] law of reflection
[D] law of diffraction
Answer: B [SONAR (Sound Navigation & Ranging]

112. Which among the following is true regarding Sound Waves?
[A] They are longitudinal waves and material medium is not required for their propagation
[B] They are transverse waves and material medium is required for their propagation
[C] They are longitudinal waves and material medium is required for their propagation
[D] They are transverse waves and material medium is not required for their propagation
Answer: C [They are longitudinal waves and material medium is required for their propagation]

113. Which among the following is true about conduction, convection and radiation mode of transfer of heat?
[A] A Medium is required for conduction but not required for convection and radiation

[B] A medium is required for conduction, convection and radiation
[C] A medium is required for conduction and convection but not required for radiation
[D] A medium is not required for conduction and convectio, radiation
Answer: C [A medium is required for conduction and convection but not required for radiation]

114. The ideal fluid which is a hypothetical fluid should contain _____?
[A] Zero Viscosity Only
[B] Zero Compressibility Only
[C] Zero Viscosity & Zero Compressibility
[D] None of the above
Answer: C [Zero Viscosity & Zero Compressibility]

115. Which among the following defines cohesive force?
[A] the force of attraction acting between the molecules of same material
[B] the force of attraction acting between the molecules of different material
[C] the force of attraction acting between the atoms of same material
[D] None of the above
Answer: A [the force of attraction acting between the molecules of same material]

116. Which of the following term denotes the internal reaction force per unit area developed as a result of applied external force ?
[A] Stress
[B] Friction
[C] Moment of Inertia
[D] tension
Answer: A [Stress]

117. What is the mean value of g at earth's surface?
[A] 0.98 meter per second
[B] 9.8 meter per second
[C] 9.8 meter per second square
[D] 0.98 meter per second square
Answer: C [9.8 meter per second square]

118. The value of acceleration due to gravity is _____?
[A] Minimum at equator and maximum at poles
[B] maximum at equator and minimum at poles
[C] equal at poles and equator
[D] None of the above
Answer: A [Minimum at equator and maximum at poles]

119. Which among the following defines gravitational mass?
[A] Ratio of weight of a body and acceleration due to gravity
[B] Ratio of Acceleration due to gravity and weight of a body
[C] matter contained in a body
[D] None of the above

Answer: A [Ratio of weight of a body and acceleration due to gravity]

120. The scientists have discovered that Milky Way is having two components, the disc and spherical. What may be the central object of Milky Way?
[A] A Black Hole
[B] A Neuron star
[C] Vaccum
[D] A Large Magellanic Cloud
Answer: A [A Black Hole]

121. Which among the following kinds of glass is used generally in making of the Bullet proof screens?
[A] Pyrex glass
[B] Jena glass
[C] Reinforced Glass
[D] Flint Glass
Answer: C [Reinforced Glass]- Reinforced Glass or Toughened glass or tempered glass is a kind of safety glass is used as s a component of bulletproof glass, for diving masks, and various types of plates and cookware.

122. Which among the following would be most commonly affected, if the filament of a electric Bulb is not uniform?
[A] Light
[B] Life
[C] Resistance
[D] None of the above
Answer: B [Life]

123. The term “Isopycnic” is most closely defined by which among the following?
[A] Two places with same atmospheric pressure
[B] Two liquids with same viscosity
[C] Two liquids with same density
[D] Two places with same temperature
Answer: C [Two liquids with same density]

124. Calorie of Energy is equal to _____?
[A] .42 joule
[B] 4.2 joule
[C] 42 joule
[D] 0.042 Joule
Answer: B [4.2 joule]

125. A pendulum is taken to Moon , its time period will_____?
[A] Increases
[B] Decreases
[C] Remains constant

[D] Either increase or decrease
Answer: A [Increases]

126. Knot is a unit of _____?
[A] Speed
[B] Distance
[C] Deapth
[D] Accelration
Answer: A [Speed]

127. One Nautical Mile is equivalent to how many meters?
[A] 1552
[B] 1652
[C] 1752
[D] 1852
Answer: D [1852]

128. In which year, Government of India launched the Integrated Guided Missile Development Program?
[A] 1981
[B] 1983
[C] 1990
[D] 1999
Answer: B [1983]- The Integrated Guided Missile Development Program (IGMDP) was launched in 1983 to develop five missile systems in the country viz. Trishul, Akash, Nag, Prithvi and Agni-I (intermediate-range surface-to-surface missile). In 1990s, the program was expanded to develop the long range Agni Missile, Sagarika (ballistic missile), Surya (medium-range version of the Agni ballistic missile) and Dhanush (naval version of the Prithvi). In 2008, the DRDO announced the successful completion of the program.

129. What is the use of Venturimeter?
[A] to measure subdivisions of scale
[B] to measure wavelength of radio wave
[C] To measure friction
[D] to measure rate of flow of fluids
Answer: D [to measure rate of flow of fluids]

130. Which among the following is measured using a Vernier Calliper?
[A] Dimensions
[B] Time
[C] Sound
[D] Temperature
Answer: A [Dimensions]

131. Which among the following is used to listen and record underwater sounds?
[A] Altimeter

[B] SONAR
[C] Hydrophone
[D] RADAR
Answer: C [Hydrophone]

132. Consider the following:
Help ISRO in Research
Help Department of Space in New Discoveries
Commercially sell Products & Services of Indian Space
Which among the above is / are the correct objectives of ANTRIX?
[A] 1 & 2
[B] 2 & 3
[C] Only 2
[D] Only 3
Answer: D [Only 3]- ANTRIX is the commercial arm of Indian Space Research Organisation (ISRO). It is an anglicised version of Antariksha, from the Sanskrit word for "space". It functions under the aegis of Department of Space (DoS), an independent Department directly working under the Prime Minister

133. Any moving object on earth finally comes to rest due to which among the following?
[A] Gravity
[B] Friction
[C] Inertia
[D] Motion
Answer: B [Friction]

134. When Ozone is heated its volume will…. ?
[A] increases
[B] decreases
[C] remains unchanged
[D] First Increase, then decrease
Answer: C [remains unchanged]

135. Consider the following:
Pressurized heavy water reactor (PHWR)
Fast breeder reactor (FBR)
Advanced Heavy Water Reactor(AHWR)
The above three represent the stages of India's three stage Nuclear Power programme as follows respectively?
[A] Stage I, Stage II, Stage III
[B] Stage II, Stage I, Stage III
[C] Stage III, Stage II, Stage I
[D] Stage II, Stage III, Stage I
Answer: A [Stage I, Stage II, Stage III]- India's three stage nuclear power programme was formulated in 1950s by Dr. Homi Bhabha to secure the country's long term energy independence, via use of uranium and thorium reserves found in the monazite sands of coastal

regions of South India. The ultimate focus is on Thorium Fuel Cycle. The three stages are as follows:
Pressurized heavy water reactor (PHWR)
Fast breeder reactor (FBR)
Advanced Heavy Water Reactor(AHWR)

136. Which among the following is the site of Prototype Fast Breeder Reactor (PFBR) in India?
[A] Kudankulam
[B] Kalpakkam
[C] Narora
[D] Rawatbhata
Answer: B [Kalpakkam]

137. Chandrashekhar Limit, postulated by Dr S. Chandrashekhar posts a limit of mass of which among the following?
[A] Neutron Star
[B] White Dwarf
[C] Steller Black Hole
[D] Young stellar object
Answer: B [White Dwarf]- In 1931, the astrophysicist Subrahmanyan Chandrasekhar theorised that a star would not form a stable white dwarf at the end of its life if its mass was greater than 1.44 times the solar mass (1.44 Ms). This is known as the Chandrasekhar limit, above which the white dwarf will explode as what is called a "Type 1a supernova". This work fetched Chandrasekhar the Nobel Prize in 1983.

138. India's first Nobel Prize for Physics was claimed in 1930 by the renowned physicist Sir C.V. Raman for his work in which among the following fields?
[A] Particle Physics
[B] Optics
[C] Thermodynamics
[D] Quantum Mechanics
Answer: B [Optics]- In 1930, C.V. Raman became the first person from Asia to be awarded a Nobel Prize in any field of science. The date of the discovery, February 28, is now celebrated as National Science Day in India.

139. What is the name of India's first nuclear reactor ?
[A] Cirius
[B] Apsara
[C] Dhruva
[D] Kamini
Correct Answer: B [Apsara]

140. Which among the following is NOT taken into account while choosing an orbit of the Satellite?
[A] Earth's radius
[B] Gravitational force of the earth

[C] Mass of the satellite
[D] Distance from Earth
Answer: C [Mass of the satellite]

141. Hydraulic Brakes work on which principal?
[A] Pascal's Principle
[B] Archimedes Principle
[C] Newton's Laws
[D] Casini's Laws
Answer: A [Pascal's Principle]- In 1647 the French scientist Blaise Pascal (1623–1662) discovered that water exerts the same pressure in all directions. This statement is known as Pascal's Principle. Pascal's law states that increase in pressure at a point in the enclosed liquid in equilibrium is transmitted equally in all directions in liquid and to the Walls of the container. The working of hydraulic lift, hydraulic press and hydraulic brakes are based on Pascal's law.

142. Zero point energy is the lowest possible energy that a quantum mechanical physical system may have. "Who among the following proposed this concept?
[A] Max Planck
[B] Albert Einstein and Otto Stern
[C] Hendrik B. G. Casimir
[D] Gribbin, John
Answer: B [Albert Einstein and Otto Stern]

143. Consider the following:
Dispersion
Total Internal Reflection
Refraction
[A] 1
[B] 1,2
[C] 1,2,3
[D] 2,3
Answer: C [1,2,3]

144. Which among the following lens is used to correct Presbyopia?
[A] Convex
[B] Concave
[C] Bifocal
[D] Cylindracal
Answer: C [Bifocal]- In Presbyopia defect both near and far object are not clearly visible i.e., far point is lesser than infinity and near point greater than 25 cm. This can be removed either by using two separate spectacles one for myopia and other for hypermetropia or by using bifocal lens. It is an old age disease. At old age ciliary muscles lose their elasticity so they can not change the focal length of eye lens effectively and eye losses its power of accommodation

145. Which among the following kinds of lenses are used to treat Astigmatism?
[A] Convex Lens

[B] Concave Lens
[C] Bifocal Lens
[D] Cylindrical
Answer: D [Cylindrical]- Astigmatism is due to imperfect spherical nature of eye lens. The focal length of eye lens is in two orthogonal directions become different so they cannot see objects in two orthogonal directions simultaneously. This defect in direction can be removed by using cylindrical lens in a particular direction.

146. Kakrapar Atomic Power Station (KAPS-1) is located in which among the following states?
[A] Maharastra
[B] Gujarath
[C] Goa
[D] Karnataka
Answer: B [Gujarath]

147. If in a closed room , the door of a refrigerator is kept open for some time , the temperature of room will ?
[A] Increase
[B] Decrease
[C] Remains same
[D] First decrease then become stable
Answer: A [Increase]

148. First steam-powered vehicle was built by?
[A] Richard Trevithick
[B] Nicolas-Joseph Cugnot
[C] Don Walsh
[D] Janice Meek
Answer: B [Nicolas-Joseph Cugnot]

149. Which among the following is a source of Atomic Energy ?
[A] Iron
[B] Uranium
[C] Silver
[D] Platinum
Answer: B [Uranium]
150. Which among the following types of glasses contains Cerium and other rare earths and has a high absorption of ultraviolet rays?
[A] Crookes Glass
[B] Pyrex Glass
[C] Flint Glass
[D] Crown Glass
Answer: A [Crookes Glass]

151. CDRI is among the thirty eight laboratories that are functioning under the aegis of the council of scientific and Industrial Research (CSIR) of India. Where is located CDRI (Central Drug Research Institute)?
[A] Bhopal
[B] Lucknow
[C] Kolkata
[D] Bangalore
Hide Answer
Answer: B [Lucknow]

152. Who among the following is the chairman of Council of Scientific and Industrial Research (CSIR)?
[A] Prime Minister of India
[B] Minister of Science & Technology
[C] Secretary, Department of Technology
[D] None of them
Answer: A [Prime Minister of India]- Prime Minister of India is the chairman of the Council of Scientific and Industrial Research. Council of Scientific and Industrial Research (CSIR) established in 1942, is an autonomous body and India's largest research and development (R&D) organisation, with 37 laboratories and 39 field stations or extension centres spread across the nation, with a collective staff of over 17,000. It operates as an autonomous body registered under the Registration of Societies Act of 1860

153. Consider the following comparisons between the Resourcesat-1 and Resourceset-2:
1. The Resourceset-2 will be able to collect data from a wider strip of the Earth's surface
2. The Resourceset -2 will provide remote sensing data services for entire globe, in contrast with some selected area by Resourcesat-1
3. The Resourcesat-2 has been launched with additional payload known as AIS (Automatic Identification System) from COMDEV, Canada as an experimental payload for ship surveillance in VHF band
Which among the above statement is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] 1 & 3 are correct
[D] 2 & 3 are correct
Answer: C [1 & 3 are correct]- The Resourcesat was launched recently via the PSLV C-16. The first statement which says that Resourceset-2 will be able to collect data from a wider strip of the Earth`s surface is correct. The profile page of Resourcesat-2 on ISRO website mentions that important changes in RESOURCESAT-2 compared to RESOURCESAT-1 are- Enhancement of LISS-4 multispectral swath from 23 km to 70 km and improved radiometric accuracy from 7 bits to 10 bits for LISS-3 and LISS-4 and 10 bits to 12 bits for AWIFS. Besides, suitable changes, including miniaturization in payload electronics, have been made in RESOURCESAT-2. The Swath width means the strip of the Earth`s surface from which data are collected by a satellite.
Statement 2 is NOT correct, because Resourcesat-1 was doing the same job and now Resourcesat-2 extends that.

Statement 3 is correct fact about the latest launch. Polar Satellite Launch Vehicle (PSLV)-C16 has on 20.4.2011 successfully launched India`s RESOURCESAT-2 satellite, the joint Indo-Russian YOUTHSAT satellite, and Singapore`s first satellite X-SAT. Resourcesat-2 is India`s 18th remote sensing satellite.

154. Which among the following correctly defines Pinaka?
[A] A Multi Barrel Rocket Launcher Developed by DRDO
[B] A Missile Developed by DRDO
[C] A Missile imported from Russia
[D] A rocket launcher developed by France
Answer: A [A Multi Barrel Rocket Launcher Developed by DRDO]

155. Which among the following can be measured with Anemometer?
[A] Water Velocity
[B] Wind Velocity
[C] Relative Humidity
[D] Absolute Humidity
Answer: B [Wind Velocity]

156. At which among the following temperatures, the indicator of Celsius and Fahrenheit thermometers will show the same reading?
[A] -40°C
[B] -65°C
[C] -25°C
[D] -32°C
Answer: A [-40°C]

157. At which among the following points, the high tides are lower than usual and low tides are higher than usual?
[A] New Moon
[B] Full Moon
[C] Apogee
[D] Perigee
Answer: C [Apogee]

158. Phobos and Deimos are the natural satellites of which of the following planets?
[A] Mars
[B] Saturn
[C] Jupiter
[D] Earth
Answer: A [Mars]- Mars is known as the red planet because it looks red from Earth. The reddish color comes from high concentration of iron oxide compounds that is rust—in the rocks of the Martian surface.
Phobos and Deimos are the natural satellites of Mars.

159. Sun accounts for approximately what fraction of total mass of Solar System ?
[A] 70%
[B] 90%
[C] 95%
[D] 99.86%
Answer: D [99.86%]

160. In which of the following light produces image focus in front of the retina?
[A] Presbyopia
[B] Myopia
[C] Hyperopia
[D] Hypertropia
Answer: B [Myopia]- The inability to see the distant objects clearly and distinctly is called short sightedness or Myopia. This defect arises when the image is formed infront of the retina. A short sighted person can see near objects clearly. This may arise due to either excessive curvature of the cornea or elongation of the eyeball. This defect is corrected by wearing glasses with a concave lens.
The inability to see near objects clearly and distinctly is called long sightedness or Hypermetropia. This defect arises when the image is formed behind the retina. This defect may arise due to shortening of eye ball. A long sighted person can see the distant objects clearly. This defect is corrected by wearing spectacles with convex lens (converging) of appropriate focal length. A converging lens will correct this defect by converging the incoming rays so that the image is formed on the retina.

161. Which among the following is also known as Dog Star?
[A] Alpha Centauri
[B] Proxima centauri
[C] Sirius
[D] Aludra
Answer: C [Sirius] Sirius is the Brightest star in the sky.

162. The name of Robert Watson-Watt is associated with which among the following inventions?
[A] Steam Engine
[B] Electric Bulb
[C] Radar technology
[D] Microwaves
Answer: C [Radar technology]

163. Which among the following scientists is known for laws of planetary motion?
[A] Newton
[B] Kepler
[C] Galileo
[D] Faraday
Answer: B [Kepler]- Kepler proposed Laws of planetary motion. These three laws describes the behavior of planets in the heliocentric model;

The three laws of Kepler can be stated as follows:

Law of orbits: All planets move in elliptical orbits with the Sun situated at one of the foci of the ellipse

Law of areas: The line that joins any planet to the sun sweeps equal areas in equal intervals of time.

Law of periods: The Square of the time period of revolution of a planet is proportional to the cube of the semi-major axis of the ellipse traced out by the planet. The law of areas can be understood as a consequence of conservation of angular momentum which is valid for any central force

164. The "Amos" series of satellites belongs to which among the following countries?
[A] India
[B] USA
[C] Israel
[D] China
Answer: C [Israel]

165. Which among the following compound is most commonly used in the Photochromic lenses?
[A] Potassium Dichromate
[B] Silver Chloride
[C] Potassium ferrate
[D] Ferric Chloride
Answer: B [Silver Chloride]- Photochromatic or Photochromic glass acquires a darker shade when exposed to bright light and returns to its original lighter shade in dim light. This happens because silver halides (iodide or chloride) is added to this glass

166. Which among the following are being procured by India for its armed forces, under the Project-75 India (P-75I) Programme?
[A] Medium multi-role combat aircraft
[B] Falcon Awacs
[C] Submarines
[D] Aircraft Career Ships
Answer: C [Submarines]- Under Project 75, six Scorpene submarines are being built with assistance and technology transfer from DCNS of France under deal signed in October 2005. The Project 75I-class submarine is a follow-on of the Project 75 Kalvari-class submarine for the Indian navy.

167. Soviet aircraft carrier Admiral Gorshkov, has been rechristened in India as which among the following?
[A] INS Viraat
[B] INS Vikramaditya
[C] INS Chakra
[D] INS Arihant

Answer: B [INS Vikramaditya]- INS Vikramaditya is the country's sole aircraft carrier (after retirement of INS Viraat in March 2017). It was built in 1987 and had served the Soviet navy (named as Baku). It was later renamed Admiral Gorshkov under the Russian navy.

168. In context with the Defense of India, Advanced Technology Vessel (ATV) Projects are related to which among the following?
[A] Nuclear Capable Missiles
[B] Nuclear Capable Submarines
[C] Aircraft Career Ships
[D] Amphibious warfare vessels
Answer: B [Nuclear Capable Submarines]

169. Which among the following radiations in the Sunlight causes tanning and sunburn?
[A] Ultraviolet
[B] Visible
[C] Infrared
[D] Micro waves
Answer: A [Ultraviolet]

170. What is the focal length of a concave lense with number -5D?
[A] 5 cm
[B] 10 cm
[C] 15 cm
[D] 20 cm
Answer: D [20 cm]

171. What is the focal length of a concave lense with number -5D?
[A] 5 cm
[B] 10 cm
[C] 15 cm
[D] 20 cm
Answer: D [20 cm]

172. The asteroid belt is a region of the Solar System located roughly between the orbits of which among the following planets?
[A] Earth & Mars
[B] Mars & Jupiter
[C] Jupiter and Saturn
[D] Saturn and Pluto
Answer: B [Mars & Jupiter]- There is a large gap in between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the Sun. These are called asteroids.

173. India's First Moon Mission Chandrayaan was launched on which among the following dates?
[A] October 27, 2007

[B] October 22, 2008
[C] November 23, 2008
[D] December 17, 2008
Answer: B [October 22, 2008]- Chandrayaan was launched on October 22nd 2008 and successfully reached the lunar surface on November 14, 2008. The ISRO lost communication with Chandrayaan-1 on August 29, 2009, almost a year after it was launched on October 22, 2008. It operated for 312 days.
In 2017 NASA's Jet Propulsion Laboratory (JPL) have found India's first lunar probe, Chandrayaan-1 which was considered lost, is still orbiting the moon.

174. Which of the following is India's first nuclear reactor:
[A] Apsara
[B] Dhruva
[C] Rawatbhatta
[D] Kudankulam
Answer: A [Apsara]- Apsara is the first nuclear research reactor not only in India but also in the whole of Asia

175. In which of the following states is located the Indian Astronomical Observatory?
[A] Karnataka
[B] Uttar Pradesh
[C] Maharashtra
[D] Jammu & Kashmir
Answer: D [Jammu & Kashmir]- Indian Astronomical Observatory is located in Leh in Ladakh (Jammu & Kashmir). It is operated by Indian Institute of Astro-physics (Bangalore).

176. Which among the following is the largest nuclear power station of India by capacity?
[A] Tarapur Atomic Power Station, Maharashtra
[B] Rajasthan Atomic Power Station, Rawatbhata
[C] Kaiga Atomic Power Station, Karnataka
[D] Madras Atomic Power Station, Kalpakkam, Tamil Nadu
Answer: A [Tarapur Atomic Power Station, Maharashtra]- With a capacity of 1400 MW, today, Tarapur is the largest nuclear power station in India.

177. Which among the following the correct English Official name of CERN (Conseil Européen pour la Recherche Nucléaire)?
[A] European Organization for Nuclear Research
[B] European Council for Nuclear Research
[C] European Center for Nuclear Research
[D] European Nuclear Research organization
Answer: A [European Organization for Nuclear Research]

178. What is the name of Indian's first satellite launch vehicle?
[A] SLV-1
[B] SLV-2
[C] SLV-3

[D] PSLV-1
Answer: C [SLV-3]- India's first satellite launch vehicle: SLV-3
The first attempt to launch SLV-3 was in 1979 carrying 35 Kg Rohini satellite but it was failed. However, in the second flight of SLV3 during 1980, the Rohini satellite was placed in the orbit.

179. In which year India's first satellite Aryabhatta was launched?
[A] 1975
[B] 1970
[C] 1978
[D] 1965
Answer: A [1975]- India's first satellite Aryabhatta was launched by India on 19 April 1975 from Russian space station using Kosmos-3M launch vehicle.

180. Which of the following is responsible for the fact that Tennis ball bounces higher at high altitudes than in plains?
[A] Low Gravity
[B] High Gravity
[C] Less dense air
[D] Low atmospheric temperature
Answer: C [Less dense air]- The rarified air at high altitudes gives less resistance to ball.

181. Thin lamination is used in a transformer to reduce:
[A] Eddy current losses
[B] Hysteresis losses
[C] Corona losses
[D] None of the above
Answer: A [Eddy current losses]- Lamination in a transformer construction reduces eddy current losses. Lamination provides with the efficient transfer of energy from the primary coil to the secondary one.

182. Which of the following statements is incorrect about a Plane Mirror?
[A] The focal length of a plane mirror is infinity
[B] Its optical power is one
[C] It forms a virtual image of a real object
[D] It is used in constructing periscope
Answer: B [Its optical power is one]- Second statement is incorrect because the optical power of plane mirror is zero.

183. A high-refractive-index polymer (HRIP) is a polymer that has a refractive index greater than _?
[A] .50
[B] 1.0
[C] 1.20
[D] 1.50
Answer: D [1.50]- A high-refractive-index polymer is a polymer that has a refractive index greater than 1.50. Such materials are required for anti-reflective coating and photonic devices such as light emitting diodes (LEDs) and image sensors.

184. Consider the following statements regarding Black Holes:
1. A black hole is a supergiant star that has collapsed into itself
2. The Black-hole singularity has zero radius
Which of the above is / are correct statements?
[A] Only 1
[B] Only 2
[C] Both 1 & 2
[D] Neither 1 nor 2
Answer: C [Both 1 & 2]- Black hole refers to the remains of a supergiant star that has collapsed into itself. It is so dense, and has a gravitational field so intense, that light itself cannot escape from it.. Black-hole singularity refers to the object of zero radius into which the matter of a black hole is compressed.

185. Which of the following is / are correct statements with respect to Copper (Cu), Silver (Ag) and Gold (Au)?
1. All of them are can be found naturally in their elemental state
2. All of them belong to same group in the periodic table
Select the correct option from the codes given below:
[A] Only 1
[B] Only 2
[C] Both 1 & 2
[D] Neither 1 nor 2
Answer: C [Both 1 & 2]- The elements Copper (atomic number 29), silver (atomic number 47), and gold (atomic number 79), are three of the few metals that can be found naturally in their elemental state. These three metals have found great use as coins and jewellery for a number of reasons, including their resistance to corrosion and their remarkable colors. They are all in the same group in the periodic table (group 11), which suggests they should have similar—though not identical—properties.

186. A 10 Kg block of Iron has which of the following twice in value in comparison to a 5 Kg block of Iron?
1. Inertia
2. Mass
3. Volume
Select the correct option from the codes given below:
[A] Only 1 & 2
[B] Only 2
[C] Only 1 & 3
[D] 1, 2 & 3
Answer: D [1, 2 & 3]- The answer is yes to all options. A 10 kg block of iron has twice as many iron atoms and therefore twice the inertia, mass, and weight. The blocks consist of the same material, so the 10 kg block also has twice the volume of 5Kg block.

187. Albert Einstein was awarded Nobel Prize for his path-breaking research and formulation of the:
[A] Theory of Relavitity

[B] Laws of Photo-Electric Effect
[C] Principle of Wave-Particle Duality
[D] Theory of Critical Opalescence
Answer: B [Laws of Photo-Electric Effect]

188. Which one of the following types of Laser is used in Laser Printers?
[A] Semiconductor laser
[B] Excimer Laser
[C] Dye Laser
[D] Gas Laser
Answer: A [Semiconductor laser]

189. The power of a lens is measured in :
[A] diopters
[B] aeon
[C] lumen
[D] candela
Answer: A [diopters]

190. The television technology in which a new form of light-emitting crystals which can be printed onto flexible plastic sheets to produce a paper-thin display that can be rolled up and carried in a pocket is:
[A] QD-TV
[B] SED-TV
[C] Pixel Plus
[D] Slingbox
Answer: A [QD-TV]

191. When Lunar Eclipse occur?
A. When Sun is between Earth and Moon
B. When Earth is between Sun and Moon
C. When Moon is between Earth and Sun
D. When Earth is between Sun and other celestial bodies
Answer: B. When Earth is between Sun and Moon- A lunar eclipse occurs when Earth crosses between the moon and the sun, which casts a shadow of Earth onto the moon.

192. When did Lunar Eclipse happen?
A. Half Moon
B. Full Moon
C. Equinox
D. None of the above
Answer: B. Full Moon- Eclipses of the Moon happen at Full Moon, when the Sun, Earth and Moon are aligned to form an exact or an almost straight line.

193. Select the correct option matching together about Earth shadows:
1. Umbra – darker, central part

2. Penumbra – the outer part
3. Antumbra – partly shaded area beyond the umbra
Correct Options are:
A. Only 1 and 2
B. Only 2 and 3
C. Only 1
D. All 1, 2 and 3
Answer: D. All 1, 2 and 3- Shadow of earth is divided into three parts:
Umbra is the innermost and darkest part of the shadow and an observer experiences total eclipse. Penumbra is the region in which only a portion of the light source is blocked by the body. Therefore, an observer experiences partial eclipse. Antumbra is the lighter area of a shadow that appears beyond umbra. An observer experiences annular eclipse.

194. What is Solar Eclipse?
A. When moon comes in between Earth and Sun
B. When Earth comes in between Moon and Sun
C. When Sun comes in between Earth and Moon
D. When Sun rays does not reach Earth.
Answer: A. When moon comes in between Earth and Sun- When the moon orbits Earth, it moves between the sun and Earth. When this happens, the moon blocks the light of the sun from reaching Earth. During a solar eclipse, the moon casts a shadow onto Earth.

195. When the same pattern of solar eclipse repeats every 18 years 11 days 8 hours are known as:
A. Nodes cycle
B. Saros cycle
C. Saras cycle
D. Payan cycle
Answer: B. Saros cycle- After one saros cycle of 18 years 11days 8 hours, the pattern of eclipses repeats.

196. What do you mean by Blood Moon?
A. It is total solar eclipse.
B. It is partial lunar eclipse with red glow
C. It is total lunar eclipse with deep red glow
D. None of the above
Answer: C. It is total lunar eclipse with deep red glow- A Total Lunar Eclipse can get a deep red glow and is sometimes called a Blood Moon.

197. During lunar eclipse, the visible red colour is because of:
A. Dust in space
B. Dust in moon's atmosphere
C. Dust in earth's atmosphere
D. None of the above
Answer: C. Dust in earth's atmosphere- Due to dust in earth's atmosphere during lunar eclipse red colour is seen.

198. During a calendar year, the maximum numbers of lunar eclipse that can occur are:
A. 2
B. 3
C. 4
D. 5
Answer: B. 3-
The maximum numbers of lunar eclipse that can occur during a calendar year are 3.

199. What do you understand by an eclipse?
A. Partial or total blocking of light of one celestial object by another.
B. Partial or total blocking of light by Moon.
C. Partial or total blocking of light by Earth.
D. Partial or total blocking of light by Sun.
Answer: A. Partial or total blocking of light of one celestial object by another.- An eclipse takes place when one heavenly body such as a moon or planet moves into the shadow of another heavenly body.

200. Diamond ring occurs in which type of solar eclipse?
A. Total Solar eclipse
B. Partial Solar eclipse
C. Annular Solar eclipse
D. None of the above
Answer: A. Total Solar eclipse- During total Solar eclipse diamond ring occurs. From this quiz we come to know about the lunar and solar eclipse, how eclipse occurs, what is an eclipse etc.

GENERAL SCIENCE – CHEMISTRY

1. Lysergic acid diethylamide (LSD) is a drug used as a :
[A] Steroid
[B] Sedative
[C] Analgesic
[D] Hallucinogen
Answer: D [Hallucinogen]

2. Which of the following substances undergo ‘sublimation’ on heating
1.Iodine
2.Napthalene
3.Camphor
[A] 1 and 2
[B] 1 and 3
[C] 2 and 3
[D] All of them

3. Amalgam' is a term used for an alloy of a metal with:
[A] Copper
[B] Mercury
[C] Lead
[D] Aluminium
Answer: B [Mercury]

4. Gammaxene, D.D.T. and Bleaching powder are important compounds of :
[A] Chlorine
[B] Nitrogen
[C] Sulphur
[D] Phosphorus
Answer: A [Chlorine]

5. L.P.G. is a hydrocarbon consisting of a mixture of:
[A] Methane and Butane
[B] Propane and Butane
[C] Ethane and Propane
[D] Ethane and Butane
Answer: B [Propane and Butane]

6. What is Kerogen oil?
[A] Its an unconventional oil produced from the pyrolysis, hydrogenation, or thermal dissolution of Oil Shales
[B] Its a light crude oil contained in petroleum-bearing formations of shales
[C] Its an unconventional oil produced from the pyrolysis, hydrogenation, or thermal dissolution of environmental wastes
[D] It's a new form of vegetable oil prepared artificially in laboratory
Answer: A [Its an unconventional oil produced from the pyrolysis, hydrogenation, or thermal dissolution of Oil Shales]

7. Which among the following was first human-made plastic?
[A] Bakelite
[B] Polyethene
[C] Celluloid
[D] Nylon
Answer: C [Celluloid]- he first human-made plastic was made by Alexander Parkes in 1855, when he synthesized celluloid. The new discovery found its use in photographic films, but it could not be used for making containers or insulators for electric circuits.
The first true plastic was made in 1909 by Leo Baekeland, who synthesized Bakelite. The hard plastic could be used to make handles, auto parts, etc. The First World War witnessed improvements in the manufacture of polystyrene and polyvinyl chloride, which found use in plumbing equipment and electric wire insulation. Nylon was synthesized in the 1930s. By 1950, plastics became quite popular and as a result we can see them everywhere today

8. Which among the following is the correct impact of the London Forces in the Cycloalkanes?
[A] The melting and boiling points get increased
[B] The Melting and boiling points get decreased
[C] There is not impact on the melting and boiling points
[D] The melting point increases but boiling point decreases
Answer: A [The melting and boiling points get increased]- Please note that the Cycloalkanes with more than 20 carbon atoms are called Cycloparaffins. The cycloalkanes have the same properties as the alkanes but they have `Higher Boiling & Melting points`. This is because of the stronger dispersion forces between the atoms known as London Forces.
9. Gargling with a solution of table salt is known to provide relief for a sore throat because ___ ?
[A] It kills bacteria
[B] It works as analgesic
[C] It dehydrates water from inflammatory tissues by Osmosis
[D] Placebo effect
Answer: C [It dehydrates water from inflammatory tissues by Osmosis]

10. The Potassium graphite and Calcium Graphite can be mostly used as which among the following?
[A] Moderators
[B] Semiconductors
[C] Superconductors
[D] Lubricants
Answer: C [Superconductors]

11. Which among the following minerals is also known as Horn Silver?
[A] Silver Iodide
[B] Silver Chroride
[C] Zinc Phosphate
[D] Silver Sulphide
Answer: B [Silver Chroride]

12. Consider the following particles in relation to the matter:
π-Meson (Pi-meson)
Photon
Which among the above are considered to be mass less and charge less?
[A] Only 1
[B] Only 2
[C] Both 1 & 2
[D] Neither 1 nor 2
Answer: B [Only 2]

13. Polymetallic Modules (PMN) predominantly contain_____?
[A] Calcium
[B] Magnesium
[C] Manganese
[D] Copper
Answer: C [Manganese]

14. The colors in the fine cut diamond are because of which among the following?
[A] Variance in transparency of diamond
[B] Variance in index of refraction
[C] Presence of Impurities
[D] Existence of definite planer layers
Answer: C [Presence of Impurities]- Pure diamond should transmit visible light and appear as a clear colorless crystal. Colors in diamond originate from lattice defects and impurities. The diamond crystal lattice is exceptionally strong and only atoms of nitrogen, boron and hydrogen can be introduced into diamond during the growth at significant concentrations (up to atomic percents). Nitrogen gives yellowish color while the Boron gives bluish color.

15. Benzoepin, Parrysulfan, Phaser, Thiodan, Thionex etc. are the names of which among the following pesticides?
[A] Kepone
[B] Paraquat
[C] Endosulfan
[D] Toxaphene
Answer: C [Endosulfan]

16. An aqueous solution of Sodium Acetate will be of which among the following nature?
[A] Acidic
[B] Basic
[C] Neutral
[D] Either acidic or basic depending upon temperature of solution
Answer: B [Basic]

17. Aluminum is getting popular worldwide today as a “Green Metal”. Which among the following properties of Aluminum makes it a Green Metal?
[A] Aluminum has been providing a replacement of wood for saving forests and contributes in environment protection
[B] Aluminum is a light metal and it is resistant to corrosion
[C] Aluminum has fairly high rate of recycling and it can be re-used repeatedly without its quality deteriorating
[D] The lands after the Bauxite mining can be restored very quickly and easily
Answer: C [Aluminum has fairly high rate of recycling and it can be re-used repeatedly without its quality deteriorating]

18. Acetylene cannot be safely pressurized as a pure compound. Which among the following is used for safe storage and transportation of Acetylene?
[A] Kerosene
[B] Acetone
[C] Vinegar (Acetic Acid)
[D] Propylene glycol
Answer: B [Acetone]

19. Above 70 °C, sodium bicarbonate has a property of gradually decomposing, which makes it usable in Bakery products. Which among the following end product of this Thermal decomposition of Sodium bicarbonate makes it usable for the above purpose?
[A] Hydrogen
[B] Carbon Dioxide
[C] Water Vapor
[D] Sodium Carbonate
Answer: B [Carbon Dioxide]- Above 70 °C, sodium bicarbonate gradually decomposes into sodium carbonate, water and carbon dioxide as follows –
$2\ NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$,
In bakery, it reacts with other components or decomposes at higher temperature to release carbon dioxide, which causes dough to rise.

20. Which among the following substances is being used most commonly for producing synthetic jet Fuel?
[A] Coal
[B] Natural Gas
[C] Plastic Waste
[D] Biomass
Answer: A [Coal]

21. A baby diaper, if tested with various solutions, will absorb maximum amount of which among the following:
[A] Distill Water
[B] Drinking water
[C] Hard water
[D] Urine
Answer: A [Distill Water]

22. Now a days, a little pack of Silica Gel (granular beads of Silica made from Sodium Silicate) comes with many products to control humidity and avoid spoilage or degradation of some goods. Which among the following property of Silica gel makes it useful for that purpose?
[A] Silica gel molecules are hydrophilic with large surface area and so its molecules trap the moisture
[B] Silica gel is a Hygroscopic substance with large surface area so its molecules absorb the moisture.
[C] Silica gel molecules are with a portion that is charge-polarized and capable of hydrogen bonding, thus bonds with the water molecules
[D] The semi permeable pouch in which silica gel is placed absorbs the moisture which later reacts with water.
Answer: B [Silica gel is a Hygroscopic substance with large surface area so its molecules absorb the moisture.]

23. Which among the following is the correct almost equivalent to 1 MMBTU Natural Gas ?
[A] 1.054615 gigajoule
[B] 0.1054615 gigajoul

[C] 10.54615 gigajoule
[D] 105.4615 gigajoule
Answer: A [1.054615 gigajoule]

24. Consider the following statements:
1. The space between the valence and conduction bands is zero in Graphene
2. This property of Graphene makes it an excellent transistor of commercial viability
Which among the above statements is/ are correct?
[A] Only 1
[B] Only 2
[C] Both 1 & 2
[D] Neither 1 nor 2
Answer: A [Only 1]

25. Pyrolusite, Braunite, Psilomelane and Rhodochrosite are the ores of which among the following:
1. Manganese
2. Aluminium
3. Copper
Choose the correct option:
[A] Only 1
[B] Only 1 & 2
[C] Only 3
[D] Only 1 & 3
Answer: A [Only 1]

26. Consider the following statements:
1. Copernicium is at present highest-numbered element recognized by IUPAC
2. Copernicum has been synthesized in the lab by a nuclear reaction of Zinc and Lead Isotopes
Which among the above statements is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] Both 1 & 2 are correct
[D] Neither 1 nor 2 are correct
Answer: C [Both 1 & 2 are correct]

27. The first metal to be used by man was:
[A] Aluminum
[B] copper
[C] Iron
[D] Silver
Answer: B [copper]

28. For respiration in deep sea, divers use mixture of:
[A] Oxygen and helium
[B] Oxygen and hydrogen

[C] Oxygen and carbon dioxide
[D] Oxygen, Helium & nitrogen
Answer: D [Oxygen, Helium & nitrogen]

29. The minimum temperature at which a combustible substance catches fire is called:
[A] fireless temperature
[B] ignition temperature
[C] static temperature
[D] optimum temperature
Answer: B [ignition temperature]

30. Consider the following statements regarding Graphene and Fullerene:
1. Graphene is 2 dimensional , Fullerene is generally 3 dimensional
2. Graphene is SP2 allotrope of Carbon, while Fullerene is SP3 allotrope of Carbon
3. Graphene does not dissolve in petrol but fullerenes dissolve
Which among the above statements is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] Only 3 is correct
[D] 1 & 3 are correct
Answer: D [1 & 3 are correct]

31. Haber Process is used to produce which among the following?
[A] Potash
[B] Ammonia
[C] Urea
[D] Nitrates
Answer: B [Ammonia]

32. If a Hydrogen atom is removed from a hydrocarbon of Benzene group, the remaining residue is called _____?
[A] Alkyl
[B] Aryl
[C] Arene
[D] Azene
Answer: B [Aryl]

33. Which among the following kinds of Chemical reactions cause the rocks turn red or yellowish?
[A] Hydration
[B] Oxidation
[C] Carbonation
[D] Exfoliation
Answer: B [Oxidation]

34. Which among the following is the unit of the scale used for measurement of the spicy heat of a chili pepper?
[A] Smith
[B] Wright
[C] Orville
[D] Scoville
Answer: D [Scoville]

35. Every kilogram of seawater has approximately how much dissolved salts?
[A] 1 gm
[B] 0.35 gms
[C] 3.5 gms
[D] 35 gms
Answer: D [35 gms]

36. Gypsum is added to Cement so that, _____?
[A] setting of cement can be fastened
[B] setting of cement can be slowed
[C] Cement strength can be improved
[D] Cement strength can be controlled
Answer: B [setting of cement can be slowed]

37. The color “Carmine” is a shade of which among the following colors?
[A] Red
[B] Blue
[C] Yellow
[D] Green
Answer: A [Red]

38. Consider the following:
Copper
Zinc
Tin
Gun Metal is the alloy of which among the above?
[A] 1 & 2
[B] 1 & 3
[C] 2 & 3
[D] 1, 2 & 3
Answer: D [1, 2 & 3]

39. Which among the following makes Chile saltpetre different from saltpetre?
[A] Nitrate
[B] Sodium
[C] Magnesium
[D] Calcium
Answer: B [Sodium]

40. Which among the following is “Fool’s Gold” ?
[A] Copper Sulphate
[B] Iron Sulfide
[C] Brass
[D] Silver Bromide
Answer: B [Iron Sulfide]rrect Answer: D [1 & 3 are correct]

41. When a piece of quicklime is dipped in water, it gives bubbles. This bubbling is due to which of the following?
[A] Oxygen
[B] Carbon Dioxide
[C] Water Vapour
[D] Hydrogen
Answer: C [Water Vapour]

42. Which among the following acid is used to ascertain, whether pure Ghee has been adulterated with Vanaspati or Margarine?
[A] Sulphuric Acid
[B] Nitric Acid
[C] Hydrochloric Acid
[D] Boric Acid
Answer: C [Hydrochloric Acid]

43. Mizoroki-Heck reaction is catalyzed by which of the following metals?
[A] Rhodium
[B] Sodium
[C] Palladium
[D] Osmium
Answer: C [Palladium]

44. Which among the following is used in preparing windows for X-Ray Tubes ?
[A] Barium
[B] Beryllium
[C] Magnesium
[D] Calcium
Answer: B [Beryllium]

45. Which among the following first increases than decreases in a Period of a periodic table?
[A] metallic property
[B] Chemical Reactiveness
[C] Valency
[D] Electron affinity
Answer: C [Valency]

46. Which among the following were not discovered by the time , Mendeleev published his periodic table?

[A] Lathanides
[B] Actinides
[C] Noble Gases
[D] Halogens
Answer: C [Noble Gases]

47. Ekaboron was an element predicted by Mendeleev and he leaved a space for it in his Periodic Table. Later Ekaboron was identified with _____?
[A] Gallium
[B] Scandium
[C] Technitium
[D] Germanium
Answer: B [Scandium]

48. Which among the following allotropes of Oxygen is found in 6 phases under various pressures and temperatures?
[A] Ozone
[B] Tetra oxygen
[C] Octaoxygen
[D] None of them
Answer: C [Octaoxygen]

49. Buckeyballs are basically the allotropes of _____?
[A] Carbon
[B] Sulfur
[C] Phosphorus
[D] Calcium
Answer: A [Carbon]

50. What is the number of synthetic elements in periodic Table?
[A] 18
[B] 22
[C] 24
[D] 26
Answer: C [24]

51. Kimberley Process" is related to which among the following ?
[A] Gold
[B] Diamonds
[C] Semi Precious Stones
[D] Aluminium
Answer: B [Diamonds]

52. Which among the following protein is responsible for maintenance of osmotic pressure?
[A] Beta macroglobulin
[B] Gamma globulin

[C] immunoglobulin
[D] albumin
Answer: D [albumin]

53. Pearl is mainly made up of which among the following?
[A] Protein
[B] Calcium Carbonate
[C] Silica
[D] Sodium Carbonate
Answer: B [Calcium Carbonate]

54. As we all know that, Gunpowder is a mixture of sulfur, charcoal, and potassium nitrate. Which among these components adds in speeding up the burning of the Gun Powder?
[A] Only Potassium Nitrate
[B] Only Charcoal
[C] Only Sulphur
[D] Both Sulphur and Potassium Nitrate
Answer: C [Only Sulphur]

55. Normal" rainfall is slightly acidic (and a pH of 5.6 has been assigned which might be somewhere near 5) because of the presence of_____?
[A] Nitric Oxide
[B] Sulphuric Acid
[C] Nitric Acid
[D] Carbonic Acid
Answer: D [Carbonic Acid]

56. Which among the following is not correctly matched?
[A] Brass: copper and zinc
[B] Duralumin : Copper and aluminum
[C] Constantan: Copper and Nickel
[D] White Gold- Gold and Silver
Answer: D [White Gold- Gold and Silver]- White Gold has no silver at all. It has nickel, manganese or palladium usually

57. Bring out the incorrect usage
[A] Heavy water – Moderator
[B] DDT – Insecticide
[C] Methyl Alcohol – Beverage
[D] Liquid Ammonia – Refrigerant
Answer: C [Methyl Alcohol – Beverage]- Methyl Alcohol or methanol is frequently used as a denaturant additive for ethanol manufactured for industrial uses.

58. What is Carbamide?
[A] A Pesticide
[B] A Fertilizer

[C] A Textile Dye
[D] An Explosive
Answer: B [A Fertilizer]- Carbamide is another name of Urea, an organic compound with chemical formula CO(NH2)2. This name indicates that Urea is an amide in which two –NH2 groups are joined by a carbonyl (C=O) functional group.

59. Which among the following is the main constituent of vegetable oil and animal fats?
[A] Glycogen
[B] Triglyceride
[C] Galactose
[D] Diglyceride
Answer: B [Triglyceride]

60. What is the number of known crystalline phases of water?
[A] 2
[B] 4
[C] 10
[D] 15

61. Which among the following can be used as a preservative in Tomato Juice?
[A] Sodium Chloride
[B] Sodium carbonate
[C] Sodium benzoate
[D] Sodium Lauril Sulphate
Answer: C [Sodium benzoate]

62. Which among the following gas has lowest auto-ignition temperature?
[A] Methane
[B] Hydrogen
[C] Ethylene
[D] Carbon Di Sulphide
Answer: D [Carbon Di Sulphide]- The auto-ignition temperature of a liquid, gas or vapor is the temperature at which the substance will ignite without any external heat source. Here is the temperature of some gases:
Methane -580 °C
Hydrogen -560 °C
Propane -493 °C
Ethylene -425 °C
Acetylene -305 °C
Naphtha -290 °C
Carbon disulfide -102 °C

63. Which among the following is the most stable form of carbon under standard conditions?
[A] Charcoal
[B] Graphite
[C] Diamond

[D] Amorphous carbon
Answer: B [Graphite]

64. Which among the following statement is correct?
[A] Both Melting point & Boiling Point of Heavy water are higher than normal water
[B] Both Melting point & Boiling Point of Heavy water are lower than normal water
[C] Melting point is higher and Boiling Point is lower than normal water
[D] Melting point is lower and Boiling Point is higher than normal water
Answer: A [Both Melting point & Boiling Point of Heavy water are higher than normal water]

65. Which among the following gives hissing sound when dissolved into H2O?
[A] CaCO2
[B] Ca(OH)2
[C] CaO
[D] CaCl2
Answer: C [CaO]

66. What is the number of naturally occurring Halogens in the periodic table?
[A] 3
[B] 4
[C] 5
[D] 6
Answer: C [5]- fluorine (F), chlorine (Cl), bromine (Br), iodine (I), and astatine (At)

67. Which among the following is the lowest atomic number element without any stable isotopes?
[A] Technetium
[B] Molybdenum
[C] Ruthenium
[D] Niobium
Answer: A [Technetium]

68. Which among the following is the main constituent of malleable metal alloy Pewter ?
[A] Copper
[B] Zinc
[C] Tin
[D] Bismuth
Answer: C [Tin]

69. How many parts are of other metals in a 17 carat Gold?
[A] 3
[B] 5
[C] 7
[D] 9
Answer: C [7]

70. Which among the following does not come under carbon Group of Periodic Table?
[A] silicon
[B] germanium
[C] tin
[D] selenium
Answer: D [selenium]- selenium is a chalcogenorrect Answer: D [15]

71. Which among the following is not correctly matched?
[A] Sodium: Natrium
[B] Pottassium : Kalium
[C] Mercury :Hydrargyrum
[D] Arsenic : Stibium
Answer: D [Arsenic : Stibium]- Stibium is Antimony

72. The chemical oxygen demand COD test is commonly used to measure which of the following?
[A] amount of organic compounds in water
[B] amount of oxygen in water
[C] amount of oxygen in a chemical
[D] amount of oxygen used in a oxygenation process
Answer: A [amount of organic compounds in water]- chemical oxygen demand is a measure of water quality and is amount of organic pollutants found in surface water. Potassium permanganate has been used for many years to measure COD

73. Which among the following is an organic mineral?
[A] Amber
[B] Hornblende
[C] Angite
[D] Analcime
Answer: A [Amber]

74. Liming is the application of calcium and magnesium rich materials to soil in various forms, including marl, chalk, limestone, or hydrated lime. What is the purpose of liming?
[A] Increase the Soil pH
[B] Increase the bacteria activity
[C] Both A & B
[D] Decrease the bacterial activity
Answer: C [Both A & B]

75. Who among the following established that genetic code of all organisms is spelled out in three-letter words, each set of three nucleotides codes for a specific amino acid?
[A] Hargobind Khorana
[B] Barbara McClintock
[C] Theodor O. Diener
[D] Joseph L. Goldstein
Answer: A [Hargobind Khorana]

76. Which among the following is a main component of some alert tablets such as Alert, No Doz, Stay Awake & Vivarin?
[A] Thein
[B] Caffeine
[C] Nicotine
[D] catechins
Answer: B [Caffeine]

77. Which among the following compound of barium is used as radio contrast agent for X-ray imaging and other diagnostic procedures and also commonly called as Barium Food?
[A] Barium Carbonate
[B] Barium Sulphate
[C] Barium Bromide
[D] Barium hydroxide
Answer: B [Barium Sulphate]

78. Which among the following is used as an antidote?
[A] Paracetamol
[B] Nicotine
[C] Thiamine
[D] Activated Charcoal
Answer: D [Activated Charcoal]

79. Which among the following will undergo a chemical reaction depending on the pH of the solution?
[A] Calcium Oxide
[B] Zinc Oxide
[C] Ferric Oxide
[D] Ferrous Oxide

80. Which among the following will undergo a chemical reaction depending on the pH of the solution?
[A] Calcium Oxide
[B] Zinc Oxide
[C] Ferric Oxide
[D] Ferrous Oxide
Answer: B [Zinc Oxide]

81. Bring out the statement which is wrong:
[A] Acetone is used as a solvent
[B] Adrenaline is used in the event of heart failure
[C] graphite is an example of allotropy
[D] All are correct
Answer: D [All are correct]

82. Which among the following basic atoms are must in an Alkaloid?
[A] Sodium
[B] Nitrogen
[C] Magnesium
[D] Potassium
Answer: B [Nitrogen]

83. F block elements in the periodic table which are commonly called Lanthanides have the following atomic numbers:
[A] 57-70
[B] 58-71
[C] 59-72
[D] 58-70
Answer: B [58-71]

84. The volume of a gas at a given pressure and temperature is proportional to the number of atoms or molecules regardless of the nature of the gas. This concept is called as___?
[A] Avogadro's law
[B] Dalton's law
[C] Henry's law
[D] Ideal gas law
Answer: A [Avogadro's law]

85. Who among the following is known to manufacture first Cyclotron?
[A] Ernest Lawrence
[B] Niels Bohr
[C] Rutherford
[D] Max Born
Answer: A [Ernest Lawrence]

86. British Scientist JJ Thomson was awarded Nobel prize in Physics in 1906 for discovery of which of the following particle?
[A] Electron
[B] Proton
[C] Neutron
[D] Radio activity
Answer: A [Electron]

87. Charles Goodyear is known for which of the following?
[A] Experiments on Rubber Plants
[B] Vulcanization of Rubber
[C] Invention of Radial Tyres
[D] Invention of Artificial Rubber
Answer: B [Vulcanization of Rubber]

88. Which among the following gas is used in Balloons?
[A] Hydrogen
[B] Helium
[C] Nitrogen
[D] Oxygen
Answer: B [Helium]

89. Which among the following is the most important characteristic of Noble metals?
[A] Luster
[B] Non reactive nature
[C] Preciousness
[D] Rare availability
Answer: B [Non reactive nature]

90. Which among the following is correct regarding the alkaline battery?
[A] Negative terminal made of Zinc Powder and Positive terminal made of Manganese dioxide & electrolyte is KOH
[B] Negative terminal made of Manganese dioxide and Positive terminal made of Zinc powder & electrolyte KOH
[C] Negative terminal made of Zinc Powder and Positive terminal made of Manganese dioxide & Electrolyte is Ammonium Chloride
[D] Negative terminal made of Manganese dioxide and Positive terminal made of Zinc powder & electrolyte Ammonium Chloride
Answer: A [Negative terminal made of Zinc Powder and Positive terminal made of Manganese dioxide & electrolyte is KOH]

91. What is the atomic number of Transuranic elements?
[A] Greater than 90
[B] Greater than 92
[C] Greater than 91
[D] Greater than 93
Correct Answer: B [Greater than 92]

92. A Cyclotron is ___?
[A] A charged particle
[B] A particle Accelerator
[C] A magnetic particle
[D] A radioactive particle
Answer: B [A particle Accelerator]

93. Steel is an alloy consisting mostly of iron, with a carbon content between 0.2% and 2.1% by weight. An increasing amount of Iron will result in which of the following?
[A] Increase Hardening
[B] Decrease Hardening
[C] Increase ductility
[D] Increase melting Point

Answer: A [Increase Hardening]

94. Cassiterite is an ore of which of the following ?
[A] Iron
[B] Zinc
[C] Copper
[D] Tin
Answer: D [Tin]- Cassiterite is SnO2 or Tin Oxide

95. Which of the following are found in nucleus of Deuterium
[A] 1 proton & 1 neutron
[B] 2 protons
[C] 1 proton and 1 electron
[D] 2 neutrons only
Answer: A [1 proton & 1 neutron]

96. Which among the following provides the centripetal force to an electron circulating around the nucleus?
[A] electrostatic forces of repulsion
[B] electrostatic force of attraction
[C] speed of the electron
[D] nuclear charge
Answer: B [electrostatic force of attraction]

97. Which among the following of a catalyst does not change at the end of a reaction?
[A] Quantity
[B] Chemical Composition
[C] Both Quantity and Chemical com position
[D] None of the above
Answer: C [Both Quantity and Chemical com position]

98. The noble gases are a group of chemical elements with very similar properties: under standard conditions, they are all odorless, colorless, monatomic gases, with a very low chemical reactivity. How many Noble gases occur naturally?
[A] 5
[B] 6
[C] 7
[D] 8
Answer: B [6]- The six noble gases that occur naturally are helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), and the radioactive radon (Rn).

99. Hard Water contains which of the following?
[A] Aluminum
[B] Chlorine
[C] Calcium
[D] Zinc

Answer: C [Calcium]- Hard water is generally found in areas where groundwater is in contact with limestone, chalk and dolomite and gets higher amount of calcium and magnesium dissolved in it.

100. Which among the following is an ionic solid?
[A] Diamond
[B] Dry ice
[C] Table salt
[D] All are ionic solids
Answer: C [Table salt]- One important character of Ionic solids is that they readily get dissolved in water

101. Which among the following statements about Ozone is INCORRECT?
[A] It is found in the upper atmosphere filters potentially damaging ultraviolet light from reaching the Earth's surface
[B] It is lighter than oxygen that is why it is found in the upper atmosphere
[C] It is an allotrope of oxygen
[D] All are correct
Answer: B [It is lighter than oxygen that is why it is found in the upper atmosphere]- Ozone is heavier than oxygen yet is found in upper atmosphere,

102. Which among the following is correct ?
[A] Oxidation takes place at Cathode and Reduction Takes Place at Anode
[B] Oxidation takes place at Anode and Reduction Takes place at Cathode
[C] Both Oxidation and Reduction takes place at cathode
[D] Both Oxidation and Reduction takes place at Anode
Answer: B [Oxidation takes place at Anode and Reduction Takes place at Cathode]- In an electrochemical cell, the half cell where oxidation takes place is known as oxidation half cell and the half cell where reduction takes place is known as reduction half cell. Oxidation takes place at anode which is negatively charged and reduction takes place at cathode which is positively charged.

103. The atomic weight of Chlorine is 35. It consists of _____?
[A] 17 Protons + 18 Neutrons
[B] 17 Neutrons + 18 protons
[C] 17 Neutrons + 17 Protons + 1 electron
[D] None of the above
Answer: A [17 Protons + 18 Neutrons]

104. When we buy a Jewellery of 22 carat Gold , this means that we are getting a purity of gold with _____?
[A] 90%
[B] 91.67%
[C] 95.5%
[D] 98%
Answer: B [91.67%]

105. An Jewellery was left exposed to the atmosphere for some time and it becomes coated with green carbonate. The Jewellery is made up of which of the following?
[A] Copper
[B] Silver
[C] Zinc
[D] Gold
Answer: A [Copper]

106. The process of purifying water by spraying water on to a bed of stones where microorganism live so that the microorganisms feed on the pathogens in water and make the water free from harmful pathogens is called?
[A] Stone bed method
[B] biofilter method
[C] aerobic filtration
[D] anerobic filtration
Answer: B [biofilter method]

107. As per Avogadro's hypothesis , equal volumes of different gases at the same temperature and pressure contain equal number of _____?
[A] Atoms
[B] Molecules
[C] Particles
[D] Electrons
Answer: B [Molecules]

108. Duralumin which is used in making aero planes is an alloy consisting of _____?
[A] Aluminum & Copper
[B] Aluminum, Copper & Manganese
[C] Aluminum, Copper, Manganese & Magnesium
[D] Aluminum and zinc
Answer: C [Aluminum, Copper, Manganese & Magnesium]

109. Which among the following was the first artificially produced element?
[A] Neptunium
[B] Ununbium
[C] Technetium
[D] none of the above
Answer: C [Technetium]

110. Froth & Foams are examples of which of the following ?
[A] solid suspended in gas
[B] liquid suspended in gas
[C] gas suspended in liquid
[D] gas suspended in solid
Answer: C [gas suspended in liquid]

111. Froth & Foams are examples of which of the following ?
[A] solid suspended in gas
[B] liquid suspended in gas
[C] gas suspended in liquid
[D] gas suspended in solid
Answer: C [gas suspended in liquid]
112. Which among the following is most electronegative element?
[A] Chlorine
[B] FLourine
[C] Bromine
[D] All of them have same electronegativity
Answer: B [FLourine]- Electronegativity is an atoms relative ability to remove an electron pair in the formation of a covalent bond. I.e. an atoms ability to steal a pair of electrons from the outer ring of another atom to make a covalent bond, (like a contract to share electons in order to fill there outer shells and become stable)

Across the periodic table (left to right) this gets harder to do due to an increase in attraction forces between the nuclear charge and the outer electons. Therefore across the periodic table 'more' electronegativity energy is required to remove those electrons.

Down the periodic table, from top to bottom attraction forces between the electrons in the outer shell and the central nuclear charge decreases (shielding effect of sub levels and increased atomic radius), this make it easier for the electrons to be stolen, so there is less electronegativity required.

Fluorine is the highest and furthest to the right, making it the most electronegative.
(Helium and Neon etc have full outer shells so arent involved in covalent bonds)

113. What is the main use of Bisphenol A drug ?
[A] A drug which was used by sports persons for doping
[B] A chemical compound which is used in plastics used for food packaging
[C] An alloy which is used in cans of cola drinks
[D] None of the above
Answer: B [A chemical compound which is used in plastics used for food packaging]

114. Which among the following is not a constituent of gobar gas?
[A] Methane
[B] Propane
[C] Carbondioxide
[D] All are constiuents of Gobar gas
Answer: B [Propane]

115. Which among the following is incorrect regarding the chemical nature of Diamond & Graphite?
[A] Density of Diamond is higher than that of Graphite
[B] Diamond is chemically unreactive while graphite is mild reactive
[C] Both Diamond and Graphite are good conductors of electricity

[D] None of the above
Answer: C [Both Diamond and Graphite are good conductors of electricity]- Diamond is bad conductor of electrcity

116. Galvanizing is a metallurgical process that is used to coat steel or iron with which of the following?
[A] Zinc
[B] Lead
[C] Chromium
[D] Copper
Answer: A [Zinc]- Galvanisation is a method of protecting steel and iron from rusting by coating them with a thin layer of zinc

117. Which among the following is Quick Silver?
[A] Aluminium
[B] Mercury
[C] Lead
[D] Zinc
Answer: B [Mercury]

118. The primary part of Liquefied Petroleum Gas LPG is _____?
[A] Butance
[B] Methane
[C] Propane
[D] Ethane
Answer: C [Propane]

119. Which among the following explains the radiation emitted by black bodies?
[A] Big-bang theory
[B] Quantum Theory
[C] Piezoelectric Effect
[D] None of the above
Answer: B [Quantum Theory]

120. Mustard gas which is a cytotoxic, vesicant chemical warfare agents with the ability to form large blisters on exposed skin contains which of the following elements?
[A] Sulphur
[B] Bromine
[C] Chlorine
[D] Magnesium

121. Calamine lotion which is used as an antipruritic (anti-itching agent) to treat mild pruritic conditions contains which of the following?
[A] Zinc
[B] Calcium
[C] Magnesium

[D] Sodium
Answer: A [Zinc]

122. In which of the following Mercury is a constituent?
[A] Cinnabar
[B] Chile saltpeter
[C] Calamine
[D] Gold
Answer: A [Cinnabar]

123. Adsorption is used commonly in which of the following processes?
[A] Purification of solids
[B] Purification of liquids
[C] Making scrubbers
[D] Chromatography
Answer: D [Chromatography]

124. Which among the following is a correct definition of Cyclotron?
[A] Accelerator of charged atomic particles
[B] Device for detection of High Energy atomic radiation
[C] Device for storing electric charge
[D] Device for storing heat
Answer: A [Accelerator of charged atomic particles]

125. The Chemical formula of Graphite is _____?
[A] C
[B] C2
[C] C4
[D] C6
Answer: A [C]

126. Which among the following is true about solubility of “Lipids”?
[A] They are soluble in water but insoluble in organic solvents
[B] They are insoluble in water but soluble in organic solvents
[C] They are soluble in water as well as organic solvents
[D] They are insoluble in water as well as organic solvents
Answer: B [They are insoluble in water but soluble in organic solvents]

127. Calcium Magnesium Silicate is commonly called as _____?
[A] Asbestos
[B] Borax
[C] Baking Soda
[D] Washing Soda
Answer: A [Asbestos]

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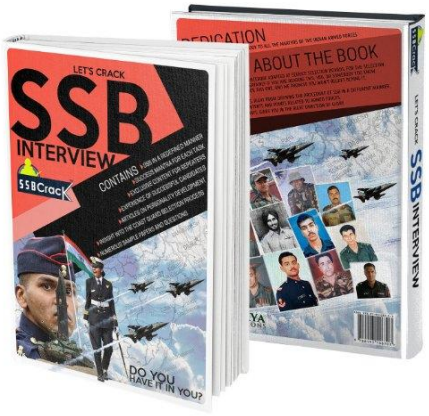

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128. Phenolphthalein is used in chemistry as a _____?
[A] Solvent
[B] Dye
[C] Catalyst
[D] Detergent
Answer: B [Dye]

129. Reserpine is an example of which kind of drug?
[A] Narcotic
[B] Anti-histamine
[C] Tranquillizer
[D] None
Answer: C [Tranquillizer]

130. Cobalt oxide is used to impart which color to glass?
[A] Brown
[B] Blue
[C] Red
[D] Yellow
Answer: B [Blue]

131. Which among the following is correct full form of DDT?
[A] Dichloro-diethyl-trifluoromethane
[B] Dichloro-diphenyl-trichloroethane
[C] Dichloro-diphenyl-trichloromethane
[D] Dipheneyl-dichloro-trichloromethane
Answer: B [Dichloro-diphenyl-trichloroethane]

132. Which among the following sentences is true?
[A] Ammophos is an organic fertilizer while Urea is an inorganic fertilizer
[B] Ammophos is an inorganic fertilizer while Urea is an organic fertilizer
[C] Both of them are organic fertilizers
[D] Both of them are inorganic fertilizers
Answer: B [Ammophos is an inorganic fertilizer while Urea is an organic fertilizer]

133. Rayon is an example of _____?
[A] a synthetic fiber
[B] a natural fiber
[C] semi-synthetic fiber
[D] Synthetic Detergent
Answer: C [semi-synthetic fiber]

134. Sodium Alkyl Sulphate and Benzene Sulphate are examples of _____
[A] Explosives
[B] Insecticides
[C] Fungicides

[D] Synthetic Detergents
Answer: D [Synthetic Detergents]

135. Which of the following group characterizes alcohols?
[A] OH group
[B] COOH group
[C] COO group
[D] CO group
Answer: A [OH group]

136. Which among the following is not a use of Graphite?
[A] making of electrodes
[B] lubricant
[C] manufacturing of crucibles,
[D] Glass cutting
Answer: D [Glass cutting]

137. Water at 4 degree centigrade has____?
[A] minimum density
[B] maximum density
[C] No density
[D] None of the above
Answer: B [maximum density]

138. To keep the hot glass item's finishing and transparency , they go through a process called annealing. This process involves _____?
[A] cooled rapidly
[B] cooled very slowly
[C] cooled slowly and uniformly under controlled environment
[D] heating rapidly
Answer: C [cooled slowly and uniformly under controlled environment]

139. Bleaching Powder is a compound of _____?
[A] Calcium
[B] Sodium
[C] Magnesium
[D] Sulphur
Answer: A [Calcium]- Bleaching powder is chemically, calcium oxychloride (CaOCl2). Bleaching powder is manufactured using Backmann's plant in which slack lime and Chlorine are made to react to create Bleaching Powder.

Bleaching powder is a yellowish white powder with a strong smell of chlorine. When exposed to air, bleaching powder gives a smell of chlorine. This is because bleaching powder reacts with carbon dioxide from the atmosphere to produce calcium carbonate and chlorine.

140. Graphite, Carbon and Diamonds are _____?
[A] Isotopes
[B] Isomers
[C] Isotones
[D] Allotropes
Answer: D [Allotropes]- Some chemical elements are known to exist in two or more different forms because the atoms are bounded together in different manners. Most common example is Carbon which exists in Diamond, graphite, fullerenes etc. Allotropy is for elements and NOT for compounds.

141. Galena & Litharge are ores of which of the following metals?
[A] Mercury
[B] Zinc
[C] Copper
[D] Lead
Answer: D [Lead]

142. A molecule is a smallest part of matter which possesses all properties of original matter. A molecule is electrically _____?
[A] Positve
[B] Negative
[C] either positive or negative
[D] neutral
Answer: D [neutral]

143. A neutron , an electron, a proton and an alpha particle are moving with the same kinetic energy. Which of the following is correct order of their speeds?
[A] Alpha Particle, Neutron, Proton, Electron
[B] Electron, Proton , Neutron, Alpha Particle
[C] Alpha Particle, Proton, Neutron, Electron
[D] Neutron, Proton, Alpha Particle, Electron
Answer: A [Alpha Particle, Neutron, Proton, Electron]

144. Whenever an alkali metal such as Lithium or Sodium reacts with water , which among the following gas is produced?
[A] Oxygen
[B] Hydrogen
[C] Ozone
[D] Carbondioxide
Answer: B [Hydrogen]

145. Which among the following are used as components to produce Nitrolim, a widely used fertilizer in past?
[A] Nitrogen & Limestone
[B] Calcium Carbide and Nitrogen
[C] Calcium Carbide & Carbon

[D] Calcium Carbide and Limestone
Answer: B [Calcium Carbide and Nitrogen]

146. The aqueous solution of which among the following acids is called Vinegar?
[A] Oxalic acid
[B] Citric acid
[C] Acetic acid
[D] Hydrochloric acid
Answer: C [Acetic acid]- Vinegar is an acidic liquid processed from the fermentation of ethanol by acetic acid bacteria.

147. Which among the following is the correct decreasing of bioelements in Human Body?
[A] oxygen, hydrogen, Carbon, nitrogen, calcium, and phosphorus
[B] oxygen, carbon, nitrogen, hydrogen, calcium, and phosphorus
[C] oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus
[D] carbon, oxygen, hydrogen, nitrogen, calcium, and phosphorus
Answer: C [oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus]

148. Which among the following happens in an oxidation reaction ?
[A] Electrons are gained
[B] Electrons are lost
[C] Protons are gained
[D] Protons are lost
Answer: B [Electrons are lost]- Chemically, oxidation is defined as the removal of electrons and reduction as the gain of electrons

149. Identify the thermosetting plastic from the given options:
[A] Polythene
[B] Bakelite
[C] PVC
[D] Casseine
Answer: B [Bakelite]

150. White Phosphorous is represented by which among the following symbols?
[A] P1
[B] P2
[C] P3
[D] P4
Answer: D [P4]- The most important form of elemental phosphorus from the perspective of applications and chemical literature is white phosphorus. It consists of tetrahedral P4 molecules, in which each atom is bound to the other three atoms by a single bond. This P4 tetrahedron is also present in liquid and gaseous phosphorus up to the temperature of 800 °C when it starts decomposing to P2 molecules

151. Which among the following is called Laughing Gas popularly?
[A] Nitric oxide

[B] Nitrous oxide
[C] Nitrogen penta oxide
[D] Nitrogen
Answer: B [Nitrous oxide]- Nitrous oxide, commonly known as laughing gas, is a chemical compound with the formula N2O. It is an oxide of nitrogen.

At room temperature, it is a colorless, non-flammable gas, with a slightly sweet odor and taste. It is used in surgery and dentistry for its anaesthetic and analgesic effects. It is known as "laughing gas" due to the euphoric effects of inhaling it, a property that has led to its recreational use as a dissociative anesthetic.

Nitrous oxide gives rise to NO (nitric oxide) on reaction with oxygen atoms, and this NO in turn reacts with ozone. As a result, it is the main naturally occurring regulator of stratospheric ozone. It is also a major greenhouse gas and air pollutant.

152. Identify the non-metallic mineral from the given options:
[A] Manganese
[B] Magnesium
[C] Silica
[D] Bauxite
Answer: C [Silica]

153. Which among the following are constituents of Brass?
[A] Zinc and Copper
[B] Iron and Zinc
[C] Copper and Nickel
[D] Iron and Copper
Answer: A [Zinc and Copper]

154. Which among the following acids is abundant in Grapes, Bananas and Tamarind?
[A] Lactic Acid
[B] Oxalic Acid
[C] Salicylic Acid
[D] Tartaric Acid
Answer: D [Tartaric Acid]

155. Which among the following gas was leaked at Bhopal during the Bhopal gas tragedy at 2-3 December 1984?
[A] Methyl isocyanide
[B] Methyl isocyanate
[C] methyl isochloride
[D] methyl isochlorate
Answer: B [Methyl isocyanate]

156. In the manufacture of Vanaspati ghee from vegetable oils, which among the following gas is used?
[A] N2

[B] CO2
[C] H2
[D] Ne
Answer: C [H2]

157. When a tubelight breaks, a cracking sound is produced because ____?
[A] Pressure inside the lamp is less than atmospheric pressure
[B] Pressure inside the lamp is more than atmospheric pressure
[C] The lamp is filled with reactive gases
[D] The lamp is filled with mercury vapour
Answer: A [Pressure inside the lamp is less than atmospheric pressure]- A fluorescent lamp tube is filled with a gas containing low pressure mercury vapor and argon, xenon, neon, or krypton. The pressure inside the lamp is around 0.3% of atmospheric pressure.

158. Which among the following is the objective of the Methyl tert-butyl ether (MTBE) mixing with Petroleum?
[A] Raise Octane Number
[B] Antioxidant Stabilizer
[C] Lead Scavanger
[D] Fuel Dye
Answer: A [Raise Octane Number]- MTBE is a gasoline additive, used as an oxygenate to raise the octane number. Its use is controversial in the US and declining in that country in part because of its occurrence in groundwater and legislation favoring ethanol.

159. The most important contributor of sea salt is ____?
[A] Rivers
[B] Salty Rocks at bottom of sea
[C] Aquatic animals in Sea
[D] Atmosphere around sea
Answer: A [Rivers]

160. Which among the following elements are generally find in free state?
[A] Group 11 elements
[B] Group 12 elements
[C] Group 13 elements
[D] Group 14 elements
Answer: A [Group 11 elements]

161. Which among the following would cause the bright red colur due to bursting of crackers?
[A] Strontium
[B] Sodium
[C] Suphur
[D] Magnesium
Answer: A [Strontium]

162. Who among the following scientists had discovered Radium?
[A] Marie Sklodowska-Curie and Pierre Curie
[B] André-Louis Debierne
[C] Kasimir Fajans
[D] Oswald Helmuth Göhring
Answer: A [Marie Sklodowska-Curie and Pierre Curie]

163. Who among the following had given the Atomic Theory?
[A] Benzamin Franklin
[B] Madam curie
[C] Albert Einstien
[D] John Dalton
Answer: D [John Dalton]

164. Which among the following oxides cause the Acid rain ?
[A] Carbon monoxide and carbon dioxide
[B] Nitrous oxide and sulphur dioxide
[C] Carbon dioxide and nitrous oxide
[D] Sulphur dioxide and carbon monoxide
Answer: B [Nitrous oxide and sulphur dioxide]

165. Which among the following element is an essential constituent of acids?
[A] Nitrogen
[B] Hydrogen
[C] Helium
[D] Oxygen
Answer: B [Hydrogen]

166. Highest percentage of nitrogen is found in which among the following fertilizers among the given options?
[A] Calcium ammonium nitrate
[B] Ammonium nitrate
[C] Calcium nitrate
[D] Urea
Answer: D [Urea]

167. Which among the following is popularly called Hypo?
[A] Silver bromide
[B] Silver nitrate
[C] Sodium thiosulphate
[D] Sodium phosphate
Answer: C [Sodium thiosulphate]

168. Which among the following is a Noble Gas?
[A] Nitrogen
[B] Hydrogen

[C] Oxygen
[D] Helium
Answer: D [Helium]

169. Which of the following is an anti-knocking compound that has been phased out in many countries so far?
[A] Lead tetrachloride
[B] Tetra Ethyl Lead
[C] Ethyl acetate
[D] None of the above
Answer: B [Tetra Ethyl Lead]- Tetra Ethyl Lead (TEL) is one such component that is added to petrol to reduce its tendency to `ping' under compression. TEL breaks down to lead at upper cylinder temperatures. Lead atoms spread around and combining with the free radicals and slowing down the reaction.

However, `Leaded' petrol was a grave danger to the environment, as lead is a poison when it is absorbed into the body.

170. Which among the following is the main constituent of Biogas?
[A] Methane
[B] Ethane
[C] Propane
[D] Butane
Answer: A [Methane]- Biogas comprises primarily methane (CH_4) and carbon dioxide (CO_2) and may have small amounts of hydrogen sulphide (H_2S), moisture and siloxanes.

171. Which among the following methods can be used to remove the permanent hardness in water due to calcium or magnesium sulphates?
[A] Sulphonate method
[B] Nitrate method
[C] Zeolite method
[D] None of the above
Answer: C [Zeolite method]

172. The free electrons are in the _____?
[A] Outermost orbit of the metals
[B] Innermost orbit of the metals
[C] Middle orbits of the metals
[D] Any orbit of the metals
Answer: A [Outermost orbit of the metals]

173. Which of the following type of Coal, has maximum carbon content?
[A] Peat
[B] Lignite
[C] Antharacite
[D] Bituminious
Answer: C [Antharacite]

174. What is the common name of Calcium Sulphate Hemihydrate?
[A] Bleaching powder
[B] Slaked lime
[C] Plaster of paris
[D] Detergent
Answer: C [Plaster of paris]- Plaster of Paris is calcium sulphate hemihydrate. The formula is given as, $CaSO_4.1/2\ H_2O$ or $(2\ CaSO_4)\ .\ H_2O$. The powder is called plaster of Paris, because the gypsum which was used to get the powder was mainly found in Paris.

175. Which among following is also known as white gold?
[A] Nickel
[B] Rhodium
[C] Platinum
[D] Palladium
Answer: C [Platinum]

176. Which acid is described as HOOCCOOH?
[A] Oxalic Acid
[B] Acetic Acid
[C] Carbonic Acid
[D] Citric Acid
Answer: A [Oxalic Acid]

177. Carnotite is a mineral of which among the following metals?
[A] Lead
[B] Uranium
[C] Aluminium
[D] Iron
Answer: B [Uranium]

178. PVC is a polymer of ?
[A] Propane
[B] Vinyl chloride
[C] Styrene
[D] Carbonates
Answer: B [Vinyl chloride]- Polyvinyl chloride (PVC) is made from the monomer vinyl chloride ($CH_2 =CHCl$). It is used for making rain coats, handbags, toys including dolls, electrical goods and as a covering of electrical wires.

179. When Sulphur is heated with rubber, the process is commonly known as ?
[A] Galvanization
[B] Sulphonation
[C] Vulcanization
[D] Hydrodesulfurization
Answer: C [Vulcanization]- Natural rubber becomes soft at high temperature (>335 K) and brittle at low temperatures (<283 k) and shows high water absorption capacity. It is soluble in

non-polar solvents and is non-resistant to attack by oxidising agents. To improve upon these physical properties, a process of vulcanisation is carried out. This process consists of heating a mixture of raw rubber with sulphur and an appropriate additive at a temperature range between 373 K to 415 K. On vulcanisation, sulphur forms cross links at the reactive sites of double bonds and thus the rubber gets stiffened.
In the manufacture of tyre rubber, 5% of sulphur is used as a crosslinking agent

180. Which among the following chemicals is used in Photography?
[A] Silver Bromide
[B] Potassium Chloride
[C] Sodium Bromide
[D] Magnesium Chloride
Answer: A [Silver Bromide]

181. Which among the following is major component of Gobar Gas?
[A] Butane
[B] Ethane
[C] Propane
[D] Metahne
Answer: D [Metahne]

182. Which among the following is a common salt in Detergents?
[A] Sulphate
[B] Nitrate
[C] Sulphonate
[D] Carbonate
Answer: A [Sulphate]

183. Potassium permanganate is used to purify water. Which among the following properties of Potassium permanganate helps in this work?
[A] sterilizing
[B] oxidizing
[C] reducing
[D] leaching
Answer: B [oxidizing]

184. What happens to the weight of Iron, when it rusts?
[A] Increases for long time
[B] Decreases then increases
[C] Increases then decreases
[D] Remains the same
Answer: C [Increases then decreases]- When iron or any other metal oxidizes, oxygen from the air combines with the iron to make iron oxide or rust. So, weight of the bar increases, due to the increased weight of oxygen which has combined with the iron. over time, the weight of the iron bar will tend to decrease, due to factors related more to erosion than to chemistry.

185. Lightest and most abundant chemical element, constituting roughly 75 % of the Universe's elemental mass.
[A] Carbon
[B] Aluminium
[C] Bauxite
[D] Hydrogen
Answer: D [Hydrogen]

186. A cotton wick dipped in pure honey when ignited with a matchstick will _____?
[A] Burn Consistently
[B] Burn with cracking sound
[C] Does not burn at all
[D] Burns with too much smoke
Answer: A [Burn Consistently]- A cotton wick dipped in pure honey burns when ignited with a match stick. If adulterated presence of water will not allow the honey to burn, if it does will produce a cracking sound.

187. The easily noticed smell of the LPG gas is because of which among the following?
[A] Butane
[B] Propane
[C] Methane
[D] Ethanethiol
Answer: D [Ethanethiol]

188. Which compound of mercury is used as antiseptic?
[A] Mercuric sulphide
[B] Mercuric oxide
[C] Mercuric chloride
[D] Mercuric iodide
Answer: C [Mercuric chloride]

189. Speed of sound is maximum in which among the following?
[A] Solids
[B] liquids
[C] Gases
[D] Vaccum
Answer: A [Solids]- The speed of sound decreases when we go from solid to gaseous state.

190. Which among the following metal is highest electrical conductivity as well as highest thermal conductivity?
[A] Gold
[B] Silver
[C] Platinum
[D] Iron
Answer: B [Silver]

191. Calamine is an ore of which among the following?
[A] Zinc
[B] Copper
[C] Mercury
[D] Iron
Answer: A [Zinc]- Calamine- ZNCO3

192. Trimethylxanthine is a chemical name of a stimulant which is found in tea and coffee. What is the popular name?
[A] Thein
[B] Caffeine
[C] Theobromine
[D] Theophylline
Answer: B [Caffeine]

193. The popular drug “Acetylsalicylic Acid” is commonly known by which among the following names?
[A] Paracetamol
[B] Aspirin
[C] Salsalate
[D] Wintergreen
Answer: B [Aspirin]- Aspirin, also known as acetylsalicylic acid, is a salicylate drug, often used as an analgesic to relieve minor aches and pains as an antipyretic to reduce fever and an anti-inflammatory medication. Aspirin also has an anti-platelet, or anti-clotting, effect and is used in long-term , low does to prevent heart attacks, strokes and blood clot formation in people.

194. What are the main constituents of LPG?
[A] Methane, Hexane, Ethane
[B] Methane, Butane, Propane
[C] Ethane, Pentane, Hexane
[D] Ethane, Methane, Pentane
Answer: B [Methane, Butane, Propane]

195. Which among the following is known as White Vitriol?
[A] Zinc Sulphate
[B] Zinc Chloride
[C] Zinc Phosphate
[D] Zinc oxide
Answer: A [Zinc Sulphate]

196. Which among the following is known as Quick Lime?
[A] CaO
[B] CaCO2
[C] Ca(OH)2
[D] CaCl2

Answer: A [CaO]- Calcium oxide (CaO), commonly known as quicklime or burnt lime, is a widely used chemical compound. It is a white, caustic, alkaline crystalline solid at room temperature.

197. In which among the following forms, Nitrogen is present in Urea?
[A] Nitrite
[B] Nitrate
[C] Ammonium
[D] Amide
Answer: D [Amide]

198. "Oil of mirbane" is the most common name of which among the following?
[A] Phenol
[B] Toluene
[C] Phenolphthalein
[D] Nitrobenzene
Answer: D [Nitrobenzene]

199. Which among the following substances is most suitable for making Compact Discs?
[A] PVC
[B] Polyethylene
[C] Polyamides
[D] Polycarbonates
Answer: D [Polycarbonates]

200. What is the common name of analgesic and antipyretic drug acetylsalicylic acid?
[A] Paracetamol
[B] Aspirin
[C] Wintergreen
[D] Trazodone
Answer: B [Aspirin] Aspirin or acetylsalicylic acid is a salicylate drug, often used as an analgesic to relieve minor aches and pains, as an antipyretic to reduce fever, and as an anti-inflammatory medication.

While in humans much of it is attributable to diet, a substantial part is synthesized endogenously.

GENERAL SCIENCE – BIOLOGY

1. Some plants are 'carnivorous' due to their adaptation to grow in places where the soil is thin or poor in nutrients, especially nitrogen.In this context, consider the following plants:
1.Utricularia
2.Nepenthes
3.Dionaea
Which of the above plant(s) is/are carnivorous?
[A] Only 2
[B] 1 and 2
[C] 2 and 3
[D] 1, 2 and 3
Answer: D [1, 2 and 3]

2. Dietary intake of 'Iodine' is essential for the normal functioning of thyroid gland.Which among the following is considered to be naturally rich in Iodine?
1.Table Salt
2.Sea-food
3.Dairy Products
[A] Only 1
[B] 1 and 2
[C] 1 and 3
[D] 1, 2 and 3
Answer: D [1, 2 and 3]

3. Consider the following plant hormones:
1. Gibberellins-Seed germination
2. Auxins-Apical dominance
3. Cytokinins-Climacteric ripening of fruits
Which among the above is/are correctly paired with their respective functions in plant physiology?
[A] Only 1
[B] 1 and 2
[C] 2 and 3
[D] 1, 2 and 3
Answer: B [1 and 2]- Cytokinins or CKs are a group of chemicals that influence cell division and shoot formation. Ethylene is related with the Climacteric ripening of fruits.

4. Bowman's Capsule' works as a part of the functional unit of which among the following human physiological system?
[A] Circulatory System
[B] Respiratory System
[C] Excretory System
[D] Reproductive System

Answer: C [Excretory System]- Bowman's Capsule is related to the process of 'Ultrafiltration' in the functional units of kidneys called 'nephrons'.Therefore, it is a part of the excretory system.

5. Which of the following Vitamins of the 'B-Complex' are correctly paired with their respective names?
1. Vitamin B2-Riboflavin
2. Vitamin B3-Niacin
3. Vitamin B7-Biotin
4. Vitamin B12-Cyanocobalamine
[A] 2 and 4
[B] 3 and 4
[C] 1, 3 and 4
[D] All of them
Answer: D [All of them]

6. Plants which are adapted to grow in soils containing high concentration of salt are known as:
[A] Xerophytes
[B] Mesophytes
[C] Halophytes
[D] Thallophytes
Answer: C [Halophytes]

7. Which among the following have a 'mixed heart' ,that is the heart in which the oxygenated and the deoxygenated blood is mixed?
[A] Birds
[B] Fishes
[C] Reptiles
[D] Nematodes
Answer: C [Reptiles]- Reptiles and Amphibians have a mixed heart.

8. Pancreas' functions as an:
1. Endocrine gland
2. Exocrine gland
[A] Only 1
[B] Only 2
[C] Both 1 and 2
[D] Neither 1 nor 2
Answer: C [Both 1 and 2]- Pancreas and gonads are mixed glands i.e. they are both endocrine and exocrine.

9. Saffron' is obtained from which among the following parts of the plant?
[A] Stigma
[B] Anther
[C] Stamen
[D] Pollen
Answer: A [Stigma]

10. Which among the following factors are essential for 'blood coagulation'?
1.Vitamin K
2.Calcium ions (Ca++)
3.Christmas factor
[A] 1 and 2
[B] 1 and 3
[C] 2 and 3
[D] 1, 2 and 3
Answer: D [1, 2 and 3]- Factor IX (or Christmas factor) is one of the serine proteases of the coagulation system.

11. Which among the followingis/are correctly paired:
1.Ginger:Tuber
2.Potato:Rhizome
3.Onion:Bulb
[A] Only 2
[B] Only 3
[C] Only 1
[D] 1, 2 and 3
Answer: B [Only 3]
Ginger::Rhizome
Potato::Tuber
Onion ::Bulb

12. The bacterium 'Escherichia coli' is found mainly in:
[A] Human Intestine
[B] Pteridophytes
[C] Root Nodules of leguminous plants
[D] Paddy fields for nitrogen fixation
Answer: A [Human Intestine]

13. Which among the following is not a 'heriditary' disease?
[A] Thalessemia
[B] Colour-Blindness
[C] Haemophilia
[D] Leukemia
Answer: D [Leukemia]

14. Human Papilloma Virus is related to which of the following diseases?
[A] Prostate Cancer
[B] Cervical Cancer
[C] Lymphatic Filariasis
[D] Leukemia
Answer: B [Cervical Cancer]

15. The nutritional supplements Spirulina, Chorella and the Vitamin-C supplement, Dunaliella are actually:
[A] Algae
[B] Lichens
[C] Probiotics
[D] Bryophytes
Answer: A [Algae]

16. Anemophily' is pollination by :
[A] Birds
[B] Wind
[C] Ants
[D] Bats
Answer: B [Wind]- Abiotic pollination refers to situations where pollination is mediated without the involvement of other organisms. The most common form of abiotic pollination, anemophily, is pollination by wind. This form of pollination is predominant in grasses, most conifers, and many deciduous trees. Of the 20% of abiotically pollinated species, 98% are anemophilous and 2% hydrophilous, being pollinated by water.

17. Pest-resistant cotton commonly known as 'Bt-Cotton' is genetically engineered by inserting a gene from a:
[A] Bacterium
[B] Virus
[C] Microalgae
[D] Protist
Answer: A [Bacterium]

18. Penicillin' which is used as an antibiotic is obtained from :
[A] Bacteria
[B] Fungi
[C] algae
[D] Lichens
Answer: B [Fungi]

19. The instrument that measures arterial blood pressure is known as :
[A] Pyknometer
[B] Hypsometer
[C] Sphygmoscope
[D] Sphygmomanometer
Answer: D [Sphygmomanometer]

20. Meg-1 is an imprinted gene which finds expression only from maternal chromosomes which regulates the transfer of nutrients from the plant to the seed. This gene has been discovered in:
[A] Maize
[B] cotton
[C] jute

[D] Sugarcane
Answer: A [Maize] Deficiency of this protein causes hemophilia B.

21. Which of the following statements is NOT true regarding the Vitamin C?
[A] Only Vitamin C is to be taken externally, all others are produced in the human body.
[B] Vitamin C is the only vitamin which is also a hormone.
[C] Scurvy is caused by the deficiency of Vitamin C
[D] Vitamin C is a water-soluble vitamin.
Answer: B [Vitamin C is the only vitamin which is also a hormone.]

22. Which of the following tests is used for the diagnosis of 'Colour-Blindness' in people ?
[A] Ishihara Test
[B] Widal Test
[C] ELISA test
[D] Rorschach test
Answer: A [Ishihara Test]

23. Which of the following artificial sweeteners is not broken down by the body and therefore it is non-caloric (no-calorie sweetener) :
[A] Aspartame
[B] Saccharin
[C] Sucralose
[D] Cyclamate
Answer: C [Sucralose]- Sucralose is an artificial sweetener. The majority of ingested sucralose is not broken down by the body and therefore it is non-caloric. Sucralose is approximately 600 times as sweet as sucrose (table sugar), twice as sweet as saccharin, and 3 times as sweet as aspartame. It is stable under heat and over a broad range of pH conditions. Therefore, it can be used in baking or in products that require a longer shelf life. The commercial success of sucralose-based products stems from its favorable comparison to other low-calorie sweeteners in terms of taste, stability, and safety.It is used because it is a no-calorie sweetener, and does not promote dental cavities, is safe for consumption by diabetics, and does not affect insulin levels.

24. The Science of using mechanical devices with human muscle skeleton and nervous systems to assist or enhance motor control lost by trauma, disease or defect is called:
[A] Gerontechnology
[B] Biomechatronics
[C] Orthotics
[D] Bionics
Answer: B [Biomechatronics]- Biomechatronics is an applied interdisciplinary science that aims to integrate mechanical elements, electronics and parts of biological organisms. Biomechatronics includes the aspects of biology, mechanics, and electronics. It also encompasses the fields of robotics and neuroscience. The goal of this science is to make devices that interact with human muscle, skeleton, and nervous systems. The end result is that the devices will help with human motor control that was lost or impaired by trauma, disease or birth defects.

25. Consider the following:
Waste products
Hormones
Ions
Circulation of blood is responsible for transport of which among the above in our bodies?
[A] Only 1
[B] 1 & 2
[C] 2 & 3
[D] 1, 2 & 3
Answer: D [1, 2 & 3]

26. Which among the following is not among Micronutrients required for plants?
[A] Molybdenum
[B] Magnesium
[C] Manganese
[D] Zinc
Answer: B [Magnesium]- In order for a plant to grow and thrive, it needs a number of different chemical elements. The most important are:
Carbon, hydrogen and oxygen – Available from air and water and therefore in plentiful supply
Nitrogen, phosphorus, potassium (a.k.a. potash) – The three macronutrients and the three elements you find in most packaged fertilizers
Sulfur, calcium, and magnesium – Secondary nutrients
Boron, cobalt, copper, iron, manganese, molybdenum and zinc – Micronutrients

27. Why do the bacteria develop resistance after slowly being exposed to a particular antibiotic?
Due to mutation in genes
Due to Horizontal Gene Transfer
Due to Vertical Gene Transfer
Choose the correct option:
[A] Only 1
[B] Only 1 & 2
[C] Only 2 & 3
[D] 1, 2 & 3
Answer: B [Only 1 & 2]- Antibiotic resistance occurs from random mutations, the first choice given is correct. The slow exposure to an antibiotic will give more chance for mutations to occur. Most antibiotics are derived from naturally derived from organisms, penicillin was derived from the mould Penicillium, other antibiotics have also been extracted from bacteria, and these bacteria will be resistant to that antibiotic. The Horizontal Gene Transfer is considered to be the main culprit of the antibiotic resistance. Horizontal gene transfer (HGT), also lateral gene transfer (LGT), is any process in which an organism incorporates genetic material from another organism without being the offspring of that organism. By contrast, vertical transfer occurs when an organism receives genetic material from its ancestor, e.g., its parent or a species from which it has evolved. Horizontal gene transfer is also the primary reason for bacterial antibiotic resistance and this often involves plasmids. Genes that are responsible for antibiotic resistance in one species of bacteria can be transferred to another

species of bacteria through various mechanisms. The resistance spreads across bacterial species usually by transfer of genetic material via a vector, this vector tends to be a circular piece of genetic material known as a plasmid. Operons within the plasmid code for several genes, a combination of proteins including an enzyme which is able to deactivate antibiotics, for example beta-lactamase is an enzyme which cleaves beta-lactam rings, deactivating penicillin and its derivatives (although certain derivatives like methicillin are resistant to beta lactamases). Sequences within plasmids that can transfer to the cell's own genetic material is known as a transposon.
The third choice "vertical gene transfer' is not correct. Vertical Gene Transfer means reproduction.

28. If a person wants to increase the level of good Cholesterol in his / her body, which among the following you would advise?
1. Increase the use of trans fatty acids in diet
2. Stop smoking
3. Consumption of omega-3 fatty acids
Choose the correct option:
[A] 1, 2 & 3
[B] Only 1 & 3
[C] Only 2 & 3
[D] Only 3
Answer: C [Only 2 & 3]- Trans fats are not essential fatty acids. The consumption of trans fats increases the risk of coronary heart disease by raising levels of LDL cholesterol and lowering levels of "good" HDL cholesterol.

29. How does calcium carbide ripen mangoes?
[A] It reacts with moisture and releases Ethylene
[B] It reacts with moisture and releases Acetaldehyde, which in turn releases ethylene
[C] It reacts with starch and releases Acetylene
[D] It reacts with moisture and releases Ethyne
Answer: A [It reacts with moisture and releases Ethylene]- or reasons of safe transportation of fruits, mangoes, bananas etc are picked before they ripen fully. Slightly green harvested mangoes are subjected to small containers of calcium carbide (CaC2) with a plastic covering. CaC2 reacts with the moisture in the air to release acetylene (or ethyne) gas as follows:
$CaC2 + 2\ H2O \rightarrow C2H2 + Ca(OH)2$
This option may give you slightest confusion if you don't know the difference between Ethylene and Ethyne (Acetylene). Both are chemical substances produced by fruits to accelerate the normal process of fruit maturation — is a ripening hormone. Ethylene is C2H4 and has a carbon-carbon double bond. Acetylene is C2H2 and has a carbon-carbon triple bind. Acetylene contains more energy and burns hotter than ethylene. Ethylene is a gaseous compound , Acetylene is the chemical compound , which is the simplest alkyne and is also a hydrocarbon while Ethylene is the simplest alkene and classified as an unsaturated hydrocarbon. I hope you will never forget it now.

30. Which among the following is the edible part in Rice?
[A] Fruit
[B] Cotyledons
[C] Endosperm
[D] Embryo
Answer: C [Endosperm]- Most of the essential micronutrients are almost exclusively stored in the husk, aleurone and embryo of rice, which are removed during the polishing process. Polishing of rice is required as the oil-rich aleurone layer turns the seed rancid upon storage and therefore making rice unsuitable for consumption. Consequently, the rice endosperm that comprises the edible part of rice for humans lacks or contains only small amount of key micronutrients (e.g., iron, zinc, protein, provitamin A, and other vitamins) that are essential for a healthy diet. Considering the facts above and severity of widespread micronutrient malnutrition, iron biofortification in rice endosperm is a promising strategy to overcome iron deficiency effectively.

31. Late Hargobind Khorana had received Nobel Prize in physiology in 1968, for work on which among the following?
[A] Mechanisms of the action of hormones
[B] Chemical Structure of antibodies
[C] Interpretation of the genetic code
[D] Structural and functional organization of the cell
Answer: C [Interpretation of the genetic code]

32. A person with "Bombay Blood group" can receive blood from a person who is from____?
[A] A Group or B Group
[B] AB Group
[C] O Group
[D] None of them
Answer: D [None of them]- Bombay Blood Group is an extremely rare ABO group, called so because it was first discovered among some people in Bombay. Their red cells lack ABH antigens and their sera contain anti-A and anti-B and anti-H. The anti-H would not be detected in the ABO group but would be detectable in pretransfusion tests. People who have Bombay phenotype can donate to any member of the ABO blood group system (unless some other blood factor gene, such as Rhesus, is incompatible), but they cannot receive any member of the ABO blood group system`s blood (which always contains one or more of A and B and H antigens), but only from other people who have Bombay phenotype

33. What is the average life of the Red Blood corpuscles?
[A] 100-120 days
[B] 120-140 days
[C] 80-95 days
[D] 70-85 days
Answer: A [100-120 days]

34."Daps one" immunotherapy is related to which among the following diseases?
[A] AIDS

[B] Tuberculosis
[C] Leprosy
[D] Malaria
Answer: C [Leprosy]

35. What is PRINT (Particle Replication in Non-wetting Templates) Technology ?
[A] It's a technology related to genetic engineering and refers to duplication of the DNA codes
[B] It's a technology related to climate change and refers to a new technique of combating air pollution
[C] It's a new technology related to synthesis of artificial blood
[D] None of them
Answer: C [It's a new technology related to synthesis of artificial blood]

36. The vaccine of which of the following diseases was not included in the Expanded Programme on Immunization (EPI) initiated by the Government of India in 1978?
[A] Polio
[B] Diphtheria
[C] Measles
[D] Tuberculosis
Answer: C [Measles]- The Expanded Programme on Immunization (EPI) was initiated in India in 1978 with the objective to reduce morbidity and mortality from diphtheria, pertussis, tetanus, poliomyelitis and childhood tuberculosis by providing immunization services to all eligible children and pregnant women by 1990. Measles vaccine was included when the EPI was accelerated by launching the Universal Immunization Programme (UIP) in 1985-6. Approximately half of all infants now receive complete primary immunization with diphtheria, polio and tetanus (DPT), oral polio vaccine (OPV) and BCG vaccine.

37. The term Cyberknife is most closely associated with which among the following?
[A] Magnetic Resonance
[B] Cancer Surgery
[C] Software Security
[D] Remote sensing
Answer: B [Cancer Surgery]

38. Deposition of which among the following in the joints, causing inflammation is reason of Gout, one of the forms of arthritis?
[A] Lactic Acid
[B] Oxalic Acid
[C] Acetic Acid
[D] Uric Acid
Answer: D [Uric Acid]- Gout is caused by deposition of uric acid crystals in the joint, causing inflammation. There is also an uncommon form of gouty arthritis caused by the formation of rhomboid crystals of calcium pyrophosphate known as pseudogout. In the early stages, the gouty arthritis usually occur in one joint, but with time, it can occur in many joints and be quite crippling. The joints in gout can often become swollen and lose function.

39. The phenomenon in which seeds germinate and seedlings grow while still attached to their mother plant before dropping down to establish themselves or be transported elsewhere, is most commonly found in which among the following plants?
[A] Allium cepa
[B] Rhizophora
[C] Solanum tuberosum
[D] Solanum melongena
Answer: B [Rhizophora]
Allium cepa is onion.
Solanum tuberosum is potato,
Solanum melongena is Brinjal.
The phenomenon given in this question is shown by Mangrove Plants and is known as Vivipary and Rhizophora belongs to that category.

40. The hormonal activities of which of the following substances were discovered while studying “foolish seedling” disease in rice?
[A] Cytokinins
[B] Ethylene
[C] Auxins
[D] Gibberellin
Answer: D [Gibberellin]

41. The useful part of Zingiber officinale is ____?
[A] Roots
[B] Rhizome
[C] Leaves
[D] fruits
Answer: B [Rhizome]

42. Beta-Keratin is found in which among the following in abundance?
[A] Fishes
[B] Reptiles
[C] Mammalians
[D] Amphibians
Answer: B [Reptiles]

43. Antipyretic medicines are used for which among the following purposes?
[A] In fever
[B] In Diarrhea
[C] In Cough
[D] In Allergy
Answer: A [In fever]

44. A health problem which is characterized by inability of the bone marrow to produce the red blood cells is placed in which among the following groups?
[A] Anuria

[B] Aplastic Anemia
[C] Pernicious Anemia
[D] Aplasia
Answer: B [Aplastic Anemia]

45. In context with the connective tissues, which among the following connect join Bones to Bones?
[A] Ligaments
[B] Tendons
[C] Reticular fibers
[D] Raphe
Answer: A [Ligaments]

46. Brachytherapy is commonly used as an effective treatment for cervical, prostate, breast, and skin cancer in many parts of the world. Why Brachytherapy is an offshoot of which among the following forms of Cancer Treatment?
[A] Radiotherapy
[B] Chemotherapy
[C] Surgery
[D] None of them,
Answer: A [Radiotherapy]

47. From the point of view of evolution of living organisms, which of the following set of animals is a correct sequence of evolution?
[A] Whale, Kangaroo, Echidna
[B] Echidna, Whale, Kangaroo
[C] Kangaroo, Whale, Echidna
[D] Echidna, Kangaroo, Whale
Answer: D [Echidna, Kangaroo, Whale]

48. Which among the following live tissues of the Human Eye does not have blood vessels?
[A] Sclera
[B] Cornea
[C] Choroid
[D] Iris
Answer: B [Cornea]

49. Which among the following is involved in the Research on Desert Flora and Fauna?
[A] CAZRI
[B] SIPRI
[C] AFRI
[D] CRIJ
Answer: A [CAZRI]- Central Arid Zone Research Institute CAZRI at Jodhpur is involved in the research on desert flora and fauna

50. The Indian Pipe Plant or Monotrapa can be best placed in which among the following groups?
[A] Parasite
[B] Saprophyte
[C] Insectivorous
[D] Lithophyte
Answer: B [Saprophyte]- Pipe Plant is a total saprophyte i.e. thrives on dead or decayed organic matter

51. The monocarpic plants produce flowers only _____?
[A] Once in a year
[B] Once in a season
[C] Once in lifetime
[D] One flower per plant
Answer: C [Once in lifetime]

52. Which among the following is the correct meaning of Phyllotaxy?
[A] Classification of plants as per the leaves structure
[B] The manner of arrangement of leaves in stem or branch
[C] The manner the leaves fall from the branches
[D] The anatomy of leaves in angiosperms
Answer: B [The manner of arrangement of leaves in stem or branch]

53. In which of the following insects, a pigment called luciferin is found?
[A] Housefly
[B] Firefly
[C] Sandfly
[D] Fruitfly
Answer: B [Firefly]

54. A plant belonging to which of the following groups would show least adaptation to marine water?
[A] Pteridophytes
[B] Gymnosperms
[C] Angiosperms
[D] Bryophytes
Answer: C [Angiosperms]

55. A treatment with which among the following plant hormones would prevent water loss from the plant leaves, by reducing transpiration, in times of low water availability?
[A] Ethylene
[B] Abscisic Acid
[C] Gibberelic Acid
[D] Auxin
Answer: B [Abscisic Acid]

56. A tablet of which among the following Vitamins should be advised to be used after purification of water by Iodine as a disinfectant?
[A] Vitamin A
[B] Vitamin B
[C] Vitamin C
[D] Vitamin D
Answer: C [Vitamin C]

57. Who among the following scientists is known for devising four criteria designed to establish a causal relationship between a causative microbe and a disease?
[A] Louis Pasteur
[B] Emil Behring
[C] Ivan Pavlov
[D] Robet Koch
Answer: D [Robet Koch]- Dr. Robert Koch was a German (Prussian) physician. In 1877 he isolated Bacillus anthracis (causative agent of Anthrax) . In 1822 he isolated Tuberculosis bacillus (Causative agent of TB) and in 1883 Vibrio cholera (causative agent of Cholera). He is also known to develop Koch's postulates, the four criteria designed to establish a causal relationship between a causative microbe and a disease. He was awarded the Nobel Prize in Physiology or Medicine for his tuberculosis findings in 1905.

58. A combination of several medicines called SHREZ is used in the treatment of which among the following diseases?
[A] HIV/ AIDS
[B] Diphtheria
[C] Tuberculosis
[D] Malaria
Answer: C [Tuberculosis]

59. The most popular Zero Calorie sugar substitutes in the market are made up of Sucralose, as an artificial sweetner. Why sucralose does not have calories?
[A] Because the Sucralose is 600 times more sweet than Sucrose (Natural Sugar) and thus its low quantity gives same taste but zero calories when it is digested in the body.
[B] Because the chemical composition of Sucralose is such that its oxidation gives less calories in body compared to the Sucrose.
[C] Because Sucralose is not a Carbohydrate
[D] Because Sucralose is not digested in the body
Answer: D [Because Sucralose is not digested in the body]

60. As per the WHO definition, within how many days of the termination of pregnancy, the death of a woman is counted in the Maternal Mortality?
[A] 36 Days
[B] 42 Days
[C] 56 Days
[D] 60 Days
Answer: B [42 Days]

61. Consider the following statements:
1. For some diseases like Malaria and Denue, techniques of Population suppression of Vectors is favored over the disease resistance techniques
2. RIDL is a Population suppression technique.
Which among the above statements is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] Both 1 & 2 are correct
[D] Neither 1 nor 2 is correct
Answer: C [Both 1 & 2 are correct]

62. Which among the following have been found to produce a protein called Defensin-1, which has been found potential to develop drugs for antibiotic resistant bacteria?
[A] Codfish
[B] Cuttle Fish
[C] Honey bee
[D] Domestic Fly
Answer: C [Honey bee]- Defensin-1 is the name of a protein, which has the property of resistance of epithelial surfaces to microbial colonization. This protein has the potential to develop drugs for antibiotic resistant bacteria. Honey bees make this protein and adds to honey and the scientists at the Academic Medical Centre, Amsterdam say that one day the drugs developed by Honey containing Defensin-1, could combat antibiotic-resistant infections.

63. The Gram Positive Bacteria can be identified by the Gram staining because of the following reasons?
[A] The cell walls have more lipids compared to peptidoglycan
[B] The Cells walls have more Peptidoglycan compared to Lipids
[C] The Cells membrane has more fatty acids
[D] The plasma has Peptidoglycans
Answer: B [The Cells walls have more Peptidoglycan compared to Lipids]- The cell wall which is made up of Peptidoglycan as well as lipids gets violet due to the reaction of the CV+. After the decolorization with alcohol, the lipids gets dissolved and the bacteria with higher Peptidoglycan remain violet. These are called Gram Positive bacteria.

64. The Bovine spongiform encephalopathy (BSE) is commonly known as _____?
[A] Foot & Mouth Disease
[B] Mad Cow Disease
[C] Fog fever
[D] Creutzfeldt-Jakob disease
Answer: B [Mad Cow Disease]

65. Consider the following statements about Archaeopteryx:
1. Archaeopteryx was the earliest and most primitive bird known, when it was found in Germany in late 19th century
2. The discovery of Archaeopteryx put an end to the debate that Birds originated from Dinosaurs or the archosaurian reptiles.

Which among the above statements is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] Both 1 & 2 are correct
[D] Neither 1 nor 2 are correct
Answer: A [Only 1 is correct]

66. The natural Pacemaker in the Human Heart is located in the SA node which is present in which among the following chambers?
[A] Right Auricle
[B] Left Auricle
[C] Right Ventricle
[D] Left Ventricle
Answer: A [Right Auricle]

67. Consider the following statements regarding the GMO (Genetically Modified Organisms) and LMO (Living Modified Organism):
GMO are essentially dead , while the LMO are alive and can grow
GMO are patentable, while LMO are not patentable
GMO are modified using Genetic Engineering, while LMO are modified by other technologies.
Which among the above statements is / are correct?
[A] Only 1 & 2 are correct
[B] Only 2 & 3 are correct
[C] All are correct
[D] None of them is correct
Answer: D [None of them is correct]- The first statement says that GMO are essentially dead , while the LMO are alive and can grow. This is incorrect because GMO can include the LMOs also apart from the dead organisms. Second statement says that GMO are patentable, while LMO are not patentable. This is wrong statement because both can be patented. Thid Statement says “GMO are modified using Genetic Engineering, while LMO are modified by other technologies” this is also incorrect because LMOs may be genetically modified.

68. Overdose of antibiotics will cause the suppression of synthesis of which among the following vitamins in human body?
[A] Vitamin A
[B] Calciferol
[C] Vitamin K
[D] Biotin
Answer: D [Biotin]
69. Who among the following first synthesized “gene” in a laboratory ?
[A] Arthur kornberg
[B] Hargobind Khorana
[C] Gregor Mendel
[D] Watson and crick
Answer: B [Hargobind Khorana]

70. Which among the following is correct definition of Bacteriophage?
[A] A Bacteria that destroys Virus
[B] A Virus that destroys Bacteria
[C] A Bacteria that destroys another bacteria
[D] A Bacteria that destroys Fungi
Answer: B [A Virus that destroys Bacteria]

71. A particular cell organelle is sometimes referred certain enzymes that can break down the cell components or even the whole cell. which one of the following is such an organelle ?
[A] Lysosome
[B] Mesosome
[C] Phagosome
[D] Ribosome
Answer: A [Lysosome]

72. The disorder “Pityriasis simplex capillitii ” is most commonly known as which among the following?
[A] Tulip fingers
[B] Dandruff
[C] Baldness
[D] Eczema
Answer: B [Dandruff]

73. What is the number of the Chromosomes affected by Turner syndrome?
[A] 44
[B] 45
[C] 46
[D] 47
Answer: B [45]

74. Ornithophily refers to the pollination through which among the following?
[A] Wind
[B] Insects
[C] Birds
[D] Water
Answer: C [Birds]

75. The insect “Apis mellifera” is commonly known as which among the following?
[A] Sand Fly
[B] Domestic Fly
[C] Honey Bee
[D] Spider
Answer: C [Honey Bee]

76. Which among the following element in the human body / organ makes the main basis of working of the MRI (Magnetic resonance imaging)?

[A] Nitrogen
[B] Hydrogen
[C] Calcium
[D] Sodium
Answer: B [Hydrogen]

77. The term “Halitosis” denotes which among the following?
[A] Bad hearing
[B] bad breathe
[C] Baldness
[D] Excessive Sweating
Answer: B [bad breathe]

78. The term “Gypsophils” is associated with the people who have liking for which among the following?
[A] Vultures
[B] Eagles
[C] Hawks
[D] Falcons
Answer: A [Vultures]

79. Bubo bubo is the scientific name of which of the following species?
[A] Hen
[B] Peacock
[C] Eagle
[D] Owl
Answer: D [Owl]

80. Which among the following Vitamin is added to the milk in some countries as it is lost during the process of Fat Removal (Skimming)?
[A] Vitamin A
[B] Vitamin B
[C] Vitamin C
[D] Vitamin D
Answer: A [Vitamin A]

81. Consider the following statements:
1. All kinds of Color Blindness are result of Genetic disorders
2. All kinds of Night Blindness are result of malnutrition
Which among the above statements is / are correct?
[A] Only 1 is correct
[B] Only 2 is correct
[C] Both 1 & 2 are correct
[D] Neither 1 nor 2 are correct
Answer: D [Neither 1 nor 2 are correct]

82. Which among the following diseases is very rare in women compared to the men affected with the same disorder?
[A] Osteoporosis
[B] Color blindness
[C] Nyctalopia
[D] Down Syndrome
Answer: B [Color blindness]

83. Which among the following disease has the minimum incubation period, comparing to other ones?
[A] Small Pox
[B] Influenza
[C] Measles
[D] Mumps
Answer: B [Influenza]- Influenza (1-2 days) , rest are 6-15 days

84. Deficiency of Vitamin D leads to lack of absorption of which of the following minerals?
[A] Iodine
[B] Phosphorus
[C] Calcium
[D] Iron
Answer: C [Calcium]

85. Which among the following indicates Vitamin B12?
[A] Niacin
[B] Pyridoxine
[C] Cobalamine
[D] Thiamine
Answer: C [Cobalamine]

86. Hodophobia is the fear of which of the following?
[A] Sleeping
[B] Travel
[C] Drugs
[D] Cattle
Answer: B [Travel]

87. “Pratham” the first animal born in 1990 by the IVF (In vitro Fertilization) at the National Dairy Research Institute, Karnal was a _____ ?
[A] Cow
[B] Buffalo
[C] Sheep
[D] Goat
Answer: B [Buffalo]

88. Genetic Modification (GM) technique RIDL was in news. RIDL is being developed for combating which of the following disease?
[A] Swine Flu
[B] Malaria
[C] Cancer
[D] AIDS
Answer: B [Malaria]

89. Which among the following acid is NOT a Vitamin ?
[A] Folic Acid
[B] Oleic Acid
[C] Pantothenic Acid
[D] Ascorbic Acid
Answer: B [Oleic Acid]

90. Which among the following is found in a Bacteriophage?
[A] only RNA
[B] only DNA
[C] Both RNA & DNA
[D] Either RNA or DNA
Answer: D [Either RNA or DNA]

91. The correct group of animals that suffer from the “Foot & Mouth ” disease is as follows:
[A] Only Cattle
[B] Cattle & Sheeps
[C] Cattle and Pigs
[D] Cattle, Sheeps and Pigs
Answer: D [Cattle, Sheeps and Pigs]

92.Turmeric belongs to from which one of the following family of plants?
[A] Radish
[B] Ginger
[C] Onion
[D] Clove
Answer: B [Ginger]

93. For which of the following diseases first successful vaccination was devloped (it is caused by Variola virus)?
[A] Cow pox
[B] Chicken pox
[C] Small pox
[D] Polio
Answer: C [Small pox]

94. In which of the following era began the Self replicating RNA molecules on Earth ?
[A] Basin Era

[B] Nectarian Era
[C] Early Imbrian
[D] Cryptic Era
Answer: A [Basin Era]

95. What fraction of Body's calcium is stored in Bones and teeth?
[A] 85%
[B] 90%
[C] 94%
[D] 99%
Answer: D [99%]

96. Consider the following:
1. Sodium
2. Potassium
Which among the above plays vital role in restoring the body fluid?
[A] 1 only
[B] 2 only
[C] Both 1& 2
[D] Neither 1 nor 2
Answer: C [Both 1& 2]

97. Which among the following is NOT a true bast fiber?
[A] Jute
[B] Hemp
[C] Flax
[D] Cotton
Answer: D [Cotton]- Please note that Bast Fibers are obtained from Phloem

98. The metals in which among the following groups are required in maximum quantities in a living organism?

[A] Potassium, Manganese, Molybdenum, Calcium
[B] Potassium, Molybdenum, Copper, Calcium
[C] Pottassium,Sodium, Magnesium, Calcium
[D] Sodium, Magnesium, Copper, Manganese
Answer: C [Pottassium, Sodium, Magnesium, Calcium]

99. which among the following helps to determine the character of a cell?
[A] Nucleus
[B] Chromosomes
[C] Genes
[D] Plasma
Answer: C [Genes]

100. Consider the following statements:
1. Color blindness is more common in men
2. Color blindness is an X-linked recessive trait
3. If both the X chromosomes are defective, a woman may have color blindness
Which among the above statements are correct?
[A] 1 only
[B] 1 & 2
[C] 2 & 3
[D] all are correct
Answer: D [all are correct]

101. What name has been given to the fear of crossing roads?
[A] Arthrophobia
[B] Atychiphobia
[C] Aichmophobia
[D] Agyrophobia
Answer: D [Agyrophobia]

102. What is the average life of Red Blood cells in our body?
[A] 30-40 days
[B] 70-80 days
[C] 100-120 days
[D] 160-180 days
Answer: C [100-120 days]

103. Which of the following plant growth hormone was recognized by Japanese scientists?
[A] Auxin
[B] Gibberellins
[C] Abscisic acid
[D] Cytokinin
Answer: B [Gibberellins]- Gibberellins, first recognized in 1926 by a Japanese scientist, Eiichi Kurosawa. He was studying foolish seedling disease in Rice called as bakanae

104. Which among the following does not fall in the category of morbid fear or Phobia?
[A] Claustrophobia
[B] Photophobia
[C] Algophobia
[D] Anthophobia
Answer: B [Photophobia]- Photophobia is not a fear. It is excessive sensitivity to light and the aversion to sunlight or well-lit places,
Claustrophobia is fear of confined places,
Algophobia is fear of pain,
Anthophobia is fear of flowers,

105. Which among the following is the correct location of pyloric sphincter in human body?
[A] between Oral cavity and esophagus

[B] between Esophagus and Stomach
[C] between Stomach and duodenum
[D] between duodenum and Jejunum
Answer: C [between Stomach and duodenum]

106. Consider the following statements:
Both Cochlea and Vestibular system are parts of Internal ear
Only Cochlea makes the auditory system of human body
None of the malleus, incus, and stapes are found in the internal ear.
Which among the above statements are correct ?
[A] 1 & 2
[B] 2 & 3
[C] 1 & 3
[D] all 1,2 & 3
Answer: C [1 & 3]- Both Cochlea and vestibular system are parts of Internal ear, Cochlea is responsible for hearing and vestibular system is responsible for balance of the body. Both make the Auditory system of the body. The malleus, incus, and stapes are ossciles in Middle Ear so statement 3 is correct

107. Consider the following statements:
1. Oxygen as well as most Carbon dioxide are transported by Red Blood cells
2. Iron is required for transportation of Oxygen as well as Carbon Dioxide
3. Both Oxygen and Carbon Dioxide bind with Hemoglobin
Which among the above statements are correct ?
[A] 1 & 2
[B] 2 & 3
[C] 1 & 3
[D] 3 only
Answer: D [3 only]- Statement 1 is incorrect because Oxygen is transported by Red blood cells but Carbon Dioxide is transported as bicarbonate ion and by plasma.
Statement 2 is incorrect because Iron is a component of Hemoglobin and the 98.5% of Oxygen binds to Hemoglobin, only some part of Carbon Dioxide binds with hemoglobin which makes carbamino compounds.
Third statement is correct.

108. In which of the following, the cellular power plants – Mitochondria are absent ?
[A] Red algae
[B] Green Algae
[C] Bacteria
[D] Brown Algae
Answer: C [Bacteria]- The mitochondria are common in Eukaryotic cells. Bacteria is Prokaryotic

109. Which among the following is essential gene material ?
[A] Protein
[B] Fat

[C] DNA
[D] RNA
Answer: C [DNA]

110. Which among the following is the smallest Human Chromosome?
[A] Chromosome 10
[B] Chromosome 16
[C] Chromosome 20
[D] Chromosome 21
Answer: D [Chromosome 21]- Made up of 47 million nucleotides, Chromosome 21 is the smallest Human Chromosome.

111. Consider the following statements:
1. Most antigens are Proteins or lipids
2. Lipids work as antigens if they combine with Proteins or polysaccharides
3. Most vaccines contain antigens.
Which among the above statements are correct?
[A] 1 only
[B] 1 & 2 only
[C] 2 & 3 only
[D] all 1, 2 and 3
Answer: C [2 & 3 only]- Please note that most antigens are either proteins or polysaccharides. Lipids are not antigens but they can work as antigens when they combine with proteins and polysaccharides.

112. Which among the following group represents the most commonly found cancers in the world?
[A] Carcinoma
[B] Sarcoma
[C] Lymphoma
[D] Germ cell tumor
Answer: A [Carcinoma]

113. Anesthesia which allows patients to undergo surgery without the distress and pain they would otherwise experience, has been practiced by man since ancient times. Which among the following plant is the most ancient source of anesthesia preparations?
[A] Opium (poppy)
[B] Cannabis
[C] Datura
[D] Coca
Answer: A [Opium (poppy)]

114. It has been demonstrated by the scientists that, certain wines such as Red Wine posses health benefits because they contain antioxidants, which work in the body as Free Radical Scavengers and slow the oxidation of other molecules by capturing the free radicals. Which among the following is the most common antioxidant found in Red Wine?

[A] Catechin
[B] Tetrodotoxin
[C] Polyphenol
[D] Tocopherol
Answer: C [Polyphenol]

115. Biologists have been able to demonstrate the hearing and sound sensory mechanism through the acoustico-lateralis system in which of the following vertebrates ?
[A] amphibians
[B] snakes
[C] fishes
[D] Birds
Answer: C [fishes]

116. The Red color of Red wine is mainly because of _____?
[A] Chemicals in Wine
[B] Pigments
[C] Color blended
[D] Ageing
Answer: B [Pigments]

117. What is RuBisCO?
[A] A Sugar
[B] An Enzyme
[C] A Fat
[D] A Carbohydrate
Answer: B [An Enzyme]- Ribulose-1,5-bisphosphate carboxylase oxygenase first enzyme of Calvin Cycle of Carbon Fixation

118. Which of the following part of the body stores Vitamin A, Vitamin D as well as Vitamin B12?
[A] Brain
[B] Liver
[C] Pancreas
[D] Red Blood Cells
Answer: B [Liver]

119. Which of the following organ in human body produces albumin, one of the major components of blood serum?
[A] Bone Marrow
[B] Liver
[C] Pancreas
[D] Spleen
Answer: B [Liver]

120. Which among the following is the only internal human organ which can regenerate?
[A] Pancreas
[B] Kidney
[C] Liver
[D] Spleen
Answer: C [Liver]

121. Horses can also digest cellulose from grasses because _____?
[A] They are ruminants and have two stomachs
[B] They have a long alimentary Canal
[C] They have hind gut
[D] They don't digest cellulose
Answer: C [They have hind gut]

122. Jamnapari is a breed of which of the following?
[A] Goat
[B] Sheep
[C] Horse
[D] Cow
Answer: A [Goat]

123. Due to which of the processes in plants the Radiocarbon dating is possible to estimate their age?
[A] Growth
[B] Chemosynthesis
[C] Photosynthesis
[D] Assimilation
Answer: C [Photosynthesis]

124. Which among the following vitamins is involved in the breakdown of energy molecules such as glucose?
[A] Vitamin A
[B] Vitamin B
[C] Vitamin C
[D] Vitamin D
Answer: B [Vitamin B]

125. Which among the following correctly refers to Ischemia?
[A] restriction in blood supply due to factors in the blood vessels
[B] Abrupt fall in the blood Pressure
[C] necrosis in a blood vessel due to a local lack of oxygen
[D] condition of severely deficient supply of oxygen to the body
Answer: A [restriction in blood supply due to factors in the blood vessels]

126. What is the correct name of premature death of cells and living tissue?
[A] Neutrophilia

[B] Necrosis
[C] Neoplasia
[D] Nephrosis
Answer: B [Necrosis]

127. Which of the following groups of plants is known as Magnoliophyta?
[A] Gymnosperms
[B] Angiosperms
[C] Algae
[D] Bryophyte
Answer: B [Angiosperms]

128. Which among the following is a correct definition of Hematocrit?
[A] proportion of blood volume that is occupied by red blood cells
[B] proportion of blood volume that is occupied by white blood cells
[C] proportion of blood volume that is occupied by Leucocytes and Thromobocytes
[D] proportion of blood volume that is occupied by plasma
Answer: A [proportion of blood volume that is occupied by red blood cells]- Hematocrit levels are used in doping tests of Athletes , (the RBCs are carriers of Oxygen). hematocrit levels also denotes the blood iron. hematocrit levels of 38 or higher are normally suitable for the donors to donate their blood. Here please note that sometimes its is asked in exams about the ion which can help better in blood coagulation and normally options given are Ca, Na, K & Fe+3. The obvious answer is Fe+3.

129. Which among the following was the first vaccine ever to be developed?
[A] Cholera
[B] Smallpox
[C] Rabies
[D] Tetanus
Answer: B [Smallpox]

130. Which among the following is the correct definition of Oxygen toxicity?
[A] A condition resulting from the harmful effects of breathing oxygen at high pressures
[B] A condition resulting from the contamination of oxygen with Carbon Monoxide
[C] A condition in which the body as a whole or a tissue is deprived of adequate oxygen supply
[D] A condition in which due to water pollution, the aquatic animals in water bodies get died
Answer: A [A condition resulting from the harmful effects of breathing oxygen at high p

131. Which among the following is true attribute to Polar bear?
[A] Herbivore
[B] Omnivore
[C] Carnivore
[D] Marsupial
Answer: C [Carnivore]- Please note that Polar Bear is the largest land carnivore animal, weighing about 350 to 700 kgs.
Kodiak bear which is also of same size is a Omnivore

132. In which year India was certified as being free of variola (small pox virus) due to Indian national smallpox eradication programme (NSEP) and its intensified version (INSEP)?
[A] 1975
[B] 1977
[C] 1980
[D] 1985
Answer: B [1977]

133. With which of the following animals Galton's whistle is most commonly associated?
[A] Horses
[B] Dogs
[C] whales
[D] Shark
Answer: B [Dogs]- Human can listen only the frequencies below 20 kHz. However animals like dogs, cats, dolphins, bats, and mice can listen above this limit. This principle was used by Galton who produced the ultrasonic waves by blowing a whistle. For human these whistle appears silent, while dogs and cats can listen it. It is used in training of dogs and cats

134. Causing agent of which of the following disease produces Integrase enzyme?
[A] Malaria
[B] Small Pox
[C] Swine flu
[D] AIDS
Answer: D [AIDS]

135. Apart from the temporal bone, which among the following is considered as strongest bone in human body?
[A] Humerus
[B] Fibula
[C] Femur
[D] Tibia
Answer: C [Femur]

136. world's first cloned Buffalo was born in which country?
[A] India
[B] China
[C] USA
[D] Russia
Answer: A [India]- The First cloned buffalo was born in February 2009 at National Dairy Research Institute karnal

137. Global Fund to Fight AIDS, Tuberculosis and Malaria commonly called "The Global Fund" or "GFATM" was established In which year ?
[A] 1999
[B] 2000
[C] 2002

[D] 2004
Answer: C [2002]

138. Non-vascular embryophytes are also known as following?
[A] Pteridophytes
[B] Algae
[C] Bryophytes
[D] Gymnosperms
Answer: C [Bryophytes]

139. How many arteries are present in Human Umbilical Cord?
[A] 1
[B] 2
[C] 3
[D] 4
Answer: B [2]

140. For Lemurs, which among the following is a correct group to place in ?
[A] Rodents
[B] Primates
[C] Bats
[D] Sloths

141. Lacrimal apparatus, Lacrimal artery, Lacrimal bone, Lacrimal ducts, Lacrimal fossa, Lacrimal fluid & Lacrimal gland are parts of which organ of the body?
[A] Ear
[B] Nose
[C] Eye
[D] Throat
Answer: C [Eye]

142. Rafflesia is the plant with largest flowers and found in many parts of the South East Asia. It is a _____?
[A] Mangrove Plant
[B] Ornamental Plant
[C] Parasitic Plant
[D] Carnivorous Plant
Answer: C [Parasitic Plant]

143. Who among the following is called father of Modern Genetics?
[A] William Bateson
[B] Robert Hooke
[C] E J Butler
[D] F O Bower
Answer: A [William Bateson]

144. Which among the following is correct about biocenosis?
[A] The study of energy transformations in the living systems
[B] Community of organisms occupying an area
[C] Study of the parts of an ecosystem with specific species
[D] A kind of abnormality related to organism living in a particular habitat
Answer: B [Community of organisms occupying an area]

145. Apart from sugarcane (most commonly Saccharum officinarum) which among the following plants is widely known in the world as a commercial source of table sugar ?
[A] Toona cilata
[B] Gloriosa superba
[C] Asparagus pulmosus
[D] Beta vulgaris
Answer: D [Beta vulgaris]- Beta vulgaris is beet or sugarbeet or Chukandar and has been widely used as a commercial crop for table sugar. Glorisoa superba is Glory Lily which is an ornamental plant. Asparagus pulmosus is also an ornamental plant. Brassica alba is common mustard. Toona cilata is a timber plant from which Indian Redwood is obtained.

146. For purity of which of the following commodity is expressed in ICUMSA numbers?
[A] Refined Edible Oil
[B] Refined Edible Sugar
[C] Refined Vegetable Oil
[D] Milk
Answer: B [Refined Edible Sugar]

147. From which part, Coconut coir is obtained?
[A] Epicarp
[B] Mesocarp
[C] Endocarp
[D] Seed
Answer: B [Mesocarp]

148. Which of the following plants have respiratory roots?
[A] Marshy Plants
[B] Mangroves
[C] Epiphytes
[D] Submerged Hydrophytes
Answer: B [Mangroves]

149. From which part of the plant Glycyrrhiza glabra , Liquorice or Mulethi is obtained?
[A] Leaves
[B] Roots
[C] Fruits
[D] Stem
Answer: B [Roots]- Mulethi is powdered liquorice root and is an effective expectorant used since ancient times in Ayurvedic medicines. Its is also used in Jastimadhu which is a tooth

powder. many cough syrups today contain Liquorice as an ingredient. It is also used in mouth ulcers and peptic ulcers.

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151. Which among the following plants is known as Indian ginseng?
[A] Withania somnifera
[B] Datura ceratocaula
[C] Iberis amara
[D] Capsella bursa pastoris
Answer: A [Withania somnifera]- Withania somnifera or commonly called as Ashwagandha

152. Which part of the plant Raphanus sativus is edible?
[A] Fruit
[B] Leaves
[C] Roots
[D] All the above
Answer: D [All the above]- Raphanus sativus is Radish. The Edible parts are roots, but Radish leaves and seedpods which are fruits are also edible.

153. Who among the following coined the term Bacterium?
[A] Antonie van Leeuwenhoek
[B] Christian Gottfried Ehrenberg
[C] Louis Pasteur
[D] Robert Koch
Answer: B [Christian Gottfried Ehrenberg]

154. Which among the following is a correct definition of Saprophytes?
[A] A parasitic plant that can complete its life cycle independent of a host
[B] A heterotrophic plant that feeds upon other living plants
[C] A heterotrophic plant that feeds upon dead organic matter

[D] A plant that is unable to synthesize a particular organic compound

Answer: C [A heterotrophic plant that feeds upon dead organic matter]

155. In which profession a qualification FRCS is awarded in many parts of the world?

[A] Doctors

[B] Architectures

[C] Engineers

[D] Chemists

Answer: A [Doctors]- Full form of FRCS is Fellow of the Royal College of Surgeons

156. Hodophobia is a fear associated with which of the following?

[A] Sleeping

[B] Walking

[C] Traveling

[D] Running

Answer: C [Traveling]

157. In which part of the human body "Pleura" is found?

[A] Lungs

[B] Brain

[C] Liver

[D] Heart

Answer: A [Lungs]

158. Plants growing on marshy areas are commonly called as _____?

[A] Oxylophytes

[B] Lithophytes

[C] Helophytes

[D] Psilophytes

Answer: C [Helophytes]

159. Who among the following were awarded Nobel Prize in 1958 for One Gene One Enzyme Concept?

[A] Landsteiner & Weiner

[B] Avery, Mccleod and mc Carthy

[C] Jacob & Wollman

[D] George Beadle and Edward Tatum

Answer: D [George Beadle and Edward Tatum]

160. Which among the following is not a beverage plant?
[A] Camellia sinensis
[B] Theobroma cacao
[C] Coffea Arabica
[D] Alonsoa grandiflora
Answer: D [Alonsoa grandiflora]- Alonsoa grandiflora is an ornamental plant

161. Which of the following organism grows on Common Bread?
[A] Bacterium
[B] Yeast
[C] Mucor
[D] Virus
Answer: C [Mucor]

162. Which among the following correctly defines Hypoglycemia ?
[A] Lower than normal level of thyroxin secretion
[B] Lower than normal level of protein
[C] Lower than normal secretion of one or more of the eight hormones normally produced by the pituitary gland
[D] Lower than normal level of blood glucose
Answer: D [Lower than normal level of blood glucose]

163. Who among the following is best known for his discovery and development of the first safe and effective polio vaccine.?
[A] Jonas Salk
[B] David Bodian
[C] Almroth Wright
[D] Albert Sabin
Answer: A [Jonas Salk]

164. Who among the following scientists is known for developing techniques for DNA fingerprinting and DNA profiling which are now used all over the world in forensic science to assist police detective work?
[A] Vernon Heywood
[B] Patrick Laidlaw
[C] Alec Jeffreys
[D] Heinz Wolff
Answer: C [Alec Jeffreys]

165. Which among the following is not rightly matched : (Ailments and affected parts of Body)
[A] Dermatitis – Skin
[B] Glossitis – Tongue
[C] Peritonitis – Abdomen
[D] Cystitis – Caecum
Answer: D [Cystitis – Caecum]- Cystitis is related to Bladder

166. Any disease which has a name with a suffix encephalitis is a disorder of _____?
[A] Nerves
[B] Brain
[C] Lungs
[D] Heart
Answer: B [Brain]

167. In which of the following diseases copper accumulates in tissues ?
[A] Fabry disease
[B] Canavan disease
[C] Wilson's disease
[D] Gunther disease
Answer: C [Wilson's disease]

168. Which among the following is essential for both activation and action of thrombin ?
[A] Na+
[B] Cl-
[C] Ca2+
[D] Mg2+
Answer: C [Ca2+]

169. Which among the following is correct about Blood Group B ?
[A] It has B antigen on its red cells and Anti A antigen in its plasma
[B] It has B antigen on its red cells and Anti B antigen in its plasma
[C] It has no antigens on its red cells but, anti A antigen in its plasma
[D] It has B antigen on its red cells but no antigen in its plasma
Answer: A [It has B antigen on its red cells and Anti A antigen in its plasma]

170. Which among the following is not a function of Sympathetic nerves in Autonomic nervous system?
[A] Enhancing the heart beats
[B] constricting the blood vessels
[C] dilate pupils
[D] contract urinary bladder
Answer: D [contract urinary bladder]- contract urinary bladder is a function of Parasympathetic nerves. Sympathetic nerves relax urinary bladder.

171. Which among the following is largest animal Phylum?
[A] Mollusca
[B] Arthropoda
[C] Mammalia
[D] Annelida
Answer: B [Arthropoda]

172. Which among the following enzyme plays an important role in adding the building blocks to the primer in a sequence determined by the DNA template?

[A] Helicase
[B] Primase
[C] Polymerase
[D] Diastase
Answer: C [Polymerase]

173. Which among the following bacterial cells are found in cubical packets?
[A] Tetracocci
[B] Streptococci
[C] Staphylococci
[D] Sarcinae
Answer: D [Sarcinae]

174. Which among the below is not a food plant?
[A] Allium cepa
[B] Allium sativum
[C] Asparagus officinalis
[D] Atropa belladona
Answer: D [Atropa belladona]

175. Consider the following types of Plants:
1. Calcicoles
2. Calcifuges
3. Calcareous
Which among the above plants grow in most acidic soils?
[A] 1
[B] 2
[C] 3
[D] 1 & 3
Answer: B [2]

176. The pneumatophores are negatively geotropic roots which grow upward & meant for gaseous exchange. These are a characteristic of _____?
[A] Halophytes
[B] Heliophytes
[C] Sciophytes
[D] Lithophytes
Answer: A [Halophytes]

177. In which of the following Cloaca which is the posterior opening that serves as the only such opening for the intestinal, reproductive and urinary tracts is present?
[A] Aves only
[B] Aves & Amphibians
[C] Aves, Amphibians and Reptiles
[D] Pisces, Aves, Amphibians & Reptiles
Answer: C [Aves, Amphibians and Reptiles]

178. Which among the following is correct about Viruses?
[A] They have DNA only
[B] They have RNA only
[C] They have both DNA & RNA
[D] They have either DNA or RNA
Answer: D [They have either DNA or RNA]

179. Lepidopterology is a branch of biology, which deals with the following?
[A] Ferns
[B] animals in stagnant waters
[C] Lipids and Fats
[D] Moths & Butterflies
Answer: D [Moths & Butterflies]

180. The existence of genes was first suggested by?
[A] Gregor Mendel
[B] George Wells Beadle
[C] Edward Lawrie Tatum
[D] Frederick Griffith
Answer: A [Gregor Mendel]

181. The human musculoskeletal system consists of
[A] human skeleton
[B] bones attached to other bones with joints
[C] skeletal muscle attached to the skeleton by tendons.
[D] All the above
Answer: D [All the above]

182. Lipoproteins which are the large molecules and which transport the cholesterol in the bloodstream are _____-?
[A] protein molecules
[B] fat molecules
[C] protein and fat molecules
[D] Lipids
Answer: C [protein and fat molecules]

183. Cobalt is a component of which of the following Vitamins?
[A] Vitamin A
[B] Vitamin D
[C] Vitamin E
[D] Vitamin B12
Answer: D [Vitamin B12]

184. Which among the following conditions will give birth to Fraternal Twins?
[A] a single egg is fertilized to form one zygote which then divides into two separate embryos
[B] sperm cells fertilize both the ovum and the second polar body

[C] two eggs are independently fertilized by two different sperm cells
[D] none of the above
Answer: C [two eggs are independently fertilized by two different sperm cells]

185. In which of the following conditions a person is born with both ovarian and testicular tissues i.e. both female & male organs?
[A] Swyer syndrome
[B] Penile agenesis
[C] Polyorchidism
[D] Hermaphroditism
Answer: D [Hermaphroditism]

186. In which of the following branches of science study of functions, characteristics, and phenomena observed in the living world and the application of this knowledge to world of machine is studied?
[A] Biometry
[B] Bionics
[C] Bionomy
[D] Bionomy
Answer: B [Bionics]

187. Which of the following places are main centers of silicosis and silico-tuberculosis diseases affecting the workers in India?
[A] Glass Factories
[B] Stone quarries and stone crushing factories.
[C] Fireworks Factories
[D] Brick Kilns
Answer: B [Stone quarries and stone crushing factories.]

188. Which among the following is correct about triticale?
[A] A hybrid seed
[B] A man made cereal
[C] A genetically modified cereal
[D] A leguminous plant
Answer: B [A man made cereal]

189. Which among the following is a main constituent of Histosols?
[A] Acidic Salts
[B] Organic Matter
[C] Minerals
[D] Clay Content
Answer: B [Organic Matter]
190. Which among the following correctly denotes Net Reproduction Rate?
[A] Average number of children that would be born to a woman over her lifetime
[B] Average number of children that would be born to a couple over their life time
[C] Birth Rate — Death rate

[D] The rate at which women are replaced by daughters who will have children
Answer: D [The rate at which women are replaced by daughters who will have children]

191. Which among the following is correct about Saliva of a Healthy Human?
[A] It is slightly acidic
[B] It is slightly saline
[C] It is slightly alkaline
[D] It is neutral
Answer: C [It is slightly alkaline]

192. With which of the following diseases Project Kavach is related to
[A] Malaria
[B] Dengue
[C] AIDS
[D] Swineflu
Answer: C [AIDS]

193. Which among the following is the first country to issue research licenses for human embryonic cloning to create stem cells?
[A] United States
[B] Australia
[C] Germany
[D] Britain
Answer: D [Britain]

194. Japanese encephalitis is a disease caused by __ ?
[A] Virus
[B] Protozoa
[C] Bacteria
[D] Fungi
Answer: A [Virus]- Japanese encephalitis is caused by virus from the family Flaviviridae. It's a Mosquito Borne Disease

195. Which among the following is caused by Virus?
[A] Mumps
[B] Beri Beri
[C] Tuberculosis
[D] Dysentery
Answer: A [Mumps]

196. Which among the following causes 'Dumdum Fever' or Kala Azar?
[A] Bacteria
[B] Fungi
[C] protozoa
[D] Virus

Answer: C [protozoa]- Kala Azar is also known as Dum dum fever and Visceral leishmaniasis . Its caused by protozoa of Leishmania genus, vector is sandfly

197. Who among the following worked on Tuberculosis?
[A] Robert Koch
[B] Karl Ernst von Baer
[C] Erwin Neher
[D] Richard Goldschmidt
Answer: A [Robert Koch]

198. Which among the following is not a carnivorous plant?
[A] Pitcher plant
[B] Venus Fly Trap
[C] waterwheel plant
[D] Marsh Mallow
Answer: D [Marsh Mallow]

199. A four chambered heart is found in which of the following?
[A] mammals only
[B] mammals and fish
[C] mammals & Birds
[D] mammals and Amphibians
Answer: C [mammals & Birds]- Archosaurs (crocodilians and birds) and mammals show complete separation of the heart into two pumps, for a total of four heart chambers;

200. What would be the percentage of Glucose in the Urine of a healthy person?
[A] less than 1%
[B] More than 1%
[C] More than 0.1%
[D] 0%
Answer: D [0%]

GENERAL SCIENCE QUIZ: PRACTICE

PHYSICS

1. What is the full form of ASLV?
(A) Augmented Satellite Launch Vehicle
(B) Automatic Satellite Launch Vehicle
(C) Aero Space Launch Vehicle
(D) Area Satellite Launch Vehicle

2. Which is India's first experimental satellite launch vehicle?
(A) ASLV
(B) GSLV
(C) SLV 3
(D) None of these

3. Which type of fuel is used by GSLV in its operations?
(A) Only solid fuel
(B) Only liquid fuel
(C) Liquid in first stage and solid in second stage
(D) Solid in first stage and liquid in second stage

4. When The Indian Space Research Organisation (ISRO) was set up?
(A) 1962
(B) 1969
(C) 1972
(D) 1952

5. Where is the Headquarter of ISRO?
(A) Chandipur
(B) Bengaluru
(C) Mahendragiri
(D) Chennai

6. Which of the following is NOT true about Indian space research?
(A) The first satellite launched in India was Aryabhatta.
(B) Great scientist Dr. Vikram Sarabhai is known as the father of Indian space research.
(C) ISRO was set up in 1962.
(D) IRSO reports to Department of Space, India

7. IRNSS is a ……..
(A) Navigation satellite
(B) Space mission
(C) MARS mission
(D) Geo stationary satellite

8. Who was the india's first man/women in the space?
(A) Rajesh Sharma
(A) Rakesh sharma
(C) Kalpana chawla
(D) Sunita williams

9. Satish Dhawan Space Centre (SDSC), SHAR is situated at…….
(A) Bangaluru
(B) Mahendragiri
(C) Ahmedabad
(D) Sriharikota

10. What was the Chandrayan I……..
(A) An earth observation satellite
(B) Lunar Probe
(C) Navigation satellite

11. Which of the following statement is/are true
(1) APPLE was India's first experimental, geostationary satellite.
(2) Indi's first experimental satellite was assisted by the Soviet Union.
(3) INSAT -2 project was India's first indigenously built satellite.
(A) Only 1, 2 are correct
(B) Only 2nd is correct
(C) Only 2, 3 are correct
(D) All are correct

12. Where is the Headquarter of DRDO?
(A) New delhi
(B) Odisha
(C) Karnataka
(D) Maharashtra

13. IRNSS-1E is the fifth satellite in the Indian Regional Navigation Satellite System (IRNSS), which vehicle launched it?
(A) PSLV-C31
(B) PSLV-C30
(C) PSLV-C21
(D) GSLV 3

14. Which of the following statement is Not true about IRNSS?
(A) IRNSS consists of constellation of seven satellites of which three are geostationary and four are non-geostationary.
(B) Till date 5 satellites of it has been launched.
(C) It will provide mapping and tracking services.
(D) It was launched on board of PSLV-C30 rocket from Satish Dhawan Space Centre (SHAR), Sriharikota in Andhra Pradesh.

15. Which of the following country do not have cryogenic engine technique?
(A) Russia
(B) Japan
(C) China
(D) Canada

16. Which of the following is the heaviest rocket of India?
(A) GSLV Mark 3
(B) RH 75
(C) RH 300
(D) RH200

17. Which of the following is not true about mars mission of India?
(A) It was launched on 5 November 2012
(B) It was India's first interplanetary mission.
(C) ISRO has become the fourth space agency to reach Mars.
(D) India is the first Asian nation to reach Mars orbit.

18. Which of the following is not true about the chandrayan1?
(A) It was launched by the Indian Space Research Organisation in October 2008.
(B) India launched the spacecraft using a PSLV-XL rocket, serial number C13.
(C) The vehicle was successfully inserted into lunar orbit on 8 November 2008.
(D) Prime Minister Atal Bihari Vajpayee announced the project on course in his Independence Day speech on 15 August 2003.

19. What is true about Polar Satellite Launch Vehicle (PSLV)?
(A) It was developed and operated by indigenously in India
(B) It was developed in collaboration with Russia.
(C) It was developed in collaboration with USA.
(D) It was developed in collaboration with USA & UK.

20. Where is Thumba Equatorial Rocket Launching Station (TERLS) situated?
(A) Andhra Pradesh
(B) Kerala
(C) Odisha
(D) Karnataka

21. Where is Vikram Sarabhai Space Centre?
(A) Thiruvananthapuram
(B) Odisha
(C) Kerala
(D) Andhra Pradesh

22. Which of the following statement is /are true?
(A) India’s first satellite communication earth station was set up at ARVI (Pune).

(B) USA is the India's biggest partner in the development of the space programmes.
(C) India's first satellite launch vehicle was SLV.
(D) SROS, stands for Stretched Rohini Satellite Series.

23. Which of the following is true?
(A) Artyabhatta institute of observational sciences is in nainital.
(B) S.N. Bose national centre for basic sciences is in Kolkata
(C) Indian institute of Astrophysics is in Odisha
(D) Indian institute of Geomagnetism is in Mumbai

24. Where is master control facility in India?
(A) Hasan (karnataka)
(B) Bhopal (MP)
(C) Chandipur (Odisha)
(D) Both a & b

25. Which of the following is true about Indian defence system?
(A) G.M. Kariyappa was the first Indian chief of army staff?
(B) Department of Defence Research And Development comes under the ministry of defence.
(C) The Headquarter of eastern command of defence is in Odisha.
(D) Only a & b

26. Chief of the air force is called……
(A) Admiral
(B) Air marshal
(C) Air Chief Marshal
(D) General

27. What is the correct decreasing order of the officers in the Indian Army?
(A) Field marshal, General, Lieutenant General and Major General
(B) General, Field marshal , Lieutenant General and Major General
(C) General, Lieutenant General, Major General and Field marshal,
(D) General, Field marshal ,Lieutenant General and Major General

28. Which of the following is not true about Agni V Missile?

(A) It's an intercontinental ballistic missile.
(B) It is indigenously developed by India.
(C) Its range is between 5000-6000 kms
(D) It is run by liquid fuel.

29. Which of the following missile works on the theory of "fire and forget"?
(A) Brahmos
(B) Akash
(C) Nag
(D) Sourya

30. Which of the following is not true?
(A) Nirbhay is a missile of 1000 km
(B) Brahmos missile is developed by DRDO
(C) Astra is an Air to Surface missile.
(D) The range of Agni iii is between 3000 to 5000 kms.

31. Who speculated that our universe is expanding?
A. Newton
B. Edwin Hubble
C. Galilio
D. Copernicus

32. Who had propounded the planetary laws?
A. Newton
B. Kepler
C. Galileo
D. Copernicus

33. Who had proved first that our earth and another planet are revolving?
A. Aristotle
B. Galileo
C. Copernicus
D. Edwin Hubble

34. Which one of the following elements occurs most abundantly in our universe?
A. Hydrogen
B. Nitrogen
C. Helium
D. Oxygen

35. The stellar and solar source of energy is:
A. Nuclear fusion

B. Nuclear fission
C. Electromagnetic induction
D. Electromotive force

36. The device employed to measure the diameters of stars and our galaxy (Milky Way) is called:
A. Photometer
B. Barometer
C. Viscometer
D. Interferometer

37. What is the difference between asteroids and comets?
I. Asteroids are small rocky planetoids, while comets are formed of frozen gases held together by rocky and metallic material.
II. Asteroids are found mostly between the orbits Jupiter and Mars, while comets are found mostly between Venus and Mercury.
III. Comets show a perceptible glowing tail, while asteroids do not.
Which of the statements given above is/ are correct?
A. I and II Only
B. I and III Only
C. III Only
D. I, II and III

38. Which of the following planets has the largest number of planets?
A. Saturn
B. Jupiter
C. Mars
D. Neptune

39. Which one of the following planet is also called morning star or evening star?
A. Mercury
B. Venus
C. Mars
D. Saturn

40. The planet which completes one revolution in 88 days around the Sun is:
A. Mercury
B. Venus
C. Mars
D. Saturn

41. The planet whose density is less than water and on keeping in the water it will start to float:
A. Mercury
B. Venus
C. Saturn
D. Mars

42. The jet aircrafts fly very easily and smoothly in the lower stratosphere. What could be the appropriate explanation?
I. There are no clouds or water vapour in the lower stratosphere.
II. There is no vertical wind in the lower stratosphere
Which of the statements given above is/ are correct in this context?
A. I only
B. II only
C. Both I and II
D. Neither I nor II

43. Which is the nearest of the sun?
A. Beta centaury
B. Alpha centaury
C. Gamma centaury
D. Proxima centaury

44. The planet Neptune was discovered by:
A. Galley
B. Galileo
C. Kepler
D. Newton

45. Which of the following is the nearest planet from the Sun?
A. Mercury
B. Venus
C. Earth
D. Mars

46. The smallest planet of the solar system:
A. Saturn
B. Jupiter
C. Neptune
D. Uranus

47. Which of the following is not a planet of solar system?
A. Mercury
B. Florida
C. Venus
D. Saturn

48. Which one of the following stars is the nearest star from the earth?
A. Pole Star
B. Comet
C. Sun
D. Asteroid

49. The small groups of planetary pieces which are confined and revolving between Mars and Jupiter are called:
A. Meteors
B. Comet
C. Celestial bodies
D. Asteroids

50. Halley's comet completes one revolution around the sun in:
A. 40 years
B. 46 years

C. 60 years
D. 76 years

51. Which year man first landed on the moon?
A. 1963
B. 1965
C. 1969
D. 1972

52. In space, the sky looks to an astronaut:
A. Blue
B. Red
C. White
D. Black

53. Which of the following is also known by the name of red planet?
A. Mercury
B. Venus
C. Mars
D. Saturn

54. The earth revolves round the sun in:
A. 360 days
B. 365 days
C. 365.25 days
D. 24 Hours

55. Paris based minor planet centre of International Astronomical Union (IAU) has given a new name to the planet Pluto and it is:
A. 134340
B. 238380
C. Iris
D. Nixe

56. The new name of the celestial body Xena-2003 UB 313 given by IAU is:
A. Sires
B. Iris
C. Grabrili
D. Daysomia

57. Which of the statement is correct about the planet Saturn?
A. Cooler than Pluto
B. Cooler than Neptune
C. Hotter than Neptune
D. Hotter than Jupiter

58. Who provided the first information regarding the Black Hole?
A. Copernicus
B. Herman Bondy
C. Rutherford
D. S. Chandrasekhar

59. What is the distance of the earth from the Sun?
A. 107.7 million km
B. 142.7 million km
C. 146.6 million km
D. 149.6 million km

60. Which of the following is also called Blue planet or Green planet?
A. Mars
B. Earth
C. Venus
D. Saturn

61. Which of the following Scientist is affiliated with the law of inertia, Kinematical equations, discovery etc.?
A. G. Marconi
B. A. Fermi
C. Galileo
D. None of the above

62. Who invented the Wireless telegraphy, radio and wireless massage?
A. G. Marconi
B. A. Fermi
C. Galileo
D. Einstein

63. Who among the following Scientist is associated with discovery of electron?
A. Galileo
B. Einstein
C. J.J Thomson
D. C.R.T Wilson

64. Which of the following outstanding contribution in Physics is associated with the Scientist Newton?
A. Universal gravitational law
B. Laws of Motion
C. Discovery of Calculus
D. All of the above

65. What was the contribution of the Scientist A. Fermi in Physics?
A. Identification of artificial radioactive elements

B. Law of electric resistance
C. Thermal effect of electric current
D. All of the above

66. What is the contribution of the Scientist Ottohan and Stassman in Physics?
A. Nuclear Fusion
B. Nuclear Fission
C. Dynamite
D. None of the above

67. Which of the following remarkable contribution in Physics is associated with the Scientist Thels?
A. Photo
B. Volta
C. Static Electricity
D. Pauli

68. Which of the following spectacular contribution in Physics is associated with the Scientist Millikan?
A. Electronic Charge
B. Neutrino
C. Both A & B
D. All of the above

69. Which of the following is the major contribution in Physics is associated with the Scientist Newton?
A. Law of Cooling
B. Thermionic Emission
C. Both A & B
D. All of the above

70. Which of the followingis the contribution in Physics is associated with the Scientist Henric Hertz?
A. Electromagnetic Wave
B. Photo
C. Mica Sheet
D. Thermionic Emission

71. Consider the following statement(s) is/are related to the device of Ammeter
I. It is a measuring device used to measure the current in a circuit.
II. It is a measuring device used to measure the altitude of an object above a fixed level.
Which of following statement(s) is/are correct?
A. Only I
B. Only II
C. Both I & II
D. Neither I nor II

72. Consider the following statement(s) is/are related to the device of Carburettor
I. It is a device that blends air and fuel for an internal combustion engine.
II. It has been largely supplanted in the automotive industry by fuel injection.
Which of following statement(s) is/are correct?
A. Only I
B. Only II
C. Both I & II
D. Neither I nor II

73. Who invented Transformer?
A. Faraday
B. Einstein
C. Parsons
D. C.R.T Wilson

74. Which of the following is the outstanding contribution of Scientist Aneriko Fermi in Physics?
A. Nuclear Furnace or Bath
B. Laws of Motion
C. Discovery of Calculus
D. Parasite

75. Which of the following is one of the contribution of Scientist Adberd Charles in Physics?
A. Photometer
B. Electric Bulb
C. Revolver
D. All of the above

76. Which of the following is the prominent contribution of Scientist Shaklay in Physics?
A. Nuclear Fusion
B. Dialysis Machine
C. Transistor
D. None of the above

77. Which of the following is the spectacular contribution of Scientist Pascal in Physics?
A. Photo
B. Volta
C. Computer
D. Calculator

78. Which of the following is the major contribution of Scientist Swington in Physics?
A. Atom Bomb
B. Military Tank
C. Both A & B
D. All of the above

79. Which of the following is the contribution of Scientist Jeans in Physics?
A. Lens Camera
B. Tyre
C. Both A & B
D. All of the above

80. Which of the following is the striking contribution in Physics of Scientist Fahrenheit?
A. Fountain Pen
B. Gas Engine
C. Clinical Thermometer
D. Thermionic Emission

81. Who invented Scooter?
A. G. Brousa

B. Harison & Kaitlin
C. William Gas Cogin
D. None of the above

82. Who among the following Scientist is associated with the invention of the refrigerator?
A. G. Brousa
B. Harison & Kaitlin
C. William Gas Cogin
D. Einstein

83. Which of the following scientist is the inventor of the lift?
A. F.G Otis
B. Edison
C. William Gas Cogin
D. Einstein

84. Who among the following scientist invented the Microphone?
A. Einstein
B. Edison
C. John & John
D. Janson & Janson

85. Powerloom invention is associated with:
A. Devi
B. Johnson Harrison
C. Carl Right
D. Walter Hunt

86. The invention of Petrol Car is associated with:
A. Janson & Janson

B. John & Johnson
C. Macmillan
D. Karl Benz

87. Which of the following Scientist is affiliated with the invention of the Wireless Telegraphy?
A. Johnson & Johnson
B. Macmillan
C. Compel
D. Marconi

88. Consider the following statement (s) is related with the Machine Gun
I. It is a fully automatic mounted or portable firearm, designed to fire bullets in quick succession.
II. James Pakal invented machine gun.
Which of the above statement (s) is/are correct?
A. Only I
B. Only II
C. Both I & II
D. Neither I nor II

89. Consider the following statement (s) is related with the Robert Mallet
I. He is considered as the "Father of Seismology"
II. He invented Sismometer.
Which of the above statement (s) is/are correct?
A. Only I
B. Only II
C. Both I & II
D. Neither I nor II

90. Match the following from inventions (List I) and inventors (List II)

List I	List II
a. Tape Recorder	1. Micheal Faraday
b. Crascograph	2. James Watt
c. Steam Engine	3. J. C Bose
d. Dynamo	4. Poulson

Select the correct matching

	a	b	c	d
A.	4	3	2	1
B.	4	2	3	1
C.	1	2	4	3
D.	1	2	3	4

91. What is the SI unit of electric charge?
A. Volt
B. Coulomb
C. Ampere

D. ohm

92. How much force does one coulomb of electric charge exerts on an equal charge placed at a distance of one metre from it?
A. 9 * 109 Newton
B. 10 * 109 Newton
C. 9 * 108 Newton
D. 8 * 109 Newton

93. An electron possesses a negative charge of:
A. 16 * 10-19 C
B. 1.60 * 10-19 C
C. 26 * 10-19 C
D. 1.8 * 10-19 C

94. How many electrons taken together make one coulomb?
A. 6.25 * 1018 electrons
B. 3.25 * 1018 electrons
C. 2.25 * 1018 electrons
D. 4.25 * 1018 electrons

95. Which of the following is a conductor of electricity?
A. Silver
B. Copper
C. Aluminium
D. All of the above

96. Substances through which electricity cannot flow are called:
A. Conductors
B. Insulators
C. Wires
D. Battery

97. Which of the following is an insulator?
A. Carbon
B. Rubber
C. Silver
D. Copper

98. What should be present in a substance to make it a conductor of electricity?
A. Strongly held electrons
B. Strongly held protons
C. Free electrons
D. Free protons

99. Which of the following is an example of static electricity?
A. Glass rod rubbed with silk cloth
B. Ebonite rod rubbed with wool
C. Lightening in the sky
D. All of the above

100. What is the work done in moving a unit positive charge from infinity to that point in electric field called?
A. Electric potential
B. Potential difference
C. Electric current
D. Electric circuits

101. One ohm is equal to:
A. 1 volt / 1ampere
B. 1 volt / 1 coulomb
C. 1 volt * 1 ampere
D. 1 volt * 1 coulomb

102. On the basis of electrical resistance, all the substances can be divided into:
A. Good conductors
B. Resistors
C. Insulators
D. All of the above

103. Which of the following are resistors?
A. Silver
B. Copper
C. Aluminium
D. All the above

104. What do electricians wear while working with electricity?
A. Rubber handgloves
B. Woollen handgloves
C. Synthetic handgloves
D. Cotton handgloves

105. Which of the following factors affect resistance of a conductor?
A. Length of conductor
B. Temperature of conductor
C. Material of conductor
D. All of the above

106. What happens to the resistance of a wire when its length is doubled?
A. Gets doubled
B. Becomes half

C. Becomes nil
D. None of the above

107. Resistance of a conductor is inversely proportional to:
A. Current
B. Its length
C. Its area of cross-section
D. Potential difference

108. The resistance of a wire is inversely proportional to the:
A. Four times of its diameter
B. Square of its diameter
C. ¼ of its diameter
D. 1/3 of its diameter

109. What will be the resistance of a wire if its diameter is tripled?
A. 1/2
B. 1/4
C. 1/3
D. 1/9

110. Resistance of which of the following is unaffected by temperature?
A. Manganin
B. Constantan
C. Nichrome
D. All of the above

111. A continuous conducting path consisting of wires and other resistances and a switch, between the two terminals of a battery along which an electric current flows is called:
A. Resistivity
B. Circuit
C. Electric power
D. Insulator

112. Which of the following is a part of electrical circuit?
A. Battery
B. Fixed resistance
C. Connecting wires
D. All of the above

113. The resistance which can be changed as desired is called:
A. Wire joints
B. Fixed resistance
C. Variable resistance
D. A switch

114. Which of the following is a current-detecting instrument?
A. Voltmeter
B. Ammeter
C. Magnetometer
D. Galvanometer

115. Rheostat is the other name of:
A. Fixed resistance
B. Variable resistance
C. Insulator
D. Conductor

116. The law which gives relationship between current and potential difference is called:
A. Ohm's law
B. Ampere's law
C. Biot-Savart law
D. Coulomb's law

117. What is the formula for calculating current?
A. I = V * R
B. I = V + R
C. I = V – R
D. I = V/R

118. Current is inversely proportional to:
A. Potential difference
B. Resistance
C. Voltage
D. Electric power

119. The resistance of a conductor depends on its:
A. Length
B. Nature of material
C. Thickness
D. All of the above

120. What is the SI unit of resistance?
A. Volt
B. Watt
C. Ohm
D. Metre

121. Name an electronic device which is used to measure the current in ampere?
A. Altimeter
B. Audiometer
C. Ammeter

D. Airometer

122. Name an equipment through which the distances travelled by the wheels of the vehicles are measured?
A. Accumulator
B. Avometer
C. Animometer
D. Adiometer

123. Name a device used for the magnification of the objects?
A. Bolometer
B. Barometer
C. Binoculars
D. Barograph

124. The equipment used in internal combustion heat engine, vehicle engine etc. is known as:
A. Altimeter
B. Crescograph
C. Cyclotron
D. Carburator

125. The device by which artificial climate is produced:
A. Callipers
B. Cytotron
C. Cardiogram
D. Avometer

126. Name an equipment through which electrons are emitted or ejected?
A. Cathode ray tube
B. Callipers
C. Coolidge tube
D. Bolometer

127. Through which equipment human's heart beats are recorded and detected via graphics?
A. Barograph
B. Crescograph
C. Comograph
D. Cardiograph

128. Name a device which is used to convert mechanical energy into electrical energy?
A. Dip Circle
B. Denial Cell
C. Dynamo
D. Dynamometer

129. The device that confirms the presence of electric charge:
A. Electric Meter
B. Electro Meter
C. Electron Microscope
D. Electroscope

130. Which equipment is employed to project or expose pictures on the screen?
A. Epidayscope
B. Endoscope
C. Density Meter
D. Escalator

131. Which device is used to measure the depth of seas and oceans?
A. Gravometer
B. Fathometer
C. Gyroscope
D. Dilatometers

132. Name a devise used to measure the sharpness of the electric current?
A. Gravometer
B. Electrometer
C. Galvanometer
D. Dynamometer

133. Name an instrument used to measure the sound waves inside the water?
A. Comograph
B. Dictaphone
C. Crescograph
D. Hydrophone

134. Name a device used to measure atmospheric humidity?
A. Hygrometer
B. Gravometer
C. Avometer
D. Calorimeter

135. Which device is used to detect and measure the purification of the milk?
A. Microphone
B. Heart Lungs Machine
C. Ganong Respiratory
D. Lactometer

136. The equipment through which any substance be cut into very small pieces:
A. Manometer
B. Microtome
C. Micrometer

D. Machmeter

137. Through which device the illumination and intensity of two light sources are compared?
A. Pyrometer
B. Phototeligraphic
C. Photometer
D. Periscope

138. Name a device through which the truthness of the human being is examined?
A. Paicnometer
B. Quadrant
C. Polygraph
D. Radiometer

139. Which devise is used to measure the intensity of the earthquake?
A. Seismograph
B. Oscilliograph
C. Comograph
D. Cardiograph

140. Which device is used to listen the vibrations of the heart and lungs?
A. Spectroscope
B. Stethoscope
C. Stereoscope
D. None of the above

141. Who discovered the magnetic field of current?
A. William Gilbert
B. Hans Christian Oersted
C. Benjamin Franklin
D. Charles Augustin de Coulomb

142. Magnetic effect of current gives rise to which force?
A. Mechanical
B. Friction
C. Spring
D. Gravitational

143. Magnetic effect around a wire is due to:
A. The presence of metal
B. Current flowing in it
C. Circular loop
D. No current in it

144. Which of the following utilise magnetic effect of current?
A. Electric motor
B. Telephone
C. Radio
D. All of the above

145. What kind of magnetic field lines will be produced around a straight wire carrying current?
A. Bigger circles
B. Straight
C. Concentrated circles
D. Parallel straight

146. According to Maxwell's right-hand thumb rule, what gives the direction of magnetic field lines around the wire?
A. Direction of thumb
B. Direction of fingers encircling wire
C. Direction opposite to thumb
D. Direction of index finger

147. Maxwell's right-hand thumb rule is also known as:
A. Biot-Savart law
B. Hall Effect
C. Born rule
D. Corkscrew rule

148. Which of the following current carrying wires will have strong magnetic field?
A. Straight
B. Circular loop
C. Solenoid
D. All of the above

149. The strength of magnetic field produced by a current carrying circular coil can be increased by:
A. Increasing number of turns of wire
B. Increasing current flow
C. Decreasing radius of coil
D. All of the above

150. What is a long coil containing a large number of close turns of insulated copper wire called?
A. Straight
B. Solenoid
C. Circular loop
D. Stranded

151. The magnetic field produced by a current carrying solenoid is similar to the magnetic field produced by a:
A. Bar magnet
B. Ring magnet
C. Rod magnet
D. Horse shoe magnet

152. The magnetic field lines inside the solenoid are:
A. Concentrated circles
B. Bigger circles
C. Parallel straight lines
D. None of the above

153. What is used to make electromagnets?
A. Circular wire
B. Solenoid
C. Straight wire
D. Horse shoe magnet

154. On what does the strength of magnetic field produced by a current carrying solenoid depend?
A. Number of turns in solenoid
B. Strength of current
C. Nature of core material
D. All of the above

155. An electromagnet consists of a long coil of insulated copper wire wound on a soft:
A. Aluminium core
B. Silver core
C. Zinc core
D. Iron core

156. Which of the following is not used for making electromagnets?
A. Carbon steel
B. Alnico
C. Cobalt steel
D. All of the above

157. Which of the following factors affects the strength of steel?
A. Number of turns in coil
B. Current flowing in coil
C. Length of air gap between poles
D. All of the above

158. Strong permanent magnets are used in:
A. Microphones

B. Loudspeakers
C. Voltmeters
D. All of the above

159. Which effect of current is used in detecting concealed current-carrying conductor in a wall?
A. Magnetic
B. Heating
C. Chemical
D. Ionic

160. Which are the two main organs of the human body where the magnetic field produced is significant?
A. Heart and kidney
B. Lungs and kidney
C. Heart and brain
D. Liver and stomach

161. Who discovered that when a current carrying conductor is placed in a magnetic field, a mechanical force exerted on the conductor makes it move?
A. Hans Christian Oersted
B. Michael Faraday
C. Benjamin Franklin
D. William Gilbert

162. The maximum force is exerted on a current carrying conductor when it is:
A. Perpendicular to magnetic field
B. Parallel to magnetic field
C. Swings in backward direction
D. All of the above

163. Which rule is applied to find the direction of force acting on the current-carrying conductor, if the direction of current and direction of magnetic field is known?
A. Maxwell's right-hand thumb rule
B. Born rule
C. Hall Effect
D. Fleming's left-hand rule

164. Which direction is indicated by the thumb in Fleming's left-hand rule?
A. Current
B. Magnetic field
C. Motion of conductor
D. None of the above

165. What does the forefinger represent in the Fleming's left-hand rule?
A. Magnetic field
B. Current
C. Motion of conductor
D. None of the above

166. The direction of deflection of a current-carrying conductor indicates the direction of:
A. Electric current
B. Force acting on it
C. Magnetic field
D. All of the above

167. Which device converts electrical energy into mechanical energy?
A. Motor
B. Generator
C. Windmill
D. Transformer

168. In which of the following devices is the electrical motor used?
A. Electric fans
B. Washing machine
C. Refrigerator
D. All of the above

169. In an electric motor, which device reverses the direction of current through a circuit?
A. Carbon brush
B. Coil
C. Commutator
D. Permanent magnet

170. The carbon strips used to pass electric current to the coil are known:
A. Commutator
B. Magnet
C. Battery
D. Brushes

171. Which of the following device converts chemical energy in to electrical energy?
A. Battery
B. Loud Speaker
C. Solar Cell
D. Electric Motor

172. The energy possessed by a body due to its position is called:
A. Kinetic Energy

B. Potential Energy
C. Mechanical Energy
D. Electrical Energy

173. Joule is a unit of:
A. Work
B. Power
C. Momentum
D. None of the above

174. The commercial unit of Energy is:
A. Watt
B. Watt-hour
C. Kilowatt-hour
D. Kilowatt

175. When an object falls freely towards the ground, then its total energy:
A. Increases
B. Decreases
C. Remains constant
D. First increases then decreases

176. In 1 minute how much energy does a 100 W electric bulb transfers?
A. 100 J
B. 600 J
C. 3600 J
D. 6000 J

177. What happens to the body on which work is done:
A. It loses energy
B. It gains energy
C. No change in the energy
D. First it loses then it gain

178. A radio set of 60 watts runs for 50 hours. How many units of electrical energy are consumed in kWh?
A. 2 kWh
B. 3 kWh
C. 4 kWh
D. 2.5 kWh

179. What is the smallest unit of power?
A. Watt
B. Kilowatt
C. Horse power
D. Milliwatt

180. On an object the work done does not depend upon:
A. Displacement
B. Angle between force and displacement
C. Force applied
D. Initial velocity of an object

181. On which theory nature of light depends upon:
A. Wave theory
B. Particle theory
C. Both A and B
D. Only A

182. Why light is said to have a dual nature?
A. It exhibits the properties of wave and particles.
B. It exhibits the properties of reflection and diffraction.
C. It has both interference and polarisation effect.
D. None of the above

183. Which object does not reflect more light?
A. Polished Surface
B. Shining Surface
C. Unpolished
D. Both A and B

184. Name a metal which is the best reflector of light?
A. Gold
B. Silver
C. Iron
D. Magnesium

185. An incident ray is:
A. The point at which incident ray falls on the mirror.
B. The ray of light which is sent back by the mirror.
C. The ray of light which falls on the mirror surface.
D. The ray which makes right angle to the mirror surface.

186. Which statement is correct about the laws of reflection?
(i) The incident ray, normal ray and the reflected ray all lie in the same plane.
(ii) The angle of reflection is always equal to the angle of incidence.
(iii) The angle of incidence is equal to the angle formed by normal ray.
(iv) The angle of reflection is equal to 90o.
A. Both (i) and (ii)
B. Both (ii) and (iii)
C. Both (iii) and (iv)
D. (i), (ii) and (iv) are correct

187. When a parallel beam of incident light is reflected as a parallel beam in one direction, this reflection is known as:
A. Diffuse reflection
B. Interference
C. Diffraction
D. Regular reflection

188. Anything which gives out light rays is called:
A. Real Image
B. Virtual Image
C. Object
D. Image

189. We see the image of our face when we look into the mirror. It is due to:
A. Interference
B. Diffraction
C. Polarisation
D. Reflection

190. The image formed on a cinema screen is an example of:
A. Real Image
B. Virtual Image
C. Point Image
D. Plane Image

191. When Lunar Eclipse occur?
A. When Sun is between Earth and Moon
B. When Earth is between Sun and Moon
C. When Moon is between Earth and Sun
D. When Earth is between Sun and other celestial bodies

192. When did Lunar Eclipse happen?
A. Half Moon
B. Full Moon
C. Equinox
D. None of the above

193. Select the correct option matching together about Earth shadows:
1. Umbra – darker, central part
2. Penumbra – the outer part
3. Antumbra – partly shaded area beyond the umbra
Correct Options are:
A. Only 1 and 2
B. Only 2 and 3
C. Only 1
D. All 1, 2 and 3

194. What is Solar Eclipse?
A. When moon comes in between Earth and Sun
B. When Earth comes in between Moon and Sun
C. When Sun comes in between Earth and Moon
D. When Sun rays does not reach Earth.

195. When the same pattern of solar eclipse repeats every 18 years 11 days 8 hours are known as:
A. Nodes cycle
B. Saros cycle
C. Saras cycle
D. Payan cycle

196. What do you mean by Blood Moon?
A. It is total solar eclipse.
B. It is partial lunar eclipse with red glow
C. It is total lunar eclipse with deep red glow
D. None of the above

197. During lunar eclipse, the visible red colour is because of:
A. Dust in space
B. Dust in moon's atmosphere
C. Dust in earth's atmosphere
D. None of the above

198. During a calendar year, the maximum numbers of lunar eclipse that can occur are:
A. 2
B. 3
C. 4
D. 5

199. What do you understand by an eclipse?
A. Partial or total blocking of light of one celestial object by another.
B. Partial or total blocking of light by Moon.
C. Partial or total blocking of light by Earth.
D. Partial or total blocking of light by Sun.

200. Diamond ring occurs in which type of solar eclipse?
A. Total Solar eclipse
B. Partial Solar eclipse
C. Annular Solar eclipse
D. None of the above

ANSWER KEY

1. A	2. C	3. D	4. B	5. B	6. C	7. A	8. B	9. D	10. B
11.D	12.A	13.A	14.D	15.D	16.A	17.A	18.B	19.A	20.B
21.A	22.B	23.C	24.D	25.D	26.C	27.A	28.D	29.C	30.C
31.B	32.B	33.C	34.A	35.A	36.D	37.C	38.A	39.B	40.A
41.C	42.C	43.D	44.A	45.A	46.A	47.B	48.C	49.D	50.D
51.C	52.D	53.C	54.C	55.A	56.B	57.C	58.D	59.D	60.B
61.C	62.A	63.C	64.D	65.A	66.B	67.C	68.A	69.A	70.A
71.A	72.B	73.A	74.D	75.C	76.D	77.D	78.C	79.C	80.A
81.A	82.B	83.A	84.D	85.C	86.D	87.D	88.C	89.C	90.A
91.B	92.A	93.B	94.A	95.D	96.B	97.B	98.C	99.D	100.A
101.A	102.D	103.D	104.A	105.D	106.A	107.C	108.B	109.D	110.D
111.B	112.D	113.C	114.D	115.B	116.A	117.D	118.B	119.D	120.C
121.C	122.D	123.C	124.D	125.B	126.A	127.D	128.C	129.D	130.A
131.B	132.C	133.D	134.A	135.D	136.B	137.C	138.C	139.A	140.B
141.B	142.A	143.B	144.D	145.C	146.B	147.D	148.C	149.D	150.B
151.A	152.C	153.B	154.D	155.D	156.D	157.D	158.D	159.A	160.C
161.B	162.A	163.D	164.C	165.A	166.B	167.A	168.D	169.D	170.D
171.A	172.B	173.A	174.C	175.C	176.D	177.B	178.B	179.A	180.D
181.C	182.A	183.C	184.B	185.C	186.A	187.D	188.C	189.D	190.A
191.B	192.B	193.D	194.A	195.B	196.C	197.C	198.B	199.A	200.A

CHEMISTRY

1. Which of the following is a large blood vessel that carries blood away from the heart?
A. Vein
B. Artery
C. Capillary
D. Nerve

2. Which of the following is not a member of the vitamin B complex?
A. Thiamine
B. Riboflavin
C. Folic acid
D. Ascorbic acid

3. Fungi are plants that lack:
A. Oxygen
B. Carbon dioxide
C. Chlorophyll
D. None of these

4. What makes a reptile a reptile?
A. Cold blooded
B. Warm Blooded
C. Non-Hearing
D. Egg-laying

5. Which blood vessels have the smallest diameter?
A. Capillaries
B. Arterioles
C. Venules
D. Lymphatic

6. Which of the following is an air-borne disease?
A. Measles
B. Typhoid
C. Pink eye
D. None of the above

7. There is a very, yellow dust that comes away on the fingers, wherever we touch the middle of a flower. These tiny yellow grains are one of the most precious substances in nature because they contain the secret of plant life. What is this dust called?

8. Which organ of the body produces the fluid known as bile?
A. Liver
B. Pancreas

C. Gall bladder
D. Kidney

9. Which of the following hormones is a steroid?
A. Estrogen
B. Glucagon
C. Insulin
D. Oxytocin

10. Which one of the following is not a function of the liver?
A. Regulation of blood sugar
B. Enzyme activation
C. Detoxiation
D. Reproduction

11. Which one is not the form of Biocides?
A. Salt
B. Iodine
C. Sugar
D. Bleech

12. How biocides work?
A. Control the multiplication of insects
B. Kill the insects
C. Manage the original form of material
D. Control the bacteria

13. What is Rodenticide?
A. A medicine to kill worms
B. A medicine to kill animals
C. A lubricant
D. A pesticide

14. Most commonly used Rodenticides are _____ in nature.
A. Anti pesticides
B. Anti solvent
C. Anti Coagulant
D. Non anti coagulant

15. Which acid is present in lemon?
A. marlic acid
B. citric acid
C. lactic acid
D. tartaric acid

16. Natural rubber is a _____ which is having high elasticity.
A. Substance
B. Material
C. Elastomer
D. Chemical using carbon as main compound

17. How will you define the process of Vulcanization?
A. Sample of butane mixed with sulphur and litharge
B. Sample of propane mixed with sulphur and litharge
C. Sample of plastic formed carbon mixed with sulphur and litharge
D. Sample of rubber mixed with sulphur and litharge

18. What is NBR?
A. Normal Acrylonitrile-butadiene rubber
B. Natural Acrylonitrile-butadiene rubber
C. N Acrylonitrile-butane rubber
D. Acrylonitrile-butadiene rubber

19. A synthetic rubber is having_____weight.
A. Higher resistance
B. Lower density
C. Higher molecular
D. Higher atomic

20. Which of the following is not a type of elements?
A. Metals
B. Non Metals
C. Metalloids
D. Gases

21. In which form the natural petroleum is found?
A. Gaslette
B. Kerosene
C. Crude Oil
D. Tar

22. Which country consumes maximum petroleum?
A. Saudi Arabia
B. India
C. UK
D. US

23. In which field petroleum is not used?
A. Automobile
B. Petro Chemical
C. Medical
D. Marketing

24. Petroleum is a combination of chains of hydrogen and_____ present in earth's crust.
A. butana
B. hydrocarbon
C. Carbon
D. proplene

25. Which of the following is wrong statement?
A. Atomic radius of the elements increases as one moves down the first group of the periodic table
B. Atomic radius of the elements decreases as one moves across from left to right in the 2nd period of the
C. Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius
D. Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius

26. Which of the following is not a greenhouse gas?
A. Carbon Dioxide
B. Methane
C. Carbon monoxide
D. Water vapours

27. What is the result of presence of green gases in excess?
A. Deforestation
B. Decay of Earth's crust
C. Excess of heat
D. More snow on Earth

28. The greenhouse gases spread _____ energy.
A. Short Wave
B. Long Wave
C. Mid Wave
D. Ultra Wave

29. The presence of the greenhouse gases is _____ for human life.
A. Harmful
B. Required
C. Necessary
D. Harmless

30. Which of the following is the acronym of PVC?
A. polyvinyl chloride
B. polyvinyl carbobate
C. phosphor vanadiu chloride
D. phosphavinyl chloride

31. Which of the following is the heaviest metal?
A. osmium
B. mercury
C. iron
D. nickel

32. Consider following statements:
I. Green chemistry focuses on effects of chemical pollutants on nature.
II. Environmental chemistry focuses on technological approach to prevent pollution.
Which statement(s) is/are correct?
A. Only I
B. Only II
C. Both I & II
D. Neither I nor II

33. Which one of the following received the Greener Reaction Conditions Award in 1996?
A. Dow Chemical
B. Exon Chemicals
C. US EPA
D. None of these

34. Which of the following is used for clean oxidation?
A. Supercritical carbon dioxide
B. Supercritical hydrogen
C. Aqueous hydrogen peroxide
D. All of these

35. Green solvents are derived from _____.
A. Renewable resources
B. Carbon resources
C. Non-renewable resources
D. All of these

36. Eating tobacco and throwing on the road can produce_____pollutant.
A. Air
B. Soil
C. Noise
D. Water

37. Which of the following is not green house gas?
A. CO
B. O3
C. CH4
D. H2O Vapour

38. Which of the following is not the components of photochemical smog that occurs in warm, dry and sunny climate?
A. NO2
B. O3
C. SO3
D. Unsaturated hydrocarbon

39. Which of the following treatment is used for removal of biological impurities?
A. Sedimentation
B. Boiling
C. Sterilization
D. distillation

40. Which of the following indicator used in determination of hardness?
A. EBT
B. Phenolphthalein
C. Methyl orange
D. Thymol blues

41. Who is known as the father of Modern Chemistry?
(a) Kolvey
(b) Wholer
(c) Leviatiae
(d) Pasteur.

42.The inventor of the atomic theory is:
(a) Rutherford
(b) Madam Curie
(c) John Dalton
(d) Albert Einstein

43. Nucleon is the name which is employed for:
(a) Electron and proton
(b) proton and neutron
(c) Electron and neutron
(d) None of these

44.The mass number of an atom is:
(a) Number of nucleons in the nucleus
(b) Number of protons in the nucleus
(c) Number of neutrons in the nucleus
(d) None of these

45. Atom is electrically:
(a) Positive
(b) negative

(c) bipositive
(d) neutral

46.The atomic properties depend upon:
(a) Number of nucleons in the nucleus
(b) Number of protons in the nucleus
(c) Number of neutrons in the nucleus
(d) None of these

47. The number of neutrons and protons in the nucleus of 88Ra226 are:
(a) 138 and 88
(b) 88 and 138
(c) 226 and 88
(d) 88 and 226

48. Who was the inventor of radioactivity?
(a) Madam Curie
(b) Irine Curie
(c) Henery Bacqurel
(d) Rutherford

49.The penetrating power of which of the following invisible radiations emitting from the nucleus has its maximum value:
(a) a-rays
(b) f)-rays
(c) y-rays
(d) None of these

50. Which of the following is negatively charged?
(a) Alpha-rays
(b) Beta-rays
(c) Gama-rays
(d) X-ray

51. How many charges alpha-rays consist of?
A. Two unit positive charges
B. Unit negative charge
C. Unit positive charge
D. None of these

52. Which of the following is not a radioactive element?
A. Astatine
B. Francium
C. Titanium
D. Zirconium

53. Which of the following is the unit of radioactivity?
A. Curie
B. Becquerel
C. Rutherford
D. All of these

54. The substance (element) obtained after emission of a beta-particle from 11Na22:
A. Mg
B. Mn
C. Ag
D. Pb

55. The half life of a radioactive substance is 4 months then the time spent in decaying ¾ th of the substance would be:
A. 3 months
B. 4 months
C. 8 months
D. 12 months

56. The estimation of the age of the earth is done by:
A. Uranium dating
B. Carbon dating
C. Atomic clock
D. Bio clock

57. The isotope of any atomic nucleus is in which:
A. Number of neutrons be same but number of protons be different
B. Number of protons be same but the number of neutrons be different
C. Number of protons and neutrons both are same
D. Number of protons and neutrons both are different

58. The group displacement law is propounded by:
A. Sody & Fujan
B. Rutherford & Sody
C. Rutherford & Fujan
D. Rutherford & Madam Curie

59. Which of the following is estimated by the radio carbon dating?
A. Age of the human being
B. Age of the fossils
C. Disease of the human body
D. Purity of the metals

60. The number of isotopes in the hydrogen:
A. 2
B. 3

C. 4
D. 5

61. Which of the following is not the isotope of hydrogen?
A. Protium
B. Deuterium
C. Iterium
D. Tritium

62. 8O16, 8O17, 8O18 are called:
A. Isotopes
B. Isotones
C. Isobars
D. Isoneutrons

63. What is the radioactive isotope of hydrogen is called?
A. Deuterium
B. Rotium
C. Radium
D. Tritium

64. Which isotope is used through the radioactive age estimation technique to obtain (determine) the age of rocks?
A. Uranium isotope
B. Plutonium isotope
C. Thorium isotope
D. Carbon isotope

65. The radio isotope used to control the disease like blood cancer (Leukaemia) is:
A. Phosphorus-32
B. Cobalt-60
C. Iodine-131
D. Sodium-24

66. Isotones are those which have:
A. Equal number of protons
B. Equal number of neutrons
C. Equal number of nucleons
D. None of these

67. The iso electronic of Al+3 is:
A. Cl-
B. Al
C. S-
D. F-

68. The element which has same mass number but different atomic number is called:
A. Isotope
B. Isobar
C. Isoneutronic
D. Isoelectronic

69. By the emission of which isomers are produced:
A. Alpha-ray
B. Beta-ray
C. Gama-ray
D. X-ray

70. How many molecules have the methane?
A. Double bond
B. Triple bond
C. Single covalent bond
D. None of these

71. What is the shape of the ethylene molecule?
A. Linear
B. Tetrahedral
C. Coplanar triangular
D. Hectohedral

72. Which of the following compound is tetrahedral?
A. Ammonia
B. Carbon tetrachloride
C. Water
D. Acetylene

73. Through the fused sodium chloride, electric current can pass out due to the presence of:
A. Free electron
B. Free ion
C. Free molecule
D. The atoms of sodium and chlorine

74. The higher boiling point of the water occurs due to:
A. Its more specific heat
B. Its more value of the dielectric constant
C. Less molecular disassociation in H20
D. Presence of hydrogen bonding among the molecules of H20

75. The tendency to donate the electron is called:
A. Oxidation
B. Reduction

C. catylisation
D. self-induction

76. The tendency to accept the electron is called:
A. Oxidation
B. Reduction
C. catylisation
D. Self induction

77. The hydrogen burning process is directly associated with:
A. Hydrolysis
B. Reduction
C. Oxidation
D. Hydrogenation

78. The rusting of the iron is the example of:
A. Oxidation
B. Reduction
C. Polymerisation
D. Galvanization

79. In which of the following chlorine has + 1 oxidation number?
A. Hypochlorous acid
B. Hydrochloric acid
C. Zinc chloride
D. Chlorine

80. The element chromium (Cr) has its oxidation number in K2Cr2O7:
A. + 6
B. - 2
C. + 7
D. - 7

81. Mohr salt is:
A. Simple salt
B. Hybrid salt
C. Double salt
D. Complex salt

82. Hydrogen is the most fundamental component of all the acid, it is firstly stated by:
A. Arrhenius
B. Bronsted
C. Devi
D. Lori

83. In which of the following silver is not to be present?
A. Horn silver
B. German silver
C. Ruby silver
D. Lunar caustic

84. The gaseous law of diffusion was propounded by:
A. Boyle
B. Charles
C. Avogadro
D. Grahm

85. The smoke is the example of:
A. the solution of solid in the liquid
B. the solution of liquid in the liquid
C. the solution of solid in the gas
D. the solution of gas in the liquid

86. The air is the example of:
A. the solution of solid in the gas
B. the solution of gas in the gas
C. the solution of liquid in the gas
D. the solution of liquid in the solid

87. The alloys are:
A. the solution of solid in the solid
B. the solution of solid in the liquid
C. the solution of gas in the liquid
D. the solution of gas in the gas

88. The milk is the example of:
A. Solution
B. Colloidal solution
C. Emulsion
D. Air-solution

89. The pH value of any solution is 6 then the hydrogen ion concentration in the solution would be:
A. 10-6M
B. 10-10M
C. 1010M
D. 106M

90. The hydrogen ions concentration in any solution is 10-4 M the concentration of hydroxyl ions in it would be:
A. 10-4

B. 10-14
C. 10-10
D. 104

91. The oxidation state of manganese (Mn) in KMnO4 is:
A. +2
B. -2
C. +7
D. -7

92. The element whose oxidation state in its every compound is same:
A. Carbon
B. Fluorine
C. Hydrogen
D. Oxygen

93. The oxidation state of oxygen in OF2 is:
A. +2
B. -2
C. +1
D. -1

94. The acid is a substance which:
A. Accepts (gains) electron
B. Donates electrons
C. Provides (donates) proton
D. Donates OH- ion

95. The alkali is a substance which:
A. Provides (donates) proton
B. Accepts proton
C. Donates electron
D. Accepts electron pair

96. The substance which makes the blue litmus paper red is :
A. Acid
B. Base
C. Alkali
D. Salt

97. The substance which makes the red litmus paper blue is:
A. Acid
B. Alkali
C. Salt
D. None of these

98. The first time pH value measurement is done by:
A. Leviatiae
B. Pristley
C. Cauvendish
D. Sorensan

99. The average pH value of the human blood is:
A. 5.4
B. 6.2
C. 7.4
D. 8.7

100. The average pH value of the milk is:
A. 6.1
B. 6.6
C. 7.4
D. 8

101. What is the pH value of pure water?
A. 6.4
B. 6.6
C. 7
D. 7.4

102. Which of the following is called philosopher's wool?
A. Zinc bromide
B. Zinc nitrate
C. Zinc oxide
D. Zinc chloride

103. The container employed in the process of electrolysis is called:
A. Ammeter
B. Voltmeter
C. Voltammeter
D. Calorimeter

104. In the process of electrolysis oxidation occurs at:
A. Cathode
B. Anode
C. Both of these
D. None of these

105. In the process of electrolysis reduction occurs at :
A. Cathode
B. Anode
C. Both of these
D. None of these

106. Which of the following is utilized in the form of electrolyte of the dry cell (battery)?
A. Ammonium chloride and zinc chloride
B. Sodium chloride and calcium chloride
C. Magnesium chloride and zinc chloride
D. Ammonium chloride and calcium chloride

107. The iron container or vessel is galvanized by :
A. Chromium
B. Zinc
C. Aluminium
D. Nickel

108. The process of corrosiondoesn't take place in which of the following metals, when these metals are left free in the air:
A. Iron
B. Copper
C. Gold
D. Silver

109. In the galvanic cell, the process takes place is:
A. Transformation of the electrical energy into the chemical energy
B. Transformation of the chemical energy into the electrical energy
C. Transformation of light energy into the electrical energy
D. Transformation of electrical energy into the light energy

110. In the exothermic reaction:
A. Heat is absorbed
B. Heat is evolved
C. Heat doesn't change
D. Temperature remains constant

111. In the endothermic reaction:
A. Heat is absorbed
B. Heat is evolved
C. Heat doesn't change
D. Temperature remains constant

112. The chemical reactions which occur in one direction (from left to right) are called:
A. Reversible reaction
B. Irreversible reactions
C. Endothermic reactions
D. Exothermic reactions

113. The catalyst is a substance through which the rates of chemical reactions are:
A. Increased
B. Decreased

C. Changed
D. None of these

114. Who is the inventor of the catalyst?
A. Berzeleous
B. Rutherford
C. Louis
D. Kosell

115. The catalyst employed in the hydrogenation process of the oils is:
A. Fe
B. Ni
C. Mo
D. Pt

116. The catalyst used in the lead chamber process is:
A. Oxide of the nitrogen
B. Platinum
C. Nickel
D. MnO2

117. The catalyst employed in the production of H2S04 by the Contact process is:
A. The pieces (powder) of iron
B. The pieces (powder) of platinum
C. Oxide of nitrogen
D. Nickel metal

118. The employed catalyst in the production of ammonia through the Haber's process is:
A. Nickel
B. Iron
C. Platinum
D. Molybdenum

119. In the contest of an alternative sources of energy and practical bio-fuel ethanol can be obtained from-which of the following?
A. Potato
B. Paddy
C. Sugarcane
D. Wheat

120. When the water vapour is poured on the red heated coke then the mixture of carbon monoxide and hydrogen gas is obtained which is:
A. Coal gas
B. Water gas
C. Producer gas
D. Bio gas

121. The gaseous mixture of carbon monoxide and nitrogen is called:
A. Coal gas
B. Water gas
C. Producer gas
D. Natural gas

122. The main component of the natural gas is:
A. Methane
B. Ethane
C. Propane
D. Butane

123. In L.P.G. the main component is:
A. Methane
B. Carbon dioxide
C. Butane
D. Sulphur dioxide

124. Which of the following has the maximum calorific value?
A. Hydrogen
B. Charcoal
C. Natural gas
D. Gasoline

125. Which of the following would produce minimum environmental pollution?
A. Diesel
B. Coal
C. Hydrogen
D. Kerosene

126. The percentage amount of carbon in the various types of coal is different, in which of the following its percentage would be the most:
A. Peat
B. Lignite
C. Bituminous
D. Anthracite

127. Which of the following is called as the brown coal?
A. Peat
B. Lignite
C. Bituminous
D. Anthracite

128. The anti-knocking properties of any fuel exhibit:
A. Golden number
B. Natural number

C. Octane number
D. Mach number

129. On what basis, the Mendeleev periodic table is classified?
A. Atomic mass
B. Atomic number
C. Atomic volume
D. Atomic density

130. Who propounded the modern periodic law?
A. Newlands
B. Dobrenor
C. Mendeleev
D. Moseley

131. The basis of the classification of the element in the modern periodic table is:
A. Atomic number
B. Atomic mass
C. Atomic volume
D. Atomic density

132. Which of the following is the heaviest metal?
A. Silver
B. Gold
C. Mercury
D. Platinum

133. Which of the following is the lightest metal?
A. Magnesium
B. Aluminium
C. Platinum
D. Lithium

134. Which of the following is the lightest element?
A. Hydrogen
B. Helium
C. Mercury
D. Platinum

135. Which of the following is the most fundamental property of the element?
A. Atomic weight
B. Molecular weight
C. Atomic number
D. Atomic density

136. The process employed to remove the magnetic impurities from the Ores is called:
A. Gravity separation process
B. Magnetic separation process
C. Forth floatation process
D. Physical process

137. The concentration process of sulphide ores is:
A. Gravity separation process
B. Magnetic separation process
C. Forth floatation process
D. Physical process

138. The main ore of the mercury is:
A. Cinnabar
B. Pyrite
C. Bauxite
D. Pyrolusite

139. The element radium was extracted from:
A. Lime stone
B. Pinch blend
C. Retile
D. Haematite

140. Aluminium metal is extracted mainly from its ore:
A. Magnetite
B. Bauxite
C. Dolomite
D. Lime Pigment

141. Galena is the ore of the metal:
A. Silver
B. Lead
C. Mercury
D. Aluminium

142. Monozite is the ore of:
A. Zirconium
B. Thorium
C. Titanium
D. Iron

143. The chemical formula of washing soda is :
A. NaOH
B. Ca (OH)2
C. NaOHC03
D. Na2C03.10H2O

144. In the ocean-water which of the following salt has its maximum contribution in the salinity:
A. Calcium sulphate
B. Magnesium chloride
C. Magnesium iodide
D. Sodium chloride

145. The chemical utilized and employed as fixer in the photography is:
A. Sodium sulphate
B. Sodium thiosulphate
C. Ammonium per-sulphate
D Borax

146. The extremely soft mineral, talk (soap stone) is mainly:
A. Manganese silicate
B. Sodium silicate
C. Sodium phosphate
D. Magnesium silicate

147. In the earth crust although the amount of aluminium is more than iron, however aluminium is costly than iron because:
A. Aluminium is more useful than iron
B. Aluminium forms more alloys than iron
C. Aluminium made equipments are more acceptable then iron equipments
D. The extraction processes of aluminium is more costly than extraction processes of iron

148. For the installation of aluminium plants in India, the minimum required parameter other than bauxite is:
A. Coke
B. Electricity
C. Labour
D. Market

149. Which of the following statement is true regarding the aluminium?
A. Aluminium hydroxide is amphoteric in nature
B. Aluminium exists in the Free State in nature
C. Nitric acid does not react with the aluminium
D. Hot and concentrated H_2SO_4 directly react with oxygen in which SO_2 gas is released

150. The chemical formula of the plaster of Paris is:
A. $CaSO_4.5H_2O$
B. $2CaSO_4. H_2O$
C. $(CaSO_4)_2. 2H_2O$
D. $CaSO_4. MgO$

151. Which of the following is the chemical name of the lime stone?
A. Calcium chloride
B. Calcium oxide
C. Calcium carbonate
D. Calcium sulphate

152. From which of the following ore, iron is extracted?
A. Lime stone
B. Pinch blend
C. Monazite sand
D. Haematite

153. What will be the change when iron get rusted?
A. Its weight is increased
B. Its weight is decreased
C. No changes take place
D. Its weight change

154. Which of the following element is mixed up for making steel which can resist high temperature and which has high level hardness and anti-frictional resistivity?
A. Aluminium
B. Chromium
C. Nickel
D. Tungsten

155. To provide stern hardness which of the following is mixed up?
A. Carbon
B. Manganese
C. Silicon
D. Chromium

156. Blue Vitriol is:
A. Copper sulphate
B. Iron sulphate
C. Calcium sulphate
D. Sodium sulphate

157. The coating of thin layer of the zinc on the steel or iron utensils is called:
A. Heat feeding
B. Material plating
C. Lamination
D. Electro plating

158. The sharp (bitter) smell of the substance which is found in the colouration or painting is:
A. CaOH
B. Al2 (S04)3
C. CaC03
D. Zn3 (P04)2

159. Which of the following metal is the best conductor of the electricity?
A. Gold

B. Silver
C. Copper
D. Zinc

160. The substance which is useful for the photography:
A. Silver Nitrate
B. Silver bromide
C. Sulphuric acid
D. Citric acid

161. Which of the following metal is the heaviest?
A. Silver
B. Copper
C. Gold
D. Lead

162. Which of the following metal is liquid at ordinary temperature?
A. Lead
B. Mercury
C. Nickel
D. Tin

163. The substance employed and frequently used in the fluorescent tube is:
A. Sodium oxide and argon
B. Sodium vapour and neon
C. Mercury vapour and argon
D. Mercury oxide and argon

164. Which of the following metal is used in the accumulator cell?
A. Copper
B. Lead
C. Aluminium
D. Zinc

165. Which of the following metal is the hardest one?
A. Gold
B. Iron
C. Platinum
D. Lead

166. The gas emancipating through paddy field is :
A. Ethane
B. Methane
C. Nitrogen
D. All of these

167. Which of the following is the heaviest metal?
A. Copper
B. Uranium
C. Aluminium
D. Silver

168. The colours of the fire crackers are extracted from the elements of the salt of:
A. Zn and S
B. K and Hg
C. Sr and Ba
D. Cr and Ni

169. The maximum density of the water exists at :
A. 100°C
B. + 4°C
C. O°C
D. -4°C

170. The boiling point and freezing point of the water on mixing edible salt would:
A. Increase
B. Increase and then decrease
C. Decrease
D. Decrease and then increase

171. The permanent hardness of water appears due to the:
A. Carbonates of calcium and magnesium
B. Bicarbonates of calcium and magnesium
C. Chloride and sulphate of the calcium and magnesium
D. None of these

172. In which of the following carbon is not present?
A. Diamond
B. Graphite
C. Coal
D. None of these

173. The heavy water is a type of:
A. Coolant
B. Moderator
C. Ore
D. Fuel

174. In all bio compounds the most necessary fundamental element is:
A. Nitrogen
B. Oxygen
C. Carbon
D. Sulphur

175. Which of the following is the most hard?
A. Diamond
B. Glass
C. Quartz
D. Platinum

176. The percentage content of carbon is more than other coal in:
A. Bituminous
B. Lignite
C. Peat
D. Anthracite

177. The ordinary and general type of coke is :
A. Anthracite
B. Lignite
C. Bituminous
D. Peat

178. The polluted gas emitted from the vehicles is mainly:
A. Carbon dioxide
B. Carbon monoxide
C. Marsh gas
D. Nitrogen oxide

179. Which of the following gas pollutes the most to the air?
A. Carbon dioxide
B. Carbon monoxide
C. Sulphur dioxide
D. Hydrocarbon

180. Dry ice is:
A. Solid water
B. Solid CO2
C. Dehydrated ice
D. Solid H2O2

181. Those reactions in which two or more substances combine to form a single substance is called:
A. Combination reaction
B. Displacement reaction
C. Decomposition reaction
D. Double displacement reaction

182. Those chemical substances which have a sour taste are:
A. Salt
B. Acid

C. Bases
D. None of the above

183. Those chemical substances which have a bitter taste are:
A. Acid
B. Bases
C. Salt
D. Concentrated Acids

184. The scale on which the strength of acid solutions as well as basic solutions could be represented by making use of hydrogen ion concentrations in them is called:
A. Balance scale
B. Platform scale
C. Pan scale
D. pH scale

185. A compound formed from an acid by the replacement of the hydrogen in the acid by a metal is called:
A. Base
B. Salt
C. Concentrated Acid
D. Alkali

186. What is the chemical bond formed by the transfer of electrons from one atom to another is called?
A. Single covalent bond
B. Ionic bond
C. Double covalent bond
D. Triple covalent bond

187. The chemical bond formed by the sharing of electrons between two atoms is known as:
A. Ionic bond
B. Triple covalent bond
C. Covalent bond
D. Single covalent bond

188. What is a homogeneous mixture of two or more metals called?
A. Salt
B. Alloy
C. Alkali
D. Acid

189. What is an unsaturated hydrocarbon in which the two carbon atoms are connected by a double bond called?
A. Alkanes

B. Alkenes
C. Alkynes
D. Ionic bond

190. An unsaturated hydrocarbon in which two carbon atoms are connected by a triple bond is called:
A. Alkynes
B. Haloalkanes
C. Alkenes
D. Ketones

191. The organic compounds having the same molecular formula but different structures are called:
A. Atoms
B. Isomers
C. Homologous series
D. Haloalkanes

192. What is the part of the solution that dissolves the solute called?
A. Solvent
B. Sol
C. Salt
D. None of the above

193. Compounds that contain carbon are called:
A. Organic compound
B. Ionic compound
C. Alkynes
D. Molecular compound

194. What is the mixing of air into a liquid or solid called?
A. Aeration
B. Aldehyde
C. Actinides
D. Allotropy

195. What are the different physical forms in which an element can exist called?
A. Alkane
B. Alloy
C. Amine
D. Allotropes

196. The study of heat flow is called:
A. Combustion
B. Calorimetry
C. Diffusion
D. Electrolysis

197. What is the process called when a compound combines with oxygen gas to form water, heat and carbon dioxide?
A. Electrolysis
B. Combustion
C. Diffusion
D. Calorimetry

198. When a gas moves through an opening into a chamber that contains no pressure, it is called:
A. Effusion
B. Diffusion
C. Combustion
D. Osmosis

199. When a substance loses electrons, it is called:
A. Corrosion
B. Rust
C. Oxidation
D. Osmosis

200. What is the substance that has an unstable nucleus that can fall apart called?
A. Organic compound
B. Radioactive
C. Nuclear fission
D. Nuclear fusion

ANSWER KEY

1. B	2. D	3. C	4. D	5. A	6. A	7. A	8. A	9. A	10. D
11.D	12.D	13.D	14.C	15.B	16.C	17.D	18.D	19.C	20.D
21.C	22.D	23.D	24.C	25.C	26.C	27.C	28.A	29.C	30.A
31.B	32.D	33.A	34.C	35.A	36.B	37.A	38.C	39.C	40.A
41.C	42.C	43.B	44.A	45.D	46.D	47.A	48.C	49.C	50.A
51.A	52.D	53.B	54.A	55.C	56.A	57.B	58.A	59.B	60.B
61.C	62.A	63.D	64.A	65.B	66.B	67.D	68.B	69.B	70.C
71.C	72.B	73.B	74.B	75.A	76.B	77.C	78.A	79.A	80.A
81.C	82.C	83.B	84.D	85.C	86.B	87.A	88.C	89.A	90.C
91.C	92.B	93.A	94.C	95.B	96.A	97.B	98.D	99.C	100.B
101.C	102.C	103.C	104.B	105.A	106.A	107.B	108.C	109.B	110.B
111.A	112.A	113.C	114.A	115.B	116.A	117.B	118.D	119.C	120.B
121.C	122.A	123.C	124.A	125.C	126.D	127.B	128.C	129.A	130.D
131.A	132.D	133.D	134.A	135.C	136.B	137.C	138.A	139.B	140.B
141.B	142.B	143.D	144.D	145.B	146.D	147.D	148.B	149.B	150.B
151.C	152.D	153.A	154.B	155.D	156.A	157.C	158.D	159.B	160.B
161.C	162.B	163.C	164.B	165.C	166.B	167.B	168.C	169.B	170.C
171.C	172.B	173.C	174.D	175.A	176.D	177.C	178.B	179.B	180.B
181.A	182.B	183.B	184.D	185.B	186.B	187.C	188.B	189.B	190.A
191.B	192.A	193.A	194.A	195.D	196.B	197.B	198.A	199.C	200.B

BIOLOGY

1. Which of the following is a large blood vessel that carries blood away from the heart?
A. Vein
B. Artery
C. Capillary
D. Nerve

2. Which of the following is not a member of the vitamin B complex?
A. Thiamine
B. Riboflavin
C. Folic acid
D. Ascorbic acid

3. Fungi are plants that lack:
A. Oxygen
B. Carbon dioxide
C. Chlorophyll
D. None of these

4. What makes a reptile a reptile?
A. Cold blooded
B. Warm Blooded
C. Non-Hearing
D. Egg-laying

5. Which blood vessels have the smallest diameter?
A. Capillaries
B. Arterioles
C. Venules
D. Lymphatic

6. Which of the following is an air-borne disease?
A. Measles
B. Typhoid
C. Pink eye
D. None of the above

7. There is a very, yellow dust that comes away on the fingers, wherever we touch the middle of a flower. These tiny yellow grains are one of the most precious substances in nature because they contain the secret of plant life. What is this dust called?
A. Pollen
B. Sperm
C. Spore
D. Sporocyst

8. Which organ of the body produces the fluid known as bile?
A. Liver
B. Pancreas
C. Gall bladder
D. Kidney

9. Which of the following hormones is a steroid?
A. Estrogen
B. Glucagon
C. Insulin
D. Oxytocin

10. Which one of the following is not a function of the liver?
A. Regulation of blood sugar
B. Enzyme activation
C. Detoxiation
D. Reproduction

11. Which part of human body skin has greatest number Sweat glands?
A. Forehead
B. Forearm
C. Palm of the hand
D. Back

12. Who among the following had started vaccination?
A. Jonas E. Salk
B. Paul Muller
C. Edward Jenner
D. Robert Frost

13. Proteins are consists of:
A. Sugars
B. Amino acids
C. Fatty acids
D. Nucleic acids

14. Liver, milk, egg yolk, fish liver oil is the source of:
A. Vitamin A
B. Vitamin B2
C. Vitamin D
D. Vitamin C

15. Which of the following name of scientist and their field of work is correctly matched?
A. DNA/Double helix: F. Crick J. Watson, M. Wilkins
B. Modern classification of plants and animals based on a system: Harvey
C. Bacteria: Linnaeus

D. Blood travels in a continuous circuit: Leuwenhock

16. Heart is made up of
A. Non-striated muscle
B. Cardiac muscle
C. Adipose tissue
D. Striated muscle

17. Hargobind Khorana's work relates to:
A. Synthesis of simple DNA
B. Understanding the genetic code
C. Reduction of mutation
D. Synthesis of RNA from bacterial cell

18. Which of the following corona virus that kills human?
A. AIDS
B. FAIDS
C. SARS
D. HIV

19. Digestion of proteins starts in the:
A. Mouth
B. Stomach
C. Duodenum
D. Intestine

20. Which of the following acid that is secreted in the stomach?
A. HCl
B. H2S04
C. H2C03
D. HNO3

21. Which vitamin is needed to prevent Xero-phthalmia?
A. A
B. B
C. C
D. D

22. Why the white blood corpuscles are popularly called "soldiers of the body"?

A. March at a regular pace
B. Appear uniform
C. Defend the body
D. Disciplined

23. Hepatitis is a general term for a disease that is caused by:
A. Viruses
B. Bacteria
C. Parasites
D. All the above

24. Which among the following is not an example of carbohydrate?
A. Maltose
B. Fructose
C. Glycogen
D. Glycine

25. Which one of the following is not correctly matched?
A. Haemoglobin: Skin
B. Vitamin C: Scurvy
C. Carbohydrate: Potato
D. Fat: Butter

26. Which is a communicable disease?
A. Asthma
B. Scurvy
C. Measles
D. Diabetes

27. Which one of the following is not correctly matched?
A. Tuberculosis: Lungs
B. Filaria: Lymph nodes
C. Encephalitis: Heart
D. Leukaemia: Blood cells

28. Which of the following has the highest protein content per gram?
A. Groundnut
B. Soyabean
C. Apple
D. Wheat

29. Which of the following have Alpha-keratin as protein?
A. Blood
B. Eggs
C. Skin
D. Wool

30. Mushrooms are/can be:
A. A variety of fungus
B. Fleshy, fruiting bodies of the fungus
C. Grown in small sheds or plots

D. All the above

31. Which of the following is not a primary food product?
A. Vegetables
B. Milk
C. Cereals
D. Fruits

32. Which of the vegetables have abundance of Vitamins A and C?
A. Brinjal
B. Lady's finger
C. Potato
D. Tomato

33. Which of the following defence of the human body against bacteria?
A. Haemoglobin
B. Phagocytes
C. Red blood cells
D. Blood platelets

34. Which of the following nerves connected from the eyes to ears?
A. Cerebrum
B. Cerebellum
C. Medulla
D. Spinal cord

35. Leukaemia is a disease that results from some kind of disorder in the blood. Precisely, leukaemia occurs due to:
A. Haemoglobin increase in blood
B. Marked increase of white corpuscles in blood
C. Marked increase of protein and calcium
D. Marked reduction of proteins in blood

36. What is blood pressure?
A. It is the pressure that the blood clot exerts over the brain.
B. It is the pressure that blood receives on account of faulty commands from the brain.
C. It is the pressure that fatness or old age exerts on the body's circulatory system.
D. It is the amount of pressure on the blood as a result of the heart's pumping function and the resistance of the arterial walls.

37. Select the correct pair of disease and its causes:
A. Trichinosis - Bacterial infections
B. Sleeping sickness - Eating uncooked Pork
C. Athlete's foot- Fungus
D. Meningitis - Protozoan (bite of tsetse fly)

38. Which of the following blood vessel that carries deoxygenated blood?
A. Aorta
B. Pulmonary artery
C. Hepatic artery
D. Pulmonary vein

39. Which of the following growth of human body affected by somatotrophic hormone?
A. Bones
B. Hair
C. Muscles
D. Connective tissue

40. Select the correct match of the disease and its affected part.
A. Caries - Epidermal tissue of the body
B. Ring worm - Brain and Spinal cord
C. Meningitis - Teeth
D. Pneumonia - Lungs

41. Hay fever is an allergic reaction to the presence of the following in the air:
A. Dust
B. Smoke
C. Pollen
D. Moisture

42. The behavioural pattern of which one of the following organisms may upset when DOT is used as pesticide?
A. Earthworm
B. Snake
C. Fish
D. Frog

43. What causes the 'mad-cow disease' (Jakob-Creutzfeldt disease)?
A. Bacterium
B. Virus
C. Viroid
D. Prion

44. What is another name of Vitamin K?
A. Nicotinic acid
B. Riboflavin
C. Thiamine
D. 2 Methyl-1, 4-naphthoquinone

45. Which of the following hormone controlled the blood pressure?
A. Vasopressin
B. Oxytocin
C. Estrogens
D. Testosterone

46. Brain and the spinal cord are invested by membranes called:
A. Arachnoids
B. Pleural membrane
C. Meninges
D. None of these

47. Which one of the following organisms has a role in converting nitrates to free nitrogen?
A. Pseudomonas
B. Nitrosomonas
C. Nitrobacter
D. Rhizobium

48. Consider the following with reference to human nutrition:
1. Vitamin A
2. Vitamin B2
3. Vitamin E
For which of these are green leafy vegetables rich sources?
A. 1 and 2
B. 2 only
C. 1 and 3
D. 1,2 and 3

49. Select correct match of the Biological theories or laws and Scientists.
A. Laws of Inheritance - Lamarck
B. Theories of Organic Evolution - Darwin
C. Theories of Natural Selection - Mendel
D. Germplasm Theory - Weismann

50. Which one of the following is the richest source of vitamin C?
A. Guava
B. Pineapple
C. Orange
D. Tomato

51. Which one of the following pairs is not correctly matched?
A. Becquerel: Radioactivity
B. Alexander Fleming: Penicillin
C. Louis Pasteur: Blood groups
D. William Harvey: Blood circulation

52. Which of the following is a sexually transmitted disease?
A. Leukaemia
B. Hepatitis
C. Colour Blindness
D. All of the above

53. Which one of the following systems of the body is primarily attacked by the HIV?
A. Cardiovascular
B. Immune
C. Respiratory
D. Reproductive

54. In the human body, the blood enters the aorta of the circulatory system from the:
A. Left atrium
B. Left ventricle
C. Right atrium
D. Right ventricle

55. Which one of the following plant nutrients is not supplemented in the soil for growing legumes?
A. Nitrogen
B. Potassium
C. Phosphorus
D. None of these

56. Which of the following are known as the suicide bags of cells?
A. Ribosomes
B. Golgi bodies
C. Lysosomes
D. Nucleoli

57. Chromosome complement in Turner's syndrome is
A. 47; XXY
B. 45; XO
C. 46; XX
D. 47; XYY

58. Excess of amino acids is broken down to form urea in:
A. Kidney
B. Liver
C. Spleen
D. Rectum

59. If a person can see an object clearly when it is placed at about 25cm away from him, he is suffering from:
A. Myopia
B. Hyper- myopia
C. Astigmatism
D. None of the above

60. Who among the following discovered the anti-rabies vaccine?
A. Edward Jenner
B. James Lind
C. Louis Pasteur
D. Robert Koch

61. Which of the following teeth of child (3-4 Years) is not a part of the milk teeth?
A. Incisors
B. Canines
C. Molars
D. Premolars

62. Who said this statement? "I flatter myself having discovered the method that nature employs to purify air. It is vegetation."

A. Antonine Laurent Lavoisier
B. Joseph Priestley
C. Louis Pasteur
D. William Harvey

63. Why it is not advisable to sleep under a tree at night?
A. Release of less oxygen
B. Release of more oxygen
C. Release of carbon dioxide
D. Release of carbon monoxide

64. What is the averages rate of the heart beats (per minute) in an adult?
A. 60
B. 72
C. 84
D. 96

65. Which of the following is the volume of the urine produced in an adult human every 24 hours?
A. 1 litre
B. 1.5 litres
C. 3.0 litres
D. 5.0 litres

66. Which of the following pigment causes eye colour of person (brown eyes, blue eyes or black eyes)?
A. Cornea
B. Choroid
C. Iris
D. Vitreous body

67. Which of the following led to the expulsion of milk from the breast during suckling?
A. Prolactin
B. Oxytocin
C. Vasopressin
D. Estrogen and Progesterone

68. Where does fertilization occurs in the female?
A. Fallopian tube
B. Uterus
C. Cervix
D. Vagina

69. Which of the following is the universal recipient blood group?
A. A
B. B

C. AB
D. 0

70. What proportion of children is likely to be colour blindness when their parent (mother has normal vision & father has colour-blindness)?
A. 0 per cent
B. 25 per cent
C. 50 per cent
D. 100 per cent

71. Which of the following blood group is considered as Universal Donor?
A. A
B. AB
C. B
D. O

72. What part of the Quinine plant is commonly used drug for Malaria?
A. Leaves
B. Fruits
C. Root
D. Stem bark

73. Which of the following disease occur when the replacement of breast feeding by less nutritive food, low in proteins and calories, infants below the age of one year?
A. Kwashiorkor
B. Marasmus
C. Rickets
D. Pellagra

74. What happen when the exposure to carbon monoxide (from coal gas) is extremely dangerous and can kill a patient?
A. The compound carboxy-haemoglobin (COHb) it forms with haemoglobin can gradually clot the blood resulting in circulatory failure.
B. COHb reduces the ability of blood to transport oxygen by rupturing a vast majority of erythrocytes.
C. COHb is stable compound and thus deprives blood of its ability to transport oxygen.
D. COHb greatly modifies the structure of haemoglobin thus making it lose its affinity for oxygen.

75. In how many times human will lose their consciousness if blood will stop flowing to the brain?
A. 2 sec
B. 5 sec
C. 15 to 20 sec
D. 5 min

76. How many bones comprise the adult human skeleton?
A. 204 bones
B. 206 bones
C. 208 bones
D. 214 bones

77. Which of the following statement is related with the 'Sulphur shower'?
A. Discharge of large quantities of Crocus (yellow kesar) pollen grains into the air.
B. Discharge of large quantities of pinus pollen grains into the air forming yellowish clouds.
C. Release of a large amount of sulphur particles into the air from factories processing sulphur.
D. Release of a large amount of sulphur particles into the air near sulphur mines.

78. In the given item consist of two statements, one labelled as 'Assertion (A)' and the other labelled as 'Reason (R)'.
Assertion (A): Persons with AB blood group can accept blood from any blood group.
Reason (R): They are universal acceptor
Select your answers to these items using the codes given below.
Codes:
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. A is true but R is false
D. A is false but R is true

79. In the given item consist of two statements, one labelled as 'Assertion (A)' and the other labelled as 'Reason (R)'.
Assertion (A): Saturated fats are more reactive as compared to unsaturated fats.
Reason (R): Molecules of unsaturated fats have double bonds.
Select your answers to these items using the codes given below.
Codes:
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. A is true but R is false
D. A is false but R is true

80. In the given item consist of two statements, one labelled as 'Assertion (A)' and the other labelled as 'Reason (R)'.
Assertion (A): The sons of a colour blind woman are always colour blind but not the daughters.
Reason (R): Colour blindness is a sex-linked character and such characters are transferred from mother to son only.
Select your answers to these items using the codes given below.
Codes:
A. Both A and R are true and R is the correct explanation of A
B. Both A and R are true but R is not a correct explanation of A
C. A is true but R is false
D. A is false but R is true

81. How many HIV positive infections that are occurring everyday in the world?
A. 6,000
B. 60,000
C. 600,000
D. 1,000,000

82. Bombyx mori, that produces fine filaments of silk inside the cocoon, is a:
A. Butterfly
B. Dipteran (silkworm)
C. Moth
D. Mulberry plant hemipteran

83. Why was DDT banned which an organ chlorine compound, used first to control malaria, carried in mosquitoes and later to a variety to insect pests?
A. It brings about a change in sex chromosomes
B. It persists in the environment and bio-accumulates
C. It increases its affinity hundred-fold for haemoglobin preventing its coupling with oxygen
D. All of these

84. What is the reason behind the small shrunken scrotal of an adult bulls straying on Delhi roads?
A. Congenital defect
B. Negative feedback due to extremely high levels of testosterone
C. Castration
D. All of these

85. Which of the following components increases the effectiveness of the Photosynthesis process?
A. Ultraviolet
B. Red
C. Blue
D. Infrared

86. What is the weight of human heart?
A. 100 gms
B. 300 gms
C. 800 gms
D. 1000 gms

87. Which of the following gland controls the blood pressure?
A. Thalamus gland
B. Adrenal gland
C. Thyroid gland
D. Pancreas gland

88. In which organ of the human body are the lymphocyte cells formed?
A. Liver
B. Long bone
C. Pancreas
D. Spleen

89. Which of the following is one of the functions of antigen?
A. Lowers body temperature
B. Destroys harmful bacteria
C. Triggers the immune system
D. Used as an antidote to poison

90. Which of the following process that does not involve evolution of CO2?
A. Combustion
B. Respiration
C. Fermentation
D. Photosynthesis

91. Name the Glands associated with the Human Digestive System?
A. Salivary Glands and Pancreas
B. Salivary Glands and Liver
C. Liver and Pancreas
D. Salivary Glands, Liver & Pancreas

92. Arrange the correct sequence of the steps involved in the process of Human Digestive System?
A. Digestion, Ingestion, Assimilation, Egestion and Absorption
B. Ingestion, Digestion, Absorption, Assimilation and Egestion
C. Egestion, Absorption, Digestion, Assimilation and Ingestion
D. Assimilation, Absorption, Ingestion, Digestion and Egestion

93. In which part of the body digestion of protein begins?
A. Pancreas
B. Stomach
C. Small Intestine
D. Large Intestine

94. What is the Function of Hydrochloric Acid?
(i) It makes pepsin enzyme effective.
(ii) It kills bacteria which may enter in stomach with food.
Which of the following statements is/are correct?
A. Only (i)
B. Only (ii)
C. Both (i) and (ii)
D. Neither (i) nor (ii)

95. Name the largest part of the Alimentary canal?
A. Large Intestine
B. Small Intestine
C. Liver
D. Stomach

96. Complete digestion of food occurs in:
A. Stomach
B. Small Intestine
C. Pancreas
D. Large Intestine

97. What is the function of Bile Juice secreted by Liver?
A. It makes the food alkaline.
B. It makes the food acidic.
C. It breaks down the food.
D. None of the above

98. Name the hardest material present in the body?
A. Dentin
B. Pulp
C. Enamel
D. None of the above

99. In which part of our body food gets absorbed?
A. Small Intestine
B. Large Intestine
C. Stomach
D. Liver

100. The undigested food stored in the liver in the form of carbohydrate is called:
A. Pulp
B. Glucose
C. Glycogen
D. Carbohydrate

101. Who discovered cell in 1665?
A. Robert Hook
B. Robert Crook
C. David Thomson
D. Marie Francois

102. Name an Organelle which serves as a primary packaging area for molecules that will be distributed throughout the cell?
A. Mitochondria
B. Plastids
C. Golgi apparatus

D. Vacuole

103. Name the outer most boundary of cell?
A. Plasma membrane
B. Cytoplasm
C. Nuclear membrane
D. None of the above

104. Name the process in which the ingestion of material by the cells is done through the plasma membrane?
A. Egestion
B. Diffusion
C. Osmosis
D. Éndocytosis

105. Which among the following sentence is not correct about the organelles?
A. They are found in all Eukaryotic cells.
B. They are found in multicellular organisms.
C. They coordinate to produce the cell.
D. They are small sized and mostly internal.

106. Name the process in which the passage of water goes from a region of higher concentration to a region of lower concentration through a semi permeable membrane?
A. Diffusion
B. Osmosis
C. Both a) and b)
D. Neither a) nor b)

107. Name an organism which contains single chromosome and cell division occurs through fission or budding?
A. Eukaryotes
B. Prokaryotes
C. Bacteria
D. Primitive organism

108. Name the process in which the membrane of a vesicle can fuse with the plasma membrane and extrude its contents to the surrounding medium?
A. Exocytosis
B. Endocytosis
C. Osmosis
D. Diffusion

109. The jelly like substance present inside the cell is known as:
A. Cytoplasm
B. Ectoplasm
C. Nucleoplasm
D. None of the above

110. Blue green Algae are:
A. Prokaryotes
B. Eukaryotes
C. Both a) and b)

D. Neither a) nor b)

111. Which of the following statements are correct regarding respiration in plants?
I. Respiration is the process of releasing energy from food.
II. Respiration takes place individually in all parts of the plants like stem, roots, leaves etc.
III. The rate of respiration is slow in plants whereas it is faster in humans and animals.
Select the correct answer from the codes given below:
A. I and III are correct
B. I and II are correct
C. I, II and III are correct
D. None of the above

112. Name the process through which much needed oxygen is supplied to all the cells of the plants?
A. Diffusion
B. Endosmosis
C. Exosmosis
D. Photosynthesis

113. Due to Water logging:
A. An air is expelled from in-between the particles of soil.
B. Oxygen becomes unavailable to the roots of the plants.
C. Plants respire anaerobically which produces alcohol and kill them.
D. All the above are correct.

114. Respiration in Plants takes place through:
A. Stomata
B. Lenticels
C. Both A and B
D. Only A

115. Consider the following statements:
A. Respiration takes place both day and night.
B. Photosynthesis occurs during day time only.
C. Both A and B are correct.
D. Neither A nor B are correct.

116. Some plants store waste in their fruits in the form of solid bodies called:
A. Raphides
B. Lenticels
C. Stomata
D. Resins

117. Various methods used by plants to get rid of their waste products are:
I. Gaseous waste through stomata and lenticels.
II. Stored solid and liquid waste by shedding leaves, peeling of bark and falling of fruits.

III. By secreting waste in the form of gum and resins.
Which of the following statements is/are correct?
A. I and II are correct.
B. II and III are correct.
C. I and III are correct.
D. I, II and III are correct.

118. Name the waste products secreted by Plants?
A. Carbon Dioxide
B. Oxygen
C. Water Vapour
D. All are correct.

119. Which of the following statements is/are correct?
I. The net gaseous exchange in leaves at night is, oxygen diffuses in and carbon dioxide diffuses out.

II. Net gaseous exchange during day time is, oxygen diffuses out and carbon dioxide diffuses in.
Select the correct answer from the codes given below:
A. Only I is correct.
B. Only II is correct
C. Both I and II are correct.
D. Neither I nor II is correct.

120. Name an extension of the epidermal cells of a root which is in direct contact with the soil?
A. Root Hairs
B. Internodes
C. Bundle Scars
D. Pith

121. What is the process of intake of nutrients by an organism as well as the utilisation of these nutrients by the organisms called?
A. Nutrition
B. Photosynthesis
C. Chloroplasts
D. Digestion

122. The mode of nutrition in which an organism makes its own food from the simple inorganic material like carbon dioxide and water present in the surrounding is called:
A. Heterotrophic nutrition
B. Saprotrophic nutrition
C. Autotrophic nutrition
D. Holozoic nutrition

123. What is the mode of nutrition called in which organisms cannot make its own food from simple inorganic material and depends on other organisms for its food?
A. Autotrophic nutrition
B. Heterotrophic nutrition
C. Parasitic nutrition
D. Holozoic nutrition

124. When an organism obtains its food from decaying organic matter of dead plants, dead animals and rotten bread, etc., it is called:
A. Parasitic nutrition
B. Autotrophic nutrition
C. Holozoic nutrition
D. Saprotrophic nutrition

125. The nutrition in which an organism derives its food from the body of another living organism without killing it, it's called:
A. Saprotrophic nutrition
B. Parasitic nutrition
C. Holozoic nutrition
D. Autotrophic nutrition

126. The nutrition in which an organism takes the complex organic food materials into its body by the process of ingestion, the ingested food is digested and then absorbed into the body cells of the organism:
A. Parasitic nutrition
B. Autotrophic nutrition
C. Holozoic nutrition
D. Heterotrophic nutrition

127. The process by which green plants make their own food from carbon dioxide and water by using sunlight energy in the presence of chlorophyll, is called:
A. Xanthophylls
B. Stomata
C. Photosynthesis
D. Chloroplast

128. Animals which eat only plants are called:
A. Herbivores
B. Omnivores
C. Carnivores
D. None of the above

129. What is the process of taking food into the body called?
A. Digestion
B. Assimilation
C. Ingestion
D. Egestion

130. The process in which the food containing large, insoluble, molecules is broken down into small, water soluble molecules is called:
A. Digestion
B. Absorption
C. Ingestion
D. Assimilation

131. The process of removal of toxic wastes from the body of an organism is called:
A. Transport
B. Respiration
C. Excretion

D. Nutrition

132. The movement of a plant part in response to light is called:
A. Phototropism
B. Geotropism
C. Chemotropism
D. Hydrotropism

133. The movement of plant part in response to gravity is called:
A. Thigmotropism
B. Hydrotropism
C. Phototropism
D. Geotropism

134. The movement of a plant part in response to a chemical stimulus is called:
A. Hydrotropism
B. Chemotropism
C. Thigmotropsim
D. Phototropism

135. The movement of a plant part in response to water is called:
A. Geotropism
B. Hydrotropism
C. Chemotropism
D. Thigmotropism

136. The directional movement of a plant part in response to the touch of an object is called:
A. Phototropism
B. Geotropism
C. Thigmotropism
D. Hydrotropism

137. The non-directional movement of a plant part in response to the touch of an object is called:
A. Thigmotropism
B. Thigmonasty
C. Phototropism
D. Photonasty

138. The pad-like swelling at the base of each leaf of a sensitive plant is called:
A. Pistol
B. Scape
C. Pulvini
D. Foliage

139. The non-directional movement of a plant part in response to light is called:
A. Phototropism
B. Thigmotropism
C. Geotropism
D. Photonasty

140. The shorter fibres on the body of a neuron are called:
A. Dendrites
B. Axon
C. Cytoplasm
D. Myelin sheath

141. The longest fibre on the cell body of a neuron is called:
A. Myelin
B. Nerve endings
C. Axon
D. Dendrites

142. The axon passes the impulse to another neuron through a junction called:
A. Nerve endings
B. Synapse
C. Cytoplasm
D. Nucleus

143. What are those reflex actions called which involve brain?
A. Reflex arcs
B. Cerebral reflexes
C. Spinal reflexes
D. None of the above

144. The chemical substances which coordinate the activities of living organisms and also their growth are called:
A. Hormones

B. Blood
C. Sodium
D. Cytoplasm

145. When the parent organism splits to form two new organisms, it is called:
A. Budding
B. Spore formation
C. Binary fission
D. Multiple fission

146. The process of getting back a full organism from its body part is called:
A. Spore formation
B. Budding
C. Regeneration
D. Fragmentation

147. The breaking up of the body of a simple organism into two or more pieces on maturing, each of which subsequently grows to form a complete new organism, is called:
A. Fragmentation
B. Vegetative propagation
C. Binary fission
D. Budding

148. When new plants are obtained from the parts of old plants, without the help of any reproductive organs, it is called:
A. Vegetative propagation
B. Spore formation
C. Fragmentation
D. Multiple fission

149. When the cut stems of two different plants are joined together in such a way that the two stems join and grow as a single plant, it is called:
A. Cutting
B. Layering
C. Grafting
D. None of the above

150. The transfer of pollen grains the anther of a stamen to the stigma of a carpel is called:
A. Germination
B. Pollination
C. Fertilisation
D. Tissue culture

151. An ancient book of 1000 B.C. deals with health, hygiene, longevity etc?
A. Sushruta Samhita
B. Atatharvaveda

C. Bhela Samhita
D. Charaka Samhita

152. Name a concise and scientific exposition of Ayurveda in verse form. It is distinguished by its knowledge of chemical reactions and laboratory processes etc.
A. Vrdukunta
B. Vaghata
C. Kasyapa Samhita
D. None of the above

153. Name an ancient book which describes difficult surgical operations like opening of a brain etc.
A. Celsus
B. Bhela Samhita
C. Chivaravastu
D. Agnivesa Samhita

154. Which ancient book of 600 B.C. deals with paediatrics?
A. Kasyapa Samhita
B. Agnivesa Samhita
C. Bhela Samhita
D. None of the above

155. A treatise on the rasa chikitsa system of ancient medicine, which considers mercury as the king of all medicines.
A. Vaghata
B. Tristia
C. Gandavadha
D. Vrdukunta

156. A treatise on medicine and surgery from Alexandria and Rome?
A. Celsus
B. Hippocratic Oath
C. Georgics
D. Aeneid

157. Which of the following ancient book is the codification of medicine scattered in the Vedas?
A. Bhela Samhita
B. Charaka Samhita
C. Sushruta Samhita
D. None of the above

158. Who is considered as the father of western medicines?
A. Hesiod
B. Hippocrates

C. Both 1 and 2
D. Neither 1 nor 2

159. Name the first book on medicine in China?
A. Huangdi Neiching
B. Celsus
C. Vaghata
D. None of the above

160. A classical exposition of Indian medicine. It deals with almost all branches of medicine?
A. Madhavacharaya
B. Kasyapa Samhita
C. Charaka Samhita
D. Agnivesa Samhita

161. In amoeba excretion takes place through the process of:
A. Diffusion
B. Infusion
C. Uricotelic
D. None of the above

162. Name the excretory organ present in earthworm through which excretion takes place?
A. Moist Skin
B. Nephridia
C. Both A and B
D. Only B

163. The major waste produced by human body are:
A. Carbon dioxide
B. Urea
C. Both A and B
D. Only B

164. Which organ in the human body is responsible for removing carbon dioxide from the body?
A. Kidney
B. Lungs
C. Blood
D. Ureter

165. Each kidney is made up of a large number of excretory units called:
A. Glomerulus
B. Bowman's Capsule
C. Nephron
D. Blood capillaries

166. In which of the following are the largest amounts of nitrogen excreted from a mammalian body?
A. Breath
B. Sweat
C. Urine
D. Faeces

167. The best long term solution for kidney failure is:
A. Dialysis
B. Kidney transplant
C. Both A and B
D. Only B

168. What types of nitrogenous wastes are excreted by living organisms?
A. Ammonia
B. Uric acid
C. Urea
D. All of the above

169. Name the organs that make up the excretory system in humans?
A. Two Kidneys
B. Two Ureters
C. Bladder and Urethra
D. All of the above

170. Which vessel carries blood to the kidneys?
A. Renal Arteries
B. Renal Vein
C. Both A and B
D. Only A

171. In Human beings the process of digestion of food begins in:
A. Stomach
B. Food Pipe
C. Mouth
D. Small Intestine

172. Which of the following organism have parasitic mode of nutrition?
A. Penicillium
B. Plasmodium
C. Paramecium
D. Parrot

173. Name the first enzyme that mix with food in the digestive tract?
A. Pepsin
B. Trypsin

C. Amylase
D. None of the above

174. Which of the following in biology is the energy currency of cells?
A. PDP
B. DTP
C. ATP
D. ADP

175. In the stem of a plant respiration and breathing takes place through:
A. Lenticels
B. Stomata
C. Root hair
D. Air tubes

176. Which animal has three-chambered heart?
A. Pigeon
B. Lizard
C. Fish
D. Lion

177. Name the blood vessel which carries blood back to the heart?
A. Vein
B. Artery
C. Capillaries
D. Platelet

178. Transportation of food in plants takes place through:
A. Xylem
B. Phloem
C. Companion cells
D. Tracheids

179. After wound or cut in a body blood coagulates through:
A. WBC
B. RBC
C. Platelets
D. Plasma

180. When blood is forced into the artery, wave like expansion takes place is called:
A. Heart beat
B. Pulse
C. Flow
D. Ticking

181. What are the two main hormones secreted by Thyroid gland?
A. T3
B. T4
C. TSH
D. Both A and B

182. Too much release of thyroid hormone in the body causes:
A. Hypothyroidism
B. Hyperthyroidism
C. Goitre
D. None of the above

183. What are the symptoms of release of too much T3 and T4 hormones?
A. Anxiety
B. Nervousness
C. Hair loss
D. All of the above

184. Name a disease causes due to the deficiency of iodine?
A. Thyroid cancer
B. Solitary thyroid nodules
C. Goitre
D. Thyroiditis

185. The symptoms of hypothyroidism are:
A. Dry skin and hair
B. Depression
C. Joint and muscle pain
D. All of the above

186. An autoimmune disease of the thyroid tissue is called:
A. Graves disease
B. Thyroiditis
C. Thyroid Cancer
D. None of the above

187. A condition of a chronic inflammation of the thyroid, which lead to under activity?
A. Goitre
B. Thyroiditis
C. Hypothyroidism
D. Hyperthyroidism

188. What are the functions of thyroid gland in the body?
A. Controls metabolism
B. Maintain internal homeostasis
C. Controls breathing and heart rate
D. All of the above

189. Which gland mainly controls and regulates the actual thyroid activity?
A. Pituitary gland
B. Hypothalamus
C. Both A and B
D. Only A
.

190. Name the condition marked by a low TSH?
A. Hypothyroidism
B. Hyperthyroidism
C. Goitre
D. Thyroid Cancer

191. Who had given the theory of evolution of species by natural selection?
A. Darwin
B. Mendel
C. Dalton
D. Morgan

192. Who is known as the father of genetics?
A. Mendel
B. Darwin
C. Dalton
D. Marie Curie

193. Which of the following are the sources which provide evidences for evolution?
A. Homologous organs
B. Analogous organs
C. Fossils
D. All the above

194. Name a fossil bird which looks like a bird but has many other features found in reptiles?
A. Dodo
B. Archaeopteryx
C. Flamingos
D. Mouse Bird

195. Name the organs which have different basic structure but have similar appearance and perform similar functions?
A. Analogous organs
B. Homologous organs
C. Both A and B
D. Neither A nor B

196. Who suggested that life must have developed from the simple inorganic molecules like methane, hydrogen etc. which were present on the earth soon after it was formed?
A. Darwin
B. Marrie Curie
C. Haldane
D. None of the above

197. Aves have evolved from:
A. Amphibians
B. Arthropods
C. Mammals
D. Reptiles

198. The theory of origin of life on earth is proposed by:
A. Haldane
B. Stanley Miller
C. Harold C. Urey
D. Lamarck

199. Which of the following are the postulates of Darwin's theory of evolution?
A. Within any population, there is natural variation.
B. Even though all species produce a large number of offsprings, populations remain fairly constant naturally.
C. The struggle for survival within populations eliminates the unfit individuals.
D. All the above are correct

200. The process by which new species develop from the existing species is called:
A. Homologous
B. Analogous
C. Speciation
D. Genetic variation

ANSWER KEY

1. B	2. D	3. C	4. D	5. A	6. A	7. A	8. A	9. A	10. D
11.C	12.C	13.B	14.C	15.A	16.B	17.B	18.C	19.B	20.A
21.A	22.C	23.A	24.D	25.A	26.C	27.C	28.B	29.D	30.D
31.B	32.D	33.B	34.B	35.B	36.D	37.C	38.B	39.A	40.D
41.C	42.C	43.D	44.D	45.A	46.C	47.D	48.D	49.D	50.C
51.C	52.C	53.B	54.B	55.B	56.C	57.B	58.A	59.D	60.C
61.C	62.B	63.C	64.B	65.B	66.C	67.B	68.A	69.C	70.A
71.D	72.D	73.B	74.C	75.B	76.B	77.B	78.A	79.D	80.B
81.A	82.C	83.B	84.C	85.B	86.B	87.B	88.B	89.C	90.D
91.D	92.B	93.B	94.C	95.B	96.B	97.A	98.C	99.A	100.C
101.A	102.C	103.A	104.D	105.B	106.B	107.B	108.A	109.A	110.A
111.C	112.A	113.D	114.C	115.C	116.A	117.D	118.D	119.C	120.A
121.A	122.C	123.B	124.D	125.B	126.C	127.C	128.A	129.C	130.A
131.C	132.A	133.D	134.B	135.B	136.C	137.B	138.C	139.D	140.A
141.C	142.B	143.B	144.A	145.C	146.C	147.A	148.A	149.C	150.B
151.B	152.B	153.C	154.A	155.D	156.A	157.A	158.B	159.A	160.C
161.A	162.C	163.C	164.B	165.C	166.C	167.B	168.D	169.D	170.D
171.C	172.B	173.C	174.C	175.A	176.B	177.A	178.B	179.C	180.B
181.C	182.B	183.C	184.C	185.A	186.B	187.A	188.B	189.C	190.B
191.A	192.B	193.D	194.B	195.A	196.C	197.D	198.A	199.D	200.C

PREVIOUS YEAR QUESTIONS ASKED IN NDA/NA EXAMINATION

1. When a ray of light enters a glass slab, then **[2016-II]**
(a) only the frequency changes
(b) frequency and velocity change
(c) frequency does not change
(d) frequency and wavelength change

2. A ball is thrown vertically upward from the ground with a speed of 25.2 m/s. The ball will reach the highest point of its journey in **[2016-II]**
(a) 5.14 s
(b) 3.57 s
(c) 2.57 s
(d) 1.29 s

3. One kilo watt hour is equal to **[2016-II]**
(a) 36×10^3 joule
(b) 36×10^6 joule
(c) 10^3 joule
(d) 10^5 joule

4. When sound waves are propagated through a medium, the physical quantity/quantities transmitted is /are **[2016-II]**
(a) matter only
(b) energy only
(c) energy and matter only
(d) energy, momentum and matter

5. Pressure is a scalar quantity because **[2016-II]**
(a) it is the ratio of force to area and both force and area are vectors
(b) it is the ratio of magnitude of force to area
(c) it is the ratio of component of force
(normal to area) to area
(d) none of the above

6. A person is unable to read a newspaper without his glasses. He is most probably suffering from **[2016-II]**
(a) Myopia
(b) Presbyopia
(c) Astigmatism
(d) Hypermetropia

7. The free fall acceleration g increases as one proceeds, at sea level, from the equator toward either pole. The reason is **[2016-II]**
(a) Earth is a sphere with same density everywhere
(b) Earth is a sphere with different density at the polar regions than in the equatorial regions

(c) Earth is approximately an ellipsoid having its equatorial radius greater than its polar radius by 21 km
(d) Earth is approximately an ellipsoid having its equatorial radius smaller than its polar radius by 21 km

8. Which one of the following statements is correct? **[2016-II]**
(a) The measurement of mass taken by a spring weighing balance is correct at the place where the spring balance is calibrated for
(b) The measurement of mass taken by a spring weighing balance is correct at all places
(c) The measurement of mass taken by a spring weighing balance is correct at the places where the acceleration due to gravity is same with the place where the spring balance is calibrated for
(d) A spring balance cannot be used to measure mass at any place

9. Which one of the following is not a contact force? **[2016-II]**
(a) Push force
(b) Gravitational force
(c) Frictional force
(d) Strain force

10. When a force of 1 newton acts on a mass of 1 kg which is able to move freely, the object moves in the direction of force with a/an **[2016-II]**
(a) speed of 1 km/s
(b) acceleration of 1 m/s^2
(c) speed of 1 m/s
(d) acceleration of $1km/s^2$

11. Which of the following items is used in the house hold wirings to prevent accidental fire in case of short circuit? **[2016-II]**
(a) Insulated wire
(b) Plastic switches
(c) Non-metallic coatings on conducting wires
(d) Electric fuse

12. Along a streamline flow of fluid **[2016-II]**
(a) the velocity of all fluid particles at a given instant is constant
(b) the speed of a fluid particle remains constant
(c) the velocity of all fluid particles crossing a given position is constant
(d) the velocity of a fluid particle remains constant

13. How is the kinetic energy of a moving object affected if the net work done on it is positive?
(a) Decreases **[2016-II]**
(b) Increases
(c) Remains constant
(d) Becomes zero

14. A particle is executing simple harmonic motion. Which one of the following statements about the acceleration of the oscillating particle is true? **[2016-II]**
(a) It is always in the opposite direction to velocity
(b) It is proportional to the frequency of oscillation
(c) It is minimum when the speed is maximum
(d) It decreases as the potential energy increases

15. Which one of the following four particles, whose displacement x and acceleration a_xare relatedas follows, is executing simple harmonic motion? **[2016-II]**
(a) $a_x = +3x$
(b) $a_x = +3x^2$
(c) $a_x = -3x^2$
(d) $a_x = -3x$

16. If we plot a graph between volume V and inverse of pressure P (i.e. 1P) for an ideal gas at constant temperature T, the curve so obtained is **[2016-II]**
(a) straight line
(b) circle
(c) parabola
(d) hyperbola

17. Which one of the following statements is correct? **[2016-II]**
(a) The speed of sound waves in a medium depends upon the elastic property of the medium but not on inertia property
(b) The speed of sound waves in a medium depends upon the inertia property of the medium but not on elastic property
(c) The speed of sound waves in a medium depends neither on its elastic property nor on its inertia property
(d) The speed of sound waves in a medium depends both on elastic and inertia properties of the medium

18. Which one of the following statement is not correct? **[2016-II]**
(a) Pitch of a sound is its characteristic by which we can generally differentiate between a male voice and female voice
(b) The loudness of sound is related to it frequency
(c) A musical sound has certain well defined frequencies which are generally harmonics of a fundamental frequency
(d) The timbre of a particular musical sound is related to the wave form of the sound wave

19. A particle executes linear simple harmonic motion with amplitude of 2cm. When the particle is at 1cm from the mean position the magnitudes of the velocity and the acceleration are equal. Then its time period (in seconds) is **[2016-II]**
(a) $\frac{2\pi}{\sqrt{3}}$
(b) $\frac{\sqrt{3}}{2\pi}$

(c) $\frac{\sqrt{3}}{\pi}$
(d) $\frac{1}{2\pi\sqrt{3}}$

20. Which one of the following statements is not correct? **[2016-II]**
(a) The longest wavelength of light visible to human eye is about 700 nm
(b) The shortest wavelength of light visible to human eye is about 400 nm
(c) The wavelength of gamma rays is shorter than that of X-rays
(d) The ability of a telescope to form separable images of close objects is called its resolving power

21. If the image of an object, formed by a concave mirror is virtual, erect and magnified, then the object is placed **[2016-II]**
(a) at the principal focus
(b) at the centre of curvature
(c) beyond the centre of curvature
(d) between the pole of the mirror and the principal focus

22. When three resistors, each having resistance r, are connected in parallel, their resultant resistance is x.If these three resistances are connected in series, the total resistance will be **[2016-II]**
(a) 3x
(b) 3rx
(c) 9x
(d) 3/x

23. The property of electric current which is applicable in the fuse wire is **[2016-II]**
(a) chemical effect of current
(b) magnetic effect of current
(c) heating effect of current
(d) optical property of current

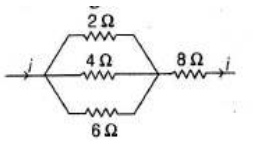
24. Which one of the following statements is not correct? **[2016-II]**
(a) The SI unit of charge is ampere-second
(b) Debye is the unit of dipole moment
(c) Resistivity of a wire of length l and area of cross-section a depends upon both l and a
(d) The kinetic energy of an electron of mass mkg and charge e coulomb, when accelerated through a potential difference of V volt, is eV joule

25. Two balls, A and B, are thrown simultaneously, a vertically upward with a speed of 20m/s from the ground and B vertically downward from a height of40m with the same speed and along the same lineofmotion. At what points do the two balls collide by taking acceleration due to gravity as9.8m/s^2? **[2016-II]**
(a) The balls will collide after 3s at a height of 30.2m from the ground
(b) The balls will collide after 2s at a height of 20.1m from the ground
(c) The balls will collide after 1s at a height of 15.1 m from the ground
(d) The balls will collide after 5s at a height of 20m from the ground

26. Matter around us can existing three different states namely, solid, liquid and gas. Correct order of their compressibility is **[2016-I]**
(a) Liquid<Gas<Solid
(b) Solid<Liquid<Gas
(c) Gas<Liquid<Solid
(d) Solid<Gas<Liquid

27. The temperature at which a solid melts to become a liquid at the atmospheric pressure is called its melting point. The melting point of a solid is an indication of **[2016-I]**
(a) Strength of the intermolecular forces of attraction
(b) Strength of the intermolecular forces of repulsion
(c) Molecular mass
(d) Molecular size

28. Consider the following circuit **[2016-I]**



The equivalent resistant the circuit will be
(a) 12Ω
(b) $8\frac{11}{12}\ \Omega$
(c) $9\frac{1}{11}\ \Omega$
(d) $\frac{24}{25}\ \Omega$

29. A racing car accelerates on a straight line from rest to a speed of 50 m/s in 25 s. Assuming uniform, acceleration of the throughout, the distance covered in this will be **[2016-I]**
(a) 625 m
(b) 1250 m
(c) 2500 m
(d) 50 m

30. A man weighing 70 kg is coming down in lift. If the cable of the lift breaks sudden the weight of the man would become **[2016-I]**
(a) 70 kg
(b) 35 kg
(c) 140 kg
(d) Zero

31. A given conductor carrying a current of I ampere. It produces an amount of heat equal to 2000J. The current through the conductor is doubled the amount of heat produced will be
(a) 2000 J **[2016-I]**
(b) 4000 J

(c) 8000 J
d) 1000 J

32. A lady is standing in front of a plane mirror at a distance of 1 m from it. She walks 60 cm towards the mirror. The distance of her image now from herself (ignoring the thickness of the mirror) is **[2016-I]**
(a) 40 cm
(b) 60 cm
(c) 80 cm
(d) 120 cm

33. The brightness of a star depends on its **[2016-I]**
(a) Size and temperature
(b) Size and distance from the Earth
(c) Size temperature and mass
(d) Size, temperature and distance from the Earth

34. A glass vessel is filled with water up to the brink and a lid is fixed to it tightly. Then it is kept inside a freezer for hours. What is expected to happen? **[2016-I]**
(a) The water freezes to ice and the level of ice comes down.
(b) The water in the glass vessel summer freezes to ice.
(c) The glass vessel breaks due to expansion as water freezes to ice.
(d) The water does not freeze at all.

35. A simple circuit contains a 12 V battery and bulb having 24 ohm resistance. When turn on the switch, the ammeter connected to the circuit would read. **[2016-I]**
(a) 0.5 A
(b) 2 A
(c) 4 A
(d) 5 A

36. Three resistors with magnitudes 2, 4, 8 ohm are connected in parallel equivalent resistance of the system would be **[2016-I]**
(a) Less than 2 ohm
(b) More than 2 ohm but less than 4 ohm
(c) 4 ohm
(d) 14 ohm

37. Two bodies A and B are moving with equal velocities. The mass of B is doubled that of A. In this context, which one of the following statements is correct? **[2016-I]**
(a) Momentum of B will be double that of A
(b) Momentum of A will be double that of B
(c) Momentum of B will be four times that of A
(d) Momentum of both A and B will be equal

38. The SI unit of acceleration is **[2016-I]**
(a) ms^{-1}
(b) ms^{-2}
(c) cms^{-2}
(d) kms^{-2}

39. An object is placed at the centre of curvature of a concave mirror of focal length 16 cm. If the object is shifted by 8 cm towards the focus, the nature of the image would be **[2016-I]**
(a) Real and magnified
(b) Virtual and magnified
(c) Real and reduced
(d) Virtual and reduced

40. A pencil is placed upright t a distance 10 cm from a convex lens of focal length 15 cm. The nature of the image of the pencil will be **[2016-I]**
(a) Real, inverted and magnified
(b) Real, erect and magnified
(c) Virtual, erect and reduced
(d) Virtual , erect and magnified

41. Which one of the following is a conventional energy source? **[2016-I]**
(a) Tidal energy
(b) Geothermal energy
(c) Solar energy
(d) Bio – mass- energy

42. A container is first filled with water and then entire water is replaced by mercury has a density of 13.6× $10^3 kg/m^3$. If X is the weight of the water and Y is the weight of the mercury, then **[2016-I]**
(a) $X = Y$
(b) $X = 13.6Y$
(c) $Y = 13.6X$
(d) None of these.

43. Density of water is **[2016-I]**
(a) Maximum at 0℃
(b) Minimum at 0℃
(c) Maximum at 4℃
(d) Minimum at -4℃

44. Suppose the force gravitation between two bodies of equal masses is F.If earth mass is doubled keeping the distance of separation between them unchanged, the force would become. **[2016-I]**
(a) F
(b) 2F
(c) 4F
(d) 1/4 F

45. A body has a free fall from a height of 20 m. After falling through a distance of 5m, then body would **[2016-I]**
(a) Lose one-fourth of its total energy
(b) Lose one-fourth of its potential energy
(c) Gain one-fourth of its potential energy
(d) Gain one-fourth of its total energy

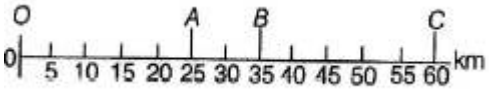
46. Mass of a particular amount of substance
1. Is the amount of matter present in it?
2. Does not vary from place to place
3. Changes with change in gravitational force
Select the correct answer using the codes given below. **[2016-I]**
(a) 1, 2 and 3
(b) 1 and 2
(c) 2 and 3
(d) Only 1

47. The impulse on a particle due to a force acting on it during a given time interval is equal to the change in its **[2016-I]**
(a) Force
(b) Momentum
(c) Work done
(d) Energy

48. Which one of the following statements with regarding to expansion of materials due to heating is not correct? **[2016-I]**
(a) As ice melts, it expands uniformly up to 4°C
(b) Mercury thermometer works using the principle of expansion due to heating.
(c) Small gap is kept between two rails to allow for expansion due to heating.
(d) The length of metallic wire increases when its temperature is increased.

49. Which one of the following is not a form of stored energy? **[2016-I]**
(a) Nuclear energy
(b) Potential energy
(c) Electrical energy
(d) Chemical energy

50. The motion of a car along a straight path is shown by the following figure



The car starts from O and reaches at different instants of time. During its motion from O to C and back to B, the distance covered and the magnitude of the displacement are, respectively **[2016]**
(a) 25 km and 60 km
(b) 95 km and 35 km
(c) 60 km and 25 km
(d) 85 km and 35 km3

51. The symbol of the element 'Tungsten' is **[2015-II]**
(a) Ta
(b) W
(c) TI
(d) TC

52. In, Egypt, ancient mummies can be found to have their arteries intact due to well preserved
(a) Mineralized blood **[2015-II]**
(b) Fibroblasts fibre
(c) Elastic fibre
(d) Brown fat

53. Which one of the following statement is correct? **[2015-II]**
(a) The image formed by a concave mirror for an object lying at infinity is at the principal focus, highly diminished, real and inverted
(b) A ray of light parallel to the principal axis after reflection from a concave mirror appears to diverge from the principal focus of the mirror
(c) The focal length of a spherical mirror is double of its radius of curvature
(d) A ray of light travelling from a rarer medium to a denser medium bends away from the normal

54. Which one of the following statements is correct? **[2015-II]**
(a) Rutherford's alpha-particle scattering experiment led of the discovery of electron
(b) J.J.Thomson suggested that the nucleus of an atom contains protons
(c) The atomic number of an element is the same as the number of protons in the nucleus of its atom
(d) The mass number of an atom is equal to the number of electrons in its shells

55. Which one of the following statements is not correct? **[2015-II]**
(a) In steady flow of a liquid, the velocity of liquid particles reaching at a particular point is the same at all points
(b) Steady flow is also called streamlined flow
(c) In steady flow, each particle may not follow the same path as taken by a previous particle passing through that point
(d) Two streamlines cannot intersect each other

56. A brass ball is tied to a thin wire and swung so as to move uniformly in a horizontal circle. Which of the following statement in this regard is/are true? **[2015-II]**
1. The ball moves with constant velocity
2. The ball moves with constant speed.
3. The ball moves with constant acceleration
4. The magnitude of the acceleration of the ball is constant.
Select the correct answer using the code given below:
(a) Only 1
(b) 1 and 3
(c) 1, 2 and 4
(d) 2 and 4

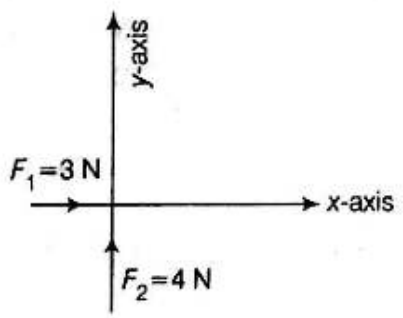
57. Two long wires each carrying a DC current in the same direction are placed close to each other. Which one of the following statement is correct? **[2015-II]**
(a) The wires will attract each other
(b) The wires will repel each other
(c) There will be no force between the wires
(d) There will be a force between the wires only at the moment when the current is switched ON or OFF

58. Lightning conductors are used to protect building from lightning strikes. Which of the following statements is/are true about lighting conductors? **[2015-II]**
1. Lightning conductors create an electric field at its top so that lighting strikes it preferentially
2. Lightning conductors reduce the effect of the strike by uniformly distributing the charge (current) over the surface of the building.
3. Lightning conductors take all charge (current) to deep down in the Earth.
4. Lightning conductors must be installed at a place taller than the building.
Select the correct answer using the code given below:
(a) 1 and 2
(b) 2 and 4
(c) 1, 3 and 4
(d) Only 4

59. The silvering in thermos flasks is done to avoid heat transfer by **[2015-II]**
(a) Convection
(b) Conduction
(c) Radiation
(d) Both (a) and (b)

60. Conservation of momentum in a collision between particles can be understood on the basis of **[2015-II]**
(a) Newton's first law of motion
(b) Newton's second law of motion
(c) Both Newton's second law motion and Newton's third law of motion
(d) Conservation of energy

61. Two forces, one of 3 Newton and another of 4 Newton are applied on a standard 1 kg body, placed on a horizontal and frictionless surface, simultaneously along the x-axis and the y-axis , respectively, as shown below: **[2015-II]**



The magnitude of the resultant acceleration is
(a) 7 m/s^2
(b) 1 m/s^2
(c) 5 m/s^2
(d) $\sqrt{7}m/s^2$

62. Magnetic meridian is an imaginary **[2015-II]**
(a) Line along North-south
(b) Point
(c) Vertical plane
(d) Horizontal plane

63. In SI unit of force, 'Newton' (N) is given by (where 'm' stands for 'metre' and's' stands for 'second') **[2015-II]**
(a) 1 $N = 1\ Kg/ms^2$
(b) 1 $N = 1\ kg - m/s^2$
(c)1 $N = 1\ kg - s^2/m$
(d)1 $N = 1\ kg - m\ s^2$

64. The acceleration due to gravity 'g' for objects on or near the surface of Earth is related to the universal gravitational constant 'G' as ('M' is the mass of the Earth and 'R' is its radius) **[2015-II]**
(a) G= g $\frac{M}{R^2}$
(b) g= G$\frac{M}{R^2}$
(c) M= $\frac{gG}{R^2}$
(d) R= $\frac{gG}{M^2}$

65. The loudness of sound is related to **[2015-II]**
(a) Its frequency
(b) Its amplitude
(c) Its speed
(d) Its pitch

66. X-rays are electromagnetic radiation whose wavelengths are of the order of **[2015-II]**
(a) 1 m
(b) $10^{-1}\ m$
(c) $10^{-5}\ m$
(d) $10^{-10}\ m$

67. In case of a compound microscope, which of the following statements is/are correct?
1. The focal length of the eyepiece is larger than the focal length of the objective.
2. The focal length of the eyepiece is smaller than the focal length of the objective.
3. The image produced in a normal optical microscope is real.
4. The image produced in a normal optical microscope is virtual.
Select the correct answer using the code given below: **[2015-II]**
(a) Only 1

(b) 1 and 4
(c) 2 and 3
(d) 2 and 4

68. Heat given to a body which raises its temperature by 1° C is known as **[2014-II]**
(a) Water Equivalent
(b) Thermal Capacity
(c) Specific heat
(d) Temperature Gradient

69. If the motion of an object is represented by a straight line parallel to the time axis in a distance-time graph, then the object undergoes **[2014-II]**
(a) an acceleration motion
(b) a decelerated motion
(c) a uniform non-zero velocity motion
(d) a zero velocity motion

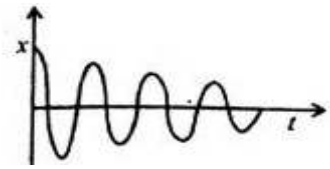
70. A force $\vec{F}$ acting on an electric charge q, in presence of an electromagnetic field, moves the charge parallel to the magnetic field with velocity$\vec{v}$. The $\vec{F}$ is equal to (where $\vec{E}$and $\vec{B}$are electric field and magnetic field respectively? **[2014-II]**
(a) $q\vec{E}$
(b)$q(\vec{v} \times \vec{B})$
(c) $q(\vec{v} \times \vec{E})$
(d)$q\vec{B}$

71. A ray light travels from a medium of refractive index n, to a medium of refractive index n1 to a medium of relative index n2. If angle of incidence is and angle of refraction is r, then $\frac{\sin i}{\sin r}$ is equal to **[2014-II]**
(a) n_1
(b) n_2
(c) $\frac{n_2}{n_1}$
(d) $\frac{n_1}{n_2}$

72. The latest discovered state of matter is **[2014-I]**
(a) solid
(b) Bose-Einstein condensate
(c) plasma
(d) liquid

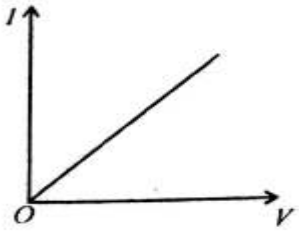
73. Bernoulli's principle is based on which one among the following laws? **[2014-I]**
(a) Conservation of Mass
(b) Conservation of Momentum
(c) Conservation of angular momentum
(d) Conservation of Energy

74. The displacement (x)-time 0) graph given above approximately represents the motion of a



(a) Simple pendulum placed in a vacuum **[2014-I]**
(b) Simple pendulum immersed in water
(c) Simple pendulum placed in outer space
(d) Point mass moving in air

75. The current (I)-voltage (V) plot of a certain electronic device is given above. The device is



(a) A semiconductor
(b) A conductor which obeys Ohm's law **[2014-I]**
(c) A superconductor
(d) An insulator

76. The temperature of water at the bottom of a lake whose upper surface has frozen to ice- would be around **[2014-I]**
(a) -10°C
(b) 0°C
(c) 4°C
(d) - 4°C

77. If speed of light in air is 3×10^8m/s, the speed of light in glass (with refractive index 1.5) would be **[2014-I]**
(a) 2 x $10^8$108 m/s
(b) 4.5 x 108 m/s
(c) 3 x 10^8m/s
(d) 1.5 x 10^8m/s

78. While looking at an image formed by a convex lens (one half of the lens is covered with a black paper), which one of the following will happen to the image? **[2014-I]**
(a) Half of the image will be visible
(b) Intensity of the image will be diminished
(c) Image will be inverted now
d) One can see an image of smaller size

79. A balloon filled up with gas would only go up in air if it is filled up with **[2014-I]**
(a) a gas whose density is lower than air
(b) a gas whose density is higher than air

(c) Cold air
(d) Water vapor

80. The displacement of a particle is given by $x = cos^2\omega t$ the motion is **[2013-I]**
(a) A Simple harmonic
(b) Periodic but not simple harmonic
(c) Non-periodic
(d) None of the above

PREVIOUS YEAR QUESTIONS - SOLUTIONS

1. (c)
When a ray of light enters a glass slab, then frequency does not change

2. (c)
Initial velocity = 25 m/s
and final velocity is 0.
The ball will reach the highest point of its journey in time, $t = \frac{v}{g} = \frac{25^2}{9.8} = 2.57s$

3. (b)
One kilowatt hour = 36×10^6joule

4. (b)
When sound waves are propagated through a medium, the physical quantity transmitted its energy only.

5. (c)
Pressure is a scalar quantity because it is the ratio of component of force (normal to area) to area

6. (d)
A person is unable to read a newspaper without his glasses. He is most probably suffering from Hypermetropia which means long-sightedness.

7. (c)
The free fall acceleration *g* increases as one proceeds, at sea level, from the equator toward either pole. Because, the Earth is approximately an ellipsoid having its equatorial radius greater than its polar radius by 21 km

8. (d)
The correct statement is: A spring balance cannot be used to measure mass at any place

9. (b)
Non-contact force is Gravitational force which is responsible for bringing the items we toss into the air back to earth. When an object is resting on a surface it is exerting a downward force equal to its weight and this downward force is known as Gravitational force.

10. (b)
When a force of 1 newton acts on a mass of 1 kg which is able to move freely, the object moves in the direction of force with an acceleration of $1\ m/s^2$

11. (d)
Electric fuse is a protective device which protects electrical equipment in the circuit by breaking the circuit when there is a short circuit.

12. (a)
Streamline flow of a liquid velocity of each particle at a particular cross section is constant, because $Av = constant$ (law of continuity) between the two cross-section of a tube of flow. So, we can say that along a streamline, the velocity of every fluid particle while crossing a given position is the same.

13. (a)
Kinetic energy doesn't change, so the net work done on the moving object is zero. If the net work done on the moving object is positive, so the kinetic energy increases. As if the net work done on the moving object is negative, so the kinetic energy decreases.

14. (c)
Speed is maximum when x = zero (through the center of the swing). If x = zero acceleration = zero, so it is true.

15. (d)
In case of simple harmonic motion, the acceleration is always directed towards the mean position and so is always opposite to displacement, i.e. $a = -x$ or $a = -\omega^2 x$.
In option (d), $a_x = -3x \text{or} a - x$, the acceleration of the particle is proportional to negative of displacement. Hence it represents Simple Harmonic Motion.

16. (a)
If we plot a graph between volume V and inverse of pressure *P* (i.e., 1P) for an ideal gas at constant temperature *T,* the curve so obtained is a straight line

17. (a)
The speed of sound waves in a medium depends upon the elastic property of the medium but not on inertia property.

18. (d)
The correct statements are: Pitch of a sound is its characteristic by which we can generally differentiate between a male voice and female voice, a musical sound has certain well defined frequencies which are generally harmonics of a fundamental frequency and the timbre of a particular musical sound is related to the wave form of the sound wave.

19. (a)
The magnitude of the velocity and acceleration of the particle when its displacement is 'y' are $\omega\sqrt{(A^2 - y^2)}$ and $\omega^2 y$ respectively.
Equating them, $\omega\sqrt{(A^2 - y^2)} = \omega^2 y$
From which we get, $\omega = \frac{\sqrt{(A^2 - y^2)}}{y}$

$$= \sqrt{4 - 1} = \sqrt{3}$$

Period, $T = \frac{2\pi}{\sqrt{3}}$

20. (c)
The wavelength of gamma rays is shorter than that of X-rays is the correct statement.

21. (d)
If the image of an object, formed by a concave mirror is virtual, erect and magnified, then the object is placed between the pole of the mirror and the principal focus

22. (c)
When three resistors, each having resistance r, areconnected in parallel, their resultant resistance is x.If these three resistances are connected in series, the total resistance will be$9x$.

23. (c)
The property of electric current which is applicable in the fuse wire is heating effect of current

24. (c)
The incorrect statement is "Resistivity of a wire of length l and area of cross-section $a$depends upon both l and a".

25. (c)
Suppose they meet at a height h from ground in time t. Their initial velocity of projection be $u = 20m/s$
For the ball thrown upwards, (u and g are opposite)
$h = ut - \frac{gt^2}{2}$..... (i)
For the ball thrown vertically downwards, (u and g are in same direction)
$40 - h = ut + \frac{gt^2}{2}$..... (ii)
By adding the two equations, we get

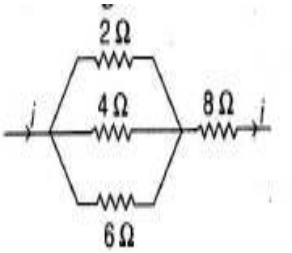
$$40 = 2ut$$
$$t = \frac{40}{2u} = \frac{40}{2 \times 20} = 1 \text{ sec}$$
$$h = 20 \times 1 - 9.8 \times \frac{1^2}{2}$$
$$= 20 - 4.9 = 15.1\ m$$

They meet at height 15.1m from the ground in 1 second.

26. (b)
The correct order o compressibility is Solid < Liquid< Gas. Gases are highly compressible as compared to Solids and liquids. In gas, the molecules have enough kinetic energy so that the effect of intermolecular forces is small and the typical distance between neighboring molecules is much greater than the molecular size.

27. (a)
The melting point of a solid is an indication of strength of intermolecular force of attraction. On increasing the temperature of solids, the kinetic energy of the particles increases. Due to the increase in kinetic energy, the particles start vibrating with greater speed. The energy supplied by the heat overcomes the forces of attraction between the particles. A stage is reached when solid melts and is converted to a liquid.

28. (c)
Consider the given circuit



This circuit consists of two sections, I and II. In first section, three resistors are in parallel connection, therefore equivalent resistance is

$$\frac{1}{R}=\frac{1}{2}+\frac{1}{4}+\frac{1}{6}=\frac{6+3+2}{12}$$

$\Rightarrow R=\frac{12}{11}\,\Omega$

This resistance is in series with the resistance 8 Ω of section II.

∴Equivalent resistance of the circuit

$$R_{eq}=R_1+8$$

$=\frac{12}{11}+8=\frac{100}{11}=9\frac{1}{11}\,\Omega$

29. (a)

Acceleration of the car is uniform. Therefore, according to first equation of motion

$$v=u+at$$

Where, $v=$ final velocity of the car = $50\ m/s$

$a=$Acceleration of the car

$t=$ Time interval = 25 s

$u=$ Initial velocity = 0

$$\therefore 50=0+a\times 25\Rightarrow a=2m/s^2$$

Now, applying second equation of motion we get,

$$s=ut+\frac{1}{2}at^2=0+\frac{1}{2}at^2$$

$=\frac{1}{2}\times 2\times 25\times 25=625$ m.

30. (d)

Consider the mass of the man in the lift is m when cable breakes as shown in the diagram. Now, the man in the lift is in free fall. Therefore, his acceleration is same as acceleration due to gravity 'g'. Due to this acceleration pseudo force as the man is mg upward. Therefore, weight of the man,

$$w=mg-mg=0$$

31. (c)

Let resistance of the coil is R and measuring heat produce for time t seconds.

$$\therefore H=I^2RT=(1)^2(R)(t)\Rightarrow 2000J=Rt$$

Similarly, when current is doubled, the amount of heat produce is

$$H'=(I')^2RT=(1)^2(Rt)=4Rt$$

$=4\times 2000J=8000J[\because Rt=2000J]$

32. (c)

Initial distance of the lady from the mirror is

$$x_1=1m=100cm$$

After moving 60 cm towards the mirror, new distance is $x_2=100-60=40cm$

∴Distance of her image from herself is Distance of her image from herself is

$$d=x_2+x_2=2x_2=80cm$$

33. (a)
According to Stefan's law, rate of loss of heat energy in the form of radiation (brightness) of a star depends upon
(i) Nature of surface of radiant object
(ii) Surface area of the star
(iii) Temperature of the star

34. (c)
Water shows anomalous in expansion during temperature range of 4℃ to 0℃. When temperature falls below 4℃, water expands. As lid is fixed tightly, stress will develop in the bottle due to this anomalous expansion which breaks the glass when water is converted into ice that is volume is maximum.

35. (a)
It is given that EMF of the battery, $E = 12V$
Resistance of the bulb, R = 24 Ω
Where switch is turned on, current through the bulb is
$I = \frac{E}{R} = \frac{12}{24} = 0.5$ A
Hence, reading of ammeter is 0.5 A.

36. (a)
Equivalent resistance of three resistors of resistances 2, 4 and 8 Ω is

$$\frac{1}{R_{eq}} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{4+2+1}{8} = \frac{7}{8}$$

$$\therefore R_{eq} = \frac{8}{7}\Omega = 1.142\Omega$$

Therefore, equivalent resistance is less than 2 Ω.

37. (a)
Let magnitude of the velocity of each body is v.
∴ Momentum of $A, p_A = m_A v$
Similarly, momentum of B,

$$p_B = m_B v$$

$$\therefore \frac{p_A}{p_B} = \frac{m_A}{m_B} = \frac{m_A}{2m_A} [\because m_B = 2m_A]$$

$\Rightarrow p_B = 2p_A$

38. (b)
Rate of change in velocity is called acceleration.

$$\therefore Acceleration, a = \frac{changeinvelocity\ \left(\frac{m}{s}\right)}{timeinterval(S)}$$

Therefore, unit of acceleration is m/s^2

39. (a)
Focal length of the concave mirror, $f = -16$ cm
∴ Magnitude of radius of curvature of the mirror, of the object
$u = -(32 - 8)$ cm = -24 cm
Applying mirror formula, we get

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$\Rightarrow \frac{1}{v} - \frac{1}{24} = \frac{1}{-16}$
$\Rightarrow \frac{1}{v} - \frac{1}{24} = \frac{1}{-16} = \frac{16-24}{24\times16} = \frac{-8}{24\times16}$
$v = -48$ cm
∴Magnification, $m = -\frac{v}{u} = \frac{-(-48)}{-24} = -2$
As magnification is negative and having magnitude more than one, image will be real and magnified.

40. (c)
It is given that,
Focal length of the convex lens, $f = 15$cm
Distance of pencil from the pole, $u = -10$cm
Applying mirror formula, we get

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{v} - \frac{1}{10} = \frac{1}{15}$$

$\Rightarrow \frac{1}{v} = \frac{1}{10} + \frac{1}{15} = \frac{25}{150} => v = 6$ cm
∴Magnification, $m = -\frac{v}{u} = \frac{-6}{10} = 0.6$
As magnification is positive and less than one, image will be vertical, erect and diminished.

41. (d)
Bio – mass energy covers entire life of our plant. This type of energy has been used since the cave-men discovered fire. Bio-mass fuel come from things that were once living. E.g. wood product, dried vegetation, crop residue, aquatic plants etc.

42. (c)
Let volume of the containers V.
Density of mercury, $\rho_m = 13.6\times10^3 kg/m^3$
We know that density of water

$$\rho_w = \frac{10^3 kg}{m^3}$$

Volume of container remains same in both the cases

$$\therefore \frac{X}{\rho_w} = \frac{Y}{\rho_m} => \left(\frac{\rho_m}{\rho_w}\right)V$$
$$=> Y = \left(\frac{13.6\times10^3}{10^3}\right)X = 13.6X$$

43. (c)
Water shows anomalous behavior between temperature 0℃ and 4℃ expands it temperature goes below 4℃.
Therefore, density decreases below4℃ Also, it expands when temperature goes above 4℃.
Therefore density of water is maximum at4℃because volume is minimum at 4℃.

44. (c)
Let mass of each body is m and separation between the bodies is$r$. Gravitational force between the bodies

$$F = \frac{Gm^2}{r^2}$$

After doubling the mass, gravitational forces becomes

$$F' = \frac{G(m)^2}{r^2} = F = \frac{4Gm^2}{r^2} = 4F$$

45. (b)
Initial gravitational potential energy of two body

$$U_1 = mgh = 20mg[\because h - 20m]$$

Initial total energy of the body

$$E = U_1 + K_1 = U_1 + 0 = U_1 = 20mg$$

After falling 5 m, new potential energy is

$$U_2 = mgh' = mg(20 - 5) = 15mg$$

∴Loss in potential energy

$$\Delta U = U_1 - U_2 = 20mg - 15mg = 5mg$$
$$= \frac{20mg}{4} = \frac{E}{4} = \frac{U_1}{4}$$

$i.e.\frac{1}{4}$ th of its potential energy.

46. (b)
Mass of a particular amount of substances in the amount of matter present in it. It is the inherent property of the substances and does not depend on location of the substances. Therefore, mass of the substances is independent of gravitational force between them.

47. (b)
According to Newton's second law of motion

$$\vec{F} = \frac{d\vec{p}}{dt} = m\vec{a}$$

Where, $\vec{F}$ =applied external force
m = mass of the particle
$\vec{a}$ = Acceleration of the particle
∴Impulse = $\vec{J} = \vec{F}.dt = d\vec{p}$ = change in the momentum.

48. (a)
Generally substances expand on heating and contract on cooling. Now, if temperature of certain amount of water is increased from 0℃ to 100℃, its volume decreases between 0℃(ice) to 4℃ and increases from 4℃ to 100℃.Therefore during 0℃ to 4℃, anamalous behavior of water is observed.

49. (a)
Potential energy of a system is the stored energy associated with the configuration of the system. Electrical energy of a system is also stored energy in the form of electrostatic potential energy. Similarly, chemical energy is stored in the form of chemical potential.
Potential energy associated with the chemical bonds. But nuclear energy is obtained by breaking a heavy nucleus into light nucleus of comparable masses. I can also be obtained by the formation of a heavy nucleus due to fusion of two light nuclei. Therefore, it is not a form of stored energy.

50. (d)
During motion from O to C and back to B, distance covered
d = Actual path taken = $OC + BC$
= 60 km + (60 – 35) km
Similarly displacement
x = Least distance between $O$and B

$$= OB = 35km$$

51. (b)
"Ta' is the symbol for element "Tantalum'.

'W' is the symbol for element "Tungsten'.
"Ti' is the symbol for element 'Thallium'.
"Tc' is the symbol for element "Technetium'.

52. (c)
Elastic fibres are formed of elastic protein, which is probably the most resistant of all body proteins to chemical changes.
Thousands of years old 'mummies' including those found in Egypt still have their arteries intact due to well preserved elastic fibres.

53. (a)
When an object is placed at infinity in front of a concave mirror it will from a highly diminished, real and inverted image at focus of the mirror.

54. (c)
Rutherford's α-scattering experiment led to the discovery of nucleus and hence structure of atoms. JJ Thomson's cathode ray tube experiment led to the discovery of electrons. Atomic number of an element is equal to the number of protons in the nucleus of an atom. Mass number of an atom is equal to the sum of total number of neutrons and protons in the nucleus

55. (c)
In steady flow, the velocity of fluid particles reaching at a particular point is the same at all times. Thus, each particle follows the same path as taken by a previous particle passing through that point. Therefore, two streamlines never intersect each other.

56. (d)
Since, the direction of the ball changes continuously during motion in horizontal circle, so the magnitude of velocity (i.e. Speed) and magnitude of acceleration remains constant. But their direction changes continuously.

57. (a)
When two wires carries current I_1 and I_2 in the same direction and separated by a distance d. The force of attraction between the wires in
$\frac{F}{L} = \frac{\mu 0}{2\pi d} I_1 I_2$
Where, L is length of the wires.

58. (b)
Since, lightning conductors are at lower potential (as its wire is buried deep inside the Earth), it attracts lightning (which is at higher potential) and send them to deep down the Earth. Lightning conductor must be installed at a place taller than the building.

59. (c)
The slivering of inner wall of a thermo flask is done to prevent heat transfer through radiation.

60. (c)
Newton's second law states that rate of change of momentum is proportional to the force applied and Newton's third law also states about the action and reaction forces. Thus, we can say that principle of conservation can be understood by both of these laws.

61. (c)
As two forces are perpendicular to each other, so resultant force is given by
$F_{net} = \sqrt{F1^2 + F2^2} = \sqrt{(3)^2 + (4)^2} = \sqrt{25} = 5N$

Now, from second law of Newton,
$F = ma$, ⇒ a= $\frac{F}{m}$= $\frac{5}{1}$= 5 m/s^2

62. (c)
The vertical plane passing through the axis of a freely suspended magnet is called magnetic meridian.

63. (b)
In SI unit of force, 'Newton' (N) is given by (where 'm' stands for 'metre' and's' stands for 'second') $1\ N\ = 1\ kg.m/s^2$

64. (b)
The acceleration due to gravity can be derived from law of gravitation. I.e. Gravitational force between mass of Earth (M) and a body of mass (M) is given by
F= $\frac{GMm}{R^2}$ [R= Radius of Earth] …… (i)
Again, we know Earth attracts anybody with the force
$F = m \times g$ …… (ii)
From Eqns. (i) and (ii), we get
$\frac{GMm}{R^2}$ = mg ⇒ g = $G\frac{M}{R^2}$

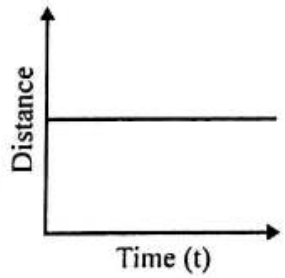
65. (b)
The amplitude of a sound wave determines its loudness or volume. A larger amplitude means a louder sound, and a smaller amplitude means a softer sound.

66. (d)
X-rays have wavelength ranging from 0.01 to 10 nm.
∵ $1\ nm\ = 10^{-9}\ m$ So, 0.1 nm = $10^{-10}\ m$

67. (b)
The focal length of the eyepiece is larger than the focal length of the objective and image produced in normal optical microscope is virtual. The focal length of objective is kept smaller to form a greatly enlarged image. This image is then viewed through eyepiece.

68. (c)
Specific heat is the amount of heat needed to raise the temperature of a certain mass 1 degree Celsius.

69. (d)
Distance time graph parallel to the time axis.

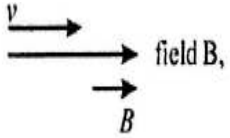


It is clear from the graph that the position of the object is not changing with the change in time, hence the object is at rest or in other words we can say that it is a zero velocity motion.

70. (a)
Force on the charge q due to electric field $\vec{E}$,

$$\vec{F}_E = q\vec{E}$$

And force on the charge q due to magnetic



$$\overrightarrow{F_B} = q(\vec{v} \times \vec{B}) \Rightarrow \overrightarrow{F_B} = qvBsin\theta$$

In the given case $\vec{v} \parallel \vec{B}$

$$\Rightarrow \theta = 0^o \Rightarrow \overrightarrow{F_B} = 0$$

Hence, the force F acting on the charge q is equal to $\vec{F}_E = q\vec{E}$

71. (c)
According to Snell's law,

$$n_1 \times \sin i = n_2 \times \sin r$$
$$\frac{\sin i}{\sin r} = \frac{n_2}{n_1}$$

72. (c)
There are four states of matter- solid, liquid, gas and plasma. A plasma can be created by heating a gas or subjecting it to a strong electromagnetic field applied with a laser or microwave generator.

73. (d)
Bernoulli's principle is based on the principle of conservation of energy. This states that, in a steady flow, the sum of all forms of energy in a fluid along a streamline is the same at all points on that streamline. This requires that the sum of kinetic energy, potential energy and internal energy remains constant

74. (b)
When a simple pendulum immersed in water then its oscillations are damped and its wave is cosine wave.

75. (a)
Ohm's Law is the linear proportionality between current and voltage that occurs for most conductors of electricity. A graph of voltage against current is straight line.

76. (c)
The temperature of water at the bottom of a lake whose upper surface has frozen to ice would be around 4 degree Celsius.

77. (a)
Given that
$c = 3 \times 10^8 m/s$, H=1.5
Then V=$\frac{C}{H} = \frac{3\times10^8}{1.5} = 2 \times 10^8$ m/s

78. (b)
The intensity of the image will be lesser when one half of the lens is covered with a black paper because the light gathering power of a lens depends upon its diameter. The image formed will still be of full size

79. (a)
A body floats, if its density is less than fluid i.e. floating medium.

80. (a)

$$x = \frac{1 + cos2\omega t}{2}$$

$=>x - \frac{1}{2} = \frac{1}{2}cos2\omega t$
$=>x = \frac{1}{2} + \frac{1}{2}cos2\omega t$
This is the equation of S.H.M.

PREVIOUS YEAR QUESTIONS ASKED IN CDS EXAMINATION

PHYSICS

1. A myopic person has a power of 1.25 dioptre, what is the local length and nature of his lens? **[2016-I]**
(a) 50 cm and convex lens
(b) 80 cm and convex lens
(c) 50 cm and concave lens
(d) 80 cm and concave lens

2. A piece of ice, 100 g in mass is kept at 0°C. The amount of heat is requires to melt at 0°C is (take latent heat of melting of ice to be 333.6 j/ g) **[2016-I]**
(a) 750.6 J
(b) 83.4 J
(c) 33360 J
(d) 3.336 J

3. Which one of the following statements about bar magnet is correct? **[2016-I]**
(a) The pole strength of the north-pole of a bar magnet is larger than that of the south-pole
(b) When a piece of bar magnet is bisected perpendicular to its axis, the north and South Pole get separated
(c) When a piece of bar magnet is bisected perpendicular to its axis two new for magnets are formed
(d) The poles of a bar magnet are unequal in magnitude and opposite in nature

4. A person rings a metallic bell near a strong concrete wall. He hears the echo after 0.3 s. if the sound moves with a speed of 340 m/s, how far is the wall from him? **[2016-I]**

(a) 102 m
(b) 11 m
(c) 51 m
(d) 30 m

5. The rate of change of momentum of a body equal of the resultant: **[2016-I]**
(a) Energy
(b) Power
(c) Force
(d) Impulse

6. After hot sunny day, people sprinkle water on the roof-top because: **[2016-I]**
(a) Water has higher boiling point instantly
(b) Water has lower specific heat capacity
(c) Water is easily available
(d) Water has large latent heat of vaporisation

7. The SI unit of mechanical power is: **[2016-I]**
(a) Joule
(b) Watt
(c) Newton-Second
(d) Joule-Second

8. Two systems are said to be in thermal equilibrium if and only if: **[2016-I]**
(a) There can be a heat flow between them even if they are at different temperatures
(b) There cannot be a heat flow between them even if they are at different temperatures
(c) There is no heat flow between them
(d) Their temperatures are slightly different

9. Match List-I with List-II and select the correct answer using the code given below the Lists: **[2015-II]**

List-I (Exponent)	List-II (Law)
A. John Dalton	1. Law of definite proportion by volume
B. Joseph Proust	2. Law of multiple proportion
C. Antoine Lavoisier	3. Law of definite proportion by weight
D. Joseph Louis Gay	4. Law of conservation Lussac of mass

Codes:

	A	B	C	D
(a)	2	3	4	1
(b)	2	4	3	1
(c)	1	4	3	2
(d)	1	3	4	2

10. The atomic theory of matter was first proposed by **[2015-II]**
(a) John Dalton
(b) Rutherford
(c) J. J. Thomson
(d) Niel Bohr

11. Which one among the following statements about diastrophism is correct? **[2015-II]**
(a) The forces may be so slow and gradual that they pass unnoticed for a long period of time.
(b) The forces may be both slow and sudden that they pass for a short period of time.
(c) The forces may be sudden and so fast that they pass unnoticed for a long period of time.
(d) The forces may be slow but for a short period of time.

12. A body is falling freely under the action of gravity alone in vacuum. Which one of the following remains constant during the fall? **[2015-II]**
(a) Potential energy
(b) Kinetic energy
(c) Total linear momentum
(d) Total mechanical energy

13. X-rays are **[2015-II]**
(a) Deflected by an electric field but not by a magnetic field
(b) Deflected by a magnetic field but not by an electric field
(c) Deflected by both a magnetic field and an electric field
(d) Not deflected by an electric field or a magnetic field

14. The focal length of the lens of a normal human eye is about **[2015-II]**
(a) 25 cm
(b) 1 m
(c) 2.5 mm
(d) 2.5 cm

15. Which one of the following statements is correct? **[2015-II]**
(a) Cold fronts move at slower rate than warm fronts and therefore cannot overtake the warm fronts.
(b) Cold fronts normally move faster than warm fronts and therefore frequently overtake the warm fronts.
(c) Cold fronts move at slower rate, and eventually they are overtaken by the warm fronts.
(d) Cold fronts move faster than warm fronts but they cannot overtake the warm fronts.

16. Which one of the following physical quantities is the same for molecules of all gases at a given temperature? **[2015-II]**
(a) Speed
(b) Mass
(c) Kinetic energy
(d) Momentum

17. Newton's laws of motion do not hold good for objects **[2015-II]**
(a) At rest
(b) Moving slowly
(c) Moving with high velocity
(d) Moving with velocity comparable to velocity of light

18. Which one of the following statements is not correct? **[2015-II]**
(a) Weight of a body is different on different planets.
(b) Mass of a body on the earth, on the moon and in empty space is the same.
(c) Weightlessness of a body occurs when the gravitational forces acting on it are counterbalanced.
(d) Weight and mass of a body are equal at sea level on the surface of the earth.

19. The outside rearview mirror of modern automobiles is marked with warning "objects in mirror are closer than they appear". Such mirrors are **[2015-II]**
(a) Plane mirrors
(b) Concave mirrors with very large focal lengths
(c) Concave mirrors with very small focal lengths
(d) Convex mirrors

DIRECTIONS (Qs. 20): The following question consists of two statements, Statement I and Statement II. You are to examine these two statements carefully and select the answers to these items using the code given below: **[2014-II]**

Code:
(a) Both the statements are individually true and Statement II is the correct explanation of Statement I.
(b) Both the statements are individually true, but Statement II is not the correct explanation of Statement I.
(c) Statement I is true, but Statement II is false.
(d) Statement I is false, but statement II is true

21. Tungsten is used for the construction of filament in an electric bulb because of its
(a) High specific resistance **[2014-II]**
(b) Low specific resistance
(c) High light emitting power
(d) High melting point

22. Inactive Nitrogen and Argon gases are usually used in electric bulbs in order to **[2014-II]**
(a) Increase the intensity of light emitted
(b) Increase the life of the filament
(c) Make the emitted light coloured
(d) Make the production of bulb economical

23. In the phenomenon of dispersion of light, the light wave of shortest wavelength is **[2014-II]**
(a) Accelerated and refracted the most
(b) Slowed down and refracted the most
(c) Accelerated and refracted the least
(d) Slowed down and refracted the least

24. An oscilloscope is an instrument which allows us to see waves produced by **[2014-II]**
(a) Visible light
(b) X-rays
(c) Sound
(d) Gamma rays

25. For a harmonic oscillator, the graph between momentum p and displacement q would come out as **[2014-II]**
(a) a straight line
(b) a parabola
(c) a circle
(d) an ellipse

26. You are asked to jog in a circular track of radius 35 m. Right one complete round on the circular track, your displacement and distance covered by you respectively **[2014 - I]**
(a) zero and 220 m
(b) 220 m and zero
(c) zero and 110 m
(d) 110 m and 220 m

27. When an incandescent electric bulb glows
(a) The electric energy is completely converted into light **[2014 - I]**
(b) The electric energy is partly converted into light energy and partly into heat energy
(c) The light energy is converted into electric energy
(d) The electric energy is converted into magnetic energy

28. In cricket match, while catching a fast moving ball, a fielder in the ground gradually pulls his hands backwards with the moving ball to reduce the velocity to zero. The act represents
(a) Newton's first law of motion **[2014 - I]**
(b) Newton's second law of motion
(c) Newton's third law of motion
(d) Law of conservation of energy

29. Two layers of a cloth of equal thickness provide warmer covering than a single layer of cloth with double the thickness. Why? **[2014 - I]**
(a) Because of the air encapsulated between two layers
(b) Since effective thickness of two layers is more
(c) Fabric of the cloth plays the role
(d) Weaving of the cloth plays the role

30. A mobile phone charger is **[2014 - I]**
(a) An inverter
(b) A UPS
(c) A step - down transformer
(d) A step-up transformer

31. No matter how far you stand from a mirror, your image appears erect. The mirror is likely to be **[2014 - I]**
(a) Either plane or convex
(b) Plane only
(c) Concave
(d) Convex only

32. The position, relative size and nature of the image formed by a concave lens for an object placed at infinity are respectively **[2014 - I]**
(a) At focus, diminished and virtual
(b) At focus, diminished and real
(c) Between focus and optical centre, diminished and virtual
(d) Between focus and optical centre, magnified and real

33. A liquid is kept in a regular cylindrical vessel up to a certain height. If this vessel is replaced by another cylindrical vessel having half the area of cross-section of the bottom, the pressure on the bottom will **[2013 -II]**
(a) remain unaffected
(b) be reduced to half the earlier pressure
(c) be increased to twice the earlier pressure
(d) be reduced to one-fourth the earlier pressure

34. In SONAR, we use **[2013 -II]**
(a) ultrasonic waves
(b) infrasonic waves
(c) radio waves
(d)audible sound waves

35. Two identical piano wires have same fundamental frequency when kept under the same tension. What will happen if tension of one of the wire is slightly increased and both the wires are made to vibrate simultaneously? **[2013 -II]**
(a) Noise
(b) Beats
(c) Resonance
(d) Non-linear effects

36. After rising a short distance the smooth column of smoke from a cigarette breaks up into an irregular and random pattern. In a similar fashion, a stream of fluid flowing past an obstacle breaks up into eddies and vortices which give the flow irregular velocity components transverse to the flow direction. Other examples include the wakes left in water by moving ships the sound produced by whistling and by wind instruments. These examples are the results of **[2013 -II]**

(a) laminar flow of air
(b) streamline flow of air
(c) turbulent flow of air
(d) viscous flow at low speed

37. Which one among the following correctly defines a unit magnetic pole in SI units? It is the pole which when placed in air at a distance of **[2013-II]**
(a) 1 foot from an equal and a similar poled repels it with a force of 1 pound
(b) 1 m from an equal and a similar pole repels it with a force of 1 N
(c) 1 cm from an equal and a similar pole repels it with a force of 1 dyne
(d) 1 meter from an equal and a similar pole repels it with a force of 1 N/m²

38. Before X-ray examination (coloured X-ray) of the stomach, patients are given suitable salt of barium because **[2013 -II]**
(a) Barium salts are white in colour and this helps stomach to appear clearly
(b) Barium is a good absorber of X-rays and helps stomach to appear clearly
(c) Barium salts are easily available
(d) Barium allows X-rays to pass through the stomach

PREVIOUS YEAR QUESTIONS – SOLUTIONS

1. (b) The nature of the lens used to correct myopic eye is a convex lens.
$\therefore D = \frac{1}{f}$ (metre) $= \frac{1}{D} = \frac{1}{1.25} = \frac{100}{125}$
= 0.80 metre = 80 cm

2. (c) $q = m \Delta H_f$
Where, m = mass, q = heat energy
Δ Hf = heat of fusion
q = (100g) × 333.6 J/g = 33360 J

3. (c) If any magnet is divided into two parts, every part will be a new magnet.

4. (c) Let the distance is x metre.
Distance = Velocity × Time
x = 340 × 0.3 = 102 metre (This is the total distance)
∴ The distance of wall is $\frac{102}{2}$ = 51 metre.

5. (c) Newton's 2nd Law - The rate of Change of momentum always acts in the direction of resultant force acting on a body Þ (F = ma) (where m = mass; a = aceeleration)

6. (d) When we sprinkle water on warm surface it provides coldness due to latent heat of water.

7. (b) Watt is the SI unit of mechanical power.

8. (c) Two systems are said to be in thermal equilibrium if there is no heat transfer takes place as both the systems have some temperature.

9. (a)

Exponent	Law
John Dalton	Law of multiple proportion
Joseph Proust	Law of definite proportion by weight
Antoine Lavoisier	Law of Conservation of mass
Joseph Louis Gay Lussac	Law of definite proportion by volume

10. (a) John Dalton (1766-1844), an English chemist is known for the work in the development of modern atomic theory. He was awarded the Royal medal for this.

11. (a) Diastrophism means the deformation of the earth's crust showing folding and faulting. Due to this phenomenon, mountains, plateaus and valleys, etc, are evolved. It is very slow and gradual process which is not noticed for a long period.

12. (d) Mechanical energy is the ability of an object to do work. This energy is equal to the sum of kinetic and potential energy, it is always constant.

13. (d) X-rays are electromagnetic radiations. It has penetrating ability, so it is used in radiography, airport railway security and CT scanning. It is not affected by electric and magnetic fields.

14. (a) The focal length of the lens of a normal human eye is about 25 cm. The eye sets focus on a thing by adjusting the eye ball. The lens flexes its curvature to focus on the objects.

15. (b) Heavier and denser cold air (cold fronts) pushes the warmer lighter air (warm fronts) causing precipitation and showering.

16. (c) Kinetic energy is the same for molecules of all gases at a given temperature.

17. (d) Newton's laws of motion do not hold good for objects moving with velocity comparable to velocity of light because it does not follow it on this level.

18. (d) Mass is the quantity of matter contained by the object. Weight is the force of gravity acting on a body. Mass is constant anywhere in the universe but weight depends upon the quantity of gravity in a particular place.

19. (d) In convex mirrors, the image is smaller than the object. This mirror provides a wider scope of view so it becomes easy for vehicles use.

20. (a) Both the statements are individually true and Statement II is the correct explanation of Statement I. respectively.

21. (d) Tungsten has the highest melting point and lowest vapour pressure of all metals.

22. (b) The inert gas within the bulb prevents the filament from evaporating. Thus, it increases.

23. (a) Accelerated and refracted the most

24. (c) Oscilloscope is an instrument which allows us to see waves produced by sound. The microphone can then pick up the sound and convert it to an electrical signal which can be displayed on the oscilloscope.

25. (d) A harmonic oscillator, the graph between momentum p and displacement q would come out as an ellipse

26. (a) Displacement = Shortest distance between initial and final point = 0 Distance travelled by you = 2πr (Circumference of the circular track)

=2*(22/7)*35 = 70*(22/7) = 220m

27. (b)

When current flows through the filament of incandescent electric bulb, it gets heated up. Soon it becomes white hot and starts emitting light.

28. (b)

We know from Newton's second law of motion $F_{ext=d/dt}$ when dt is more F_{ext} will be less. The greater the rate of change of momentum, the greater is the force and vice-versa.

29. (a)

Two layers of a cloth are warmer because air trapped between the layers acts as thermal insulator restricting the heat transfer.

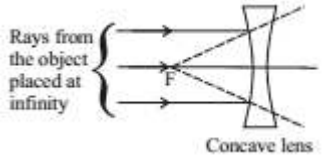
30. (c)

A mobile phone charger is basically a step-down transformer which converts high voltage to low voltage.

31. (a)

Image formed by a plane and a convex mirror is always erect. Concave mirror forms image both erect and inverted depends

32. (a)



From the ray diagram, it is very clear that the image of the object placed at infinity from a concave lens is virtual diminished and at the focus of the lens. F Concave lens Rays from the object placed at infinity

33. (a)

Pressure exerted by the fluid column depends on height (h), density r and acceleration due to gravity (g). P = hrg i.e. independent of area of cross-section of the vessel.

34. (a)

Sonar (sound navigation and ranging) is a technique that uses sound propagation to navigate (usually under water, as in submarine navigation), communicate with or detect objects on or under the surface of the water, such as the vessels as ultrasonic waves which is used having very high frequency > 20,000 Hz. **35. (c)**

Resonance is the tendency of a system to oscillate at greater amplitude at some frequencies than at others.

36. (c)

Turbulent flow is accompanied by random, irregular, local circular currents called vortices.

37. (b)

1 m from an equal and a similar pole repels it with a force of 1 N

38. (b)

Barium is a good absorber of X-rays and helps stomach to appear clearly.

CHEMISTRY

1. When hard water is evaporated completely, the white solid remains in the container. It may be due to the presence of **[2015-I]**

1. Carbonates of Ca and Mg
2. Sulphates of Ca and Mg
3. Chlorides of Ca and Mg

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 1, 2 and 3
(c) 3 only
(d) 1 and 3 only

2. Which one among the following compounds has same equivalent weight and molecular weight? **[2015-I]**

(a) H_2SO_4
(b) $CaCl_2$
(c) Na_2SO_4
(d) NaCl

3. A metallic plate sticks firmly on the mouth of a water vessel made from another metal. By way of heating, one can detach the plate from the vessel. This is because heat expands. **[2015-I]**
(a) The vessel only
(b) Both the vessel and the plate equally
(c) The vessel more than the plate
(d) The vessel and contracts the plate

4. Electricity is produced through dry cell from **[2015-I]**
(a) Chemical energy
(b) Thermal energy
(c) Mechanical energy
(d) Nuclear energy

5. Which one among the following fuels is used in gas welding? **[2015-I]**
(a) L P G
(b) Ethylene
(c) Methane
(d) Acetylene

6. Which one among the following is a micronutrient present in soil for various crops?
(a) Calcium **[2015-I]**
(b) Manganese
(c) Magnesium
(d) Potassium

7. Which one of the following gases is supporter of combustion? **[2014 - II]**
(a) Hydrogen
(b) Nitrogen
(c) Carbon dioxide
(d) Oxygen

8. Iron sheet kept in moist air covered with rust. Rust is **[2014 - II]**
(a) An element
(b) A compound
(c) A mixture of iron and dust
(d) A mixture of iron, oxygen and water

9. A metal screw top on a glass bottle which appears to be stuck could be opened by using the fact that **[2014 - II]**
(a) The metal expands more than the glass when both are heated
(b) The metal and glass expand identically when heated
(c) The metal shrinks when heated
(d) Both metal and glass shrink when cooled

10. Which of the following are the two main constituents of granite? **[2014 - II]**
(a) Iron and silica
(b) Iron and silver

(c) Silica and aluminum
(d) Iron oxide and potassium

11. Consider the following statements
Statement I: Clay layers are poor aquifers.
Statement II: The inter-particle space of clay minerals is the least.
Select the correct answer using the codes given below: **[2014 - II]**
(a) Both the statements are individually true and Statement II is the correct explanation of Statement I
(b) Both the statements are individually true but Statement II is not the correct explanation of Statement I
(c) Statement I is true but Statement II is false
(d) Statement I is false but Statement II is true

12. Addition of ethylene dibromide to petrol **[2014 - II]**
(a) Increases the octane number of fuel
(b) Helps elimination of lead oxide
(c) Removes the Sulphur compound in petrol
(d) Serves as a substitute of tetraethyl lead

13. Nitric oxide pollution can lead to all of the following, except **[2014 - II]**
(a) Leaf spotting in plants
(b) Bronchitis related respiratory problems in human
(c) Production of corrosive gases through photochemical reaction
(d) Silicosis in human

14. Which of the following statements is/are correct? **[2014 - II]**
1. Amnion contains fluid.
2. Ultrasound scan can detect the sex of an embryo.
Select the correct answer using the codes given below
(a) Only 1
(b) Only 2
(c) Both 1 and 2
(d) Neither 1 nor 2

15. Which of the following solutions will not change the colour of blue litmus paper to red?
1. Acid solution **[2014 - II]**
2. Base solution
3. Common salt solution
Select the correct answer using the codes given below
(a) 1 and 3
(b) 2 and 3
(c) Only 1
(d) Only 2

16. Which element forms the highest number of compounds in the periodic table?
(a) Carbon **[2013 - II]**
(b) Oxygen

(c) Silicon
(d) Sulphur

17. NaOH + HC1 -> NaCl + H_2O in the given chemical reaction **[2013 - II]**
(a) Sodium is oxidized and oxygen is reduced
(b) Sodium is oxidized and chlorine is reduced
(c) Sodium and hydrogen are oxidized
(d) None of them are oxidized or reduced

18. A liquid initially contracts when cooled down to 4°C but on further cooling down to 0°C, it expands. The liquid is **[2013 - II]**
(a) Alcohol
(b) Water
(c) Molten iron
(d) Mercury

19. What are the elements which are liquids at room temperature and standard pressure?
1. Helium **[2013 - II]**
2. Mercury
3. Chlorine
4. Bromine
Select the correct answer using the codes given below
(a) 2 and 3
(b) 2, 3 and 4
(c) 2 and 4
(d) 1 and 3

20. A compound that is a white solid which absorbs water vapour from the air is [**2013 - II]**
(a) Sodium nitrate
(b) Calcium chloride
(c) Sodium carbonate
(d) Calcium sulphate

21. What type of mixture is smoke? **[2013 - II]**
(a) Solid mixed with a gas
(b) Gas mixed with a gas
(c) Liquid mixed with a gas
(d) Gas mixed with a liquid and a solid

22. Which of the following gases in the atmosphere is/are responsible for acid rains?
1. Oxides of Sulphur **[2013 - I]**
2. Oxides of nitrogen
3. Oxides of carbon
Select the correct answer using the codes given below
(a) 1 and 2
(b) 1 and 3
(c) Only 2
(d) 1, 2 and 3

23. Which one among the following metals is used in fireworks to make a brilliant white light? **[2013 - I]**
(a) Sodium
(b) Magnesium
(c) Aluminum
(d) Silver

24. Why hard water does not give lather with soap? **[2013 - I]**
(a) Hard water contains calcium and magnesium ions which form precipitate with soap
(b) Hard water contains sulphate and chloride ions which form precipitate
(c) pH of hard water is high
(d) pH of hard water is less

PREVIOUS YEAR QUESTIONS – SOLUTIONS

1. (a) The white solid remains in the container when hard water is evaporated completely is mainly due to the presence of carbonates of Ca and Mg and also due to presence of traces of sulphates of Ca and Mg.

2. (d) NaCl has same molecular weight and equivalent weight
Equivalent weight of salt = Molecular weight of salt /Total charge on action
Molecular weight of NaCl = 23 + 35.5 = 58.5
Equivalent weight of NaCl = 58.5 / 1 = 58.5

3. (c) The vessel more than the plate

4. (a) Electricity is produced through dry cell from chemical energy. The cells from which electric energy is derived by irreversible chemical action are called primary cells. The primary cell is capable of providing an EMF when its constituent's two electrodes and a suitable electrolyte are assembled together. The three main primary cells are the Daniel cell, the Leclanche cell, and the dry cell. None of these cells can be recharged electrically.

5. (d) Acetylene is the only commercial fuel gas that can be used for both cutting and welding applications.

6. (b) There are about seven nutrients essential to plant growth and health that are only needed in very small quantities. These are Boron, Chlorine, Copper, Iron, Manganese, Molybdenum and Zinc.

7. (d) Oxygen is supporter of combustion. Though it is not combustible. Combustion is an oxidation process and this cannot occur without the presence of oxygen.

8. (b) Rust is an iron oxide formed by the redox reaction of iron and oxygen in the presence of water or air moisture
$4Fe+2O_2 + x\ H_2O \rightarrow 2Fe_2O_3 - x\ H_2O$
Hence rust is a compound.

9. (a) Both metal and glass expand when heated. Here glass is a non-metal. Metal expands more than non-metal due to temperature change.

10. (c) Silica and aluminum are the two main constituents of granite. Granite contains 70-77% of silica and 11-13% of aluminum in the form of (Al_2O_3).

11. (a) An aquifer is an underground layer of water bearing rock. Water bearing rocks are permeable i.e., they have opening that liquids and gases can pass through. But clay layers are poor aquifers. Clay minerals are dense, impermeable material and act as an 'aquiteral' i.e., a layer of material that is almost impenetrable to water. Through groundwater might more through such material it will do so reny slowly.

12. (d) serves as a substitute of tetraethyl lead

13. (d) Silicosis in human is lung disease caused by inhalation of crystalline silica-dust.

14. (c) Amnion is a membrane, filled with fluid, closely covers the embryo. The sex of the embryo may be determined by ultrasound as early as 11 weeks gestation.

15. (b) The blue litmus paper turns red in acidic solution and blue in basic solution. The neutral solution does not affect the litmus paper. Now since common salt solution is neutral hence do not show any colour change on litmus paper.

16. (a) Carbon (C) forms a large number of compounds due to its two characteristics properties.
(i) Catenation (ability to link with other carbon atoms)
(ii) Tetra valency (valency of carbon is 4)

17. (d) It is a simple displacement reaction in which Hydrogen is displaced by Sodium metal, results in the formation of sodium chloride (NaCl). Also the oxidation state of each atom is same in both sides.

18. (b) Water

19. (c) Mercury (Hg), a metal is a liquid at room temperature and standard pressure. Bromine (Br_2) a non metal is a liquid at room temperature and standard pressure.

20. (d) A compound calcium sulphate ($CaSO_4$) which is a white solid is highly hygroscopic in nature. It has a very remarkable property of setting into a hard, solid mass on wetting with water.

21. (d) Smoke is a collection of airborne solid and liquid particulates and gases emitted when a material undergoes combustion or pyrolysis, together with entrapment of liquid droplets or solid particulates in a flowing gas.

22. (a) Oxides of Sulphur and nitrogen are responsible for acid rain. Sulphur dioxide and nitrogen oxide, react with the water molecules in the atmosphere to produce acids.

23. (b) Magnesium burns a very bright white, so it is used to add white sparks or improve the overall brilliance of a firework.

24. (a) The main cause of hardness of water is presence of Ca or Mg ions. When hard water containing these ions is treated with soap solution it reacts to form white cruddy ppt known as scum.

BIOLOGY

1. Which one among the following statements is correct? **[2015-I]**
(a) Prokaryotic cells possess nucleus.
(b) Cell membrane is present both in plant and animal cells.
(c) Mitochondria and chloroplasts are not found in eukaryotic cells.
(d) Ribosome's are present in eukaryotic cells only.

2. Which one among the following statements is not true for Mammals? **[2015-I]**
(a) They possess hair on the body.
(b) Some of them lay eggs.
(c) Their heart is three chambered
(d) Some are aquatic.

3. In human digestive system, the process of digestion starts in **[2015-I]**
(a) Oesophagus
(b) Buccal cavity
(c) Duodenum
(d) Stomach

4. Which one of the following diseases in humans can spread through air? **[2015-I]**
(a) Dengue
(b) Tuberculosis
(c) HIV-AIDS
(d) Goitre

5. Which one among the following structures or cells is not present in connective tissues?
(a) Chondrocytes **[2015-I]**
(b) Axon
(c) Collagen fibre
(d) Lymphocytes

6. Which one among the following is the generic name of the causal organism of Elephantiasis?
(a) Filarial **[2014-II]**
(b) Microfilaria

(c) Wuchereria bancrofti
(d) Culex pipiens

7. Which one among the following statements is not correct? **[2014-II]**
(a) Pulses are rich in proteins
(b) Milk is a rich source of Vitamin A
(c) Cereals are very poor source of carbohydrates
(d) Vegetables are rich source of minerals

8. Which of the statements given below are correct? **[2014-II]**
1. A person having blood group 'A' can donate blood to persons having blood group 'A' and blood group 'AB'.
2. A person having blood group 'AB' can donate blood to persons having blood groups 'A', 'B', 'AB' or 'O'.
3. A person with blood group 'O' can donate blood to persons having any blood group.
4. A person with blood group 'O' can receive blood from the person of any of the blood groups.
Select the correct answer using the code given below:
(a) 1, 2, 3 and 4
(b) l and 2 only
(c) 3 and 4 only
(d) 1 and 3 only

9. Which one among the following is the correct pathway for the elimination of urine? **[2014-II]**
(a) Kidneys, Ureters, Bladder, Urethra
(b) Kidneys, Urethra, Bladder, Ureters
(c) Urethra, Ureters, Bladder, Kidneys
(d) Bladder, Ureters, Kidneys, Urethra

10. Which of the following parts are found in both plant and animal cells? **[2014-II]**
(a) Cell membrane, Chloroplast, Vacuole
(b) Cell wall, Nucleus, Vacuole
(c) Cell membrane, Cytoplasm, Nucleus
(d) Cell wall, Chloroplast, Cytoplasm

11. Match the following **[2014-I]**

List I (Gland)	List II (Hormone)
A. Pancreas	1 Cortisol
B. Pituitary	2 Vitamin D
C. Adrenal	3 Thyroid stimulating hormone
D. Kidneys	4 Glucagon

Codes

	A	B	C	D
(a)	4	3	1	2
(b)	4	1	3	2

(c) 2 1 3 4
(d) 2 3 1 4

12. In a forest, animals like voles and woodlice feed on plant roots and barks respectively. Among the other carnivores, foxes, shrews and owls are present in that forest. Following predictions are made by a group of observers who have visited the forest.
1. If the roots of the tree develop a disease, then voles and foxes will starve and not the owls.
2. Population of voles is dependent on wood lice population through food web.
3. If owl population declines, it will indirectly affect wood lice population.
4. If barks of tree are affected due to a disease, then reduction of wood lice will affect the shrew population forcing owls to eat more voles.
Which of the above predictions is/are correct? **[2014-I]**
(a) 1, 2, and 4
(b) Only 3
(c) 1 and 2
(d) Only 2

13. Deficiency of which of the following elements is responsible for weakening of bones?
1. Calcium **[2014 - I]**
2. Phosphorus
3. Nitrogen
4. Carbon
Select the correct answer using the codes given below
(a) 1 and 2
(b) Only 1
(c) 1, 2 and 3
(d) Only 4

14. Which of the following statements is/are correct? **[2014-I]**
1. Amnion contains fluid.
2. Ultrasound scan can detect the sex of an embryo.
Select the correct answer using the codes given below
(a) Only 1
(b) Only 2
(c) Both 1 and 2
(d) Neither 1 nor 2

15. Among the following animals, choose the one having three pairs of legs. **[2014-I]**
(a) Spider
(b) Scorpion
(c) Bug
(d) Mite

16. The ultimate cause of water movement in a plant stem against gravity is **[2013-II]**
(a) Osmosis

(b) Transpiration
(c) Photosynthesis
(d) Diffusion

17. Which one among the following statements is correct? **[2013-II]**
(a) All proteins are enzymes
(b) All enzymes are proteins
(c) None of the enzymes is protein
(d) None of the proteins is enzyme

18. The fossil of *Archaeopteryx* represents the evidence of origin of **[2013-II]**
(a) Birds from reptiles
(b) Mammals from reptiles
(c) Reptiles from amphibians
(d) Mammals from birds

19. Which one among the following vitamins is necessary for blood clotting? **[2013-II]**
(a) Vitamin A
(b) Vitamin D
(c) Vitamin K
(d) Vitamin C

20. The pH of human blood is normally around **[2013 - II]**
(a) 4.5-5.5
(b) 5.5-6.5
(c) 7.4-8.0
(d) 8.5-9.0

21. The crew and passengers of a flying aircraft suffer generally from chronic obstructive pulmonary disease due to the effect of **[2013- II]**
(a) Solar radiation
(b) Ozone concentration
(c) Nitrogen oxide
(d) Particulate pollutant

22. Consider the following statements regarding antibiotics **[2013-II]**
1. They are used to destroy disease-causing bacteria.
2. They can be applied to the skin, swallowed or injected to fight micro-organisms inside the body.
3. They are effective against disease-causing viruses.
4. The first antibiotic to be discovered was Tetracycline.
Which of the statement(s) given above is/are correct?
(a) 1 and 2
(b) 1, 2 and 4

(c) 2, 3 and 4
(d) Only 1

23. The gastrointestinal hormones namely secreting and cholecystokinin secreted by duodenal epithelium activate respectively which organs to discharge their secretions? **[2013 - II]**
(a) Pancreas and gall bladder
(b) Gall bladder and stomach
(c) Pancreas and stomach
(d) Stomach and small intestine

24. Which one among the following statements about blood transfusion is correct?
Blood group B can give blood to **[2013-II]**
(a) Blood Group B and receive from Group AB
(b) Blood Groups B and AB and receive from Group B
(c) Blood Groups B and AB and receive from Group A
(d) Blood Group O and receive from Group B

25. What would happen if human blood becomes acidic (low pH)? **[2013-II]**
(a) Oxygen carrying capacity of haemoglobin is increased
(b) Oxygen carrying capacity of haemoglobin is decreased
(c) RBC count increases
(d) RBC count decreases

Previous Year Questions - Solutions

1. (b) A prokaryote is a single-celled organism that lacks a membrane-bound nucleus (karyon). Plant and animal cells are both eukaryotic cells, so they have several features in common, such as the presence of a cell membrane, mitochondria and endoplasmic reticulum. Chloroplasts are found in plant cells which is eukaryotic. Ribosomes are found in both prokaryotes and eukaryotes.

2. (c) Characteristics of mammals: • They are vertebrates (which means they have a backbone or spine). • They regulate their own body temperature which allows them to live in almost every climate on Earth. • Have hair on their bodies. • Produce milk to feed their babies. • Four chambered heart: two atria and two ventricles (bird and mammal)

3. (b) In human digestive system the process of digestion starts in buccal cavity. The buccal cavity is more commonly known as the mouth, and it is the beginning of the digestive system for humans and animals alike. It starts with the lips and ends with the throat, covering the oral cavity, the tongue, and the jaw in between.

4. (b) The TB bacteria are expelled into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks, or sings. People nearby may breathe in these bacteria and become infected.

5. (b) An axon is also known as a nerve fibre. It is a long, slender projection of a nerve cell, or neuron that typically conducts electrical impulses away from the neuron's cell body. Each nerve is a cordlike structure that contains many axons and also called nerve fibre. Within a nerve, each axon is surrounded by a layer of connective tissue called the endoneurium.

6. (c) Elephantiasis is a symptom of a variety of diseases, where parts of a person's body swell to massive proportions. It is caused by a number of parasitic worms, particularly *Wuchereria bancrofti*.

7. (b) Whole milk contains some vitamin A, however levels in semi-skimmed and skimmed milks are much lower.

8. (d) A person with AB blood group can receive blood from any group but cannot donate blood to any group other than AB. O individual can receive blood only from a group of O individual but can donate blood to all groups.

9. (a) The kidneys filter metabolic wastes, excess ions, and chemicals from the blood to form urine. The ureters are a pair of tubes that carry urine from the kidneys to the urinary bladder. The urethra is the tube through which urine passes from the bladder to the exterior of the body.

10. (c) Cell Membrane, Cytoplasm and Nucleus are found in both plant and animal cells.

11. (a) Pancreas secrete glucagon hormone, pituitary gland secretes thyroid stimulating hormone. Adrenal glands secrete cortical hormones and kidney synthesizes or converts biologically inactive 25-hydroxychole calciferol (vitamin D-3) into biologically active 1, 25 dihydroxychole calciferol (vitamin D-3).

12. (d) If owl population decreases, it will indirectly affect wood lice population. If owl population will decrease, the population of wood lice increases. Reason is that owl is not present to eat the wood lice population.

13. (a) Deficiency of calcium causes weakening of bones because bone consists of calcium and phosphate both.

14. (c) Amnion is a membrane filled with fluid which covers the embryo. The embryos sex may be determined by ultrasound as early as 11 weeks pregnancy.

15. (c) Among the given options, bug possesses only three pairs of legs. All the insects in phylum Arthropods have three pairs of legs in given option only bug belongs to class-insect.
16. (b) Transpiration is a process like evaporation. It is the loss of water vapour from different parts of plants, particularly in leaves but also in stems, flowers and roots.

17. (b) All enzymes are proteins which catalyze various reactions occurring in cells. Therefore all enzymes are proteins, but not all proteins are enzymes.

18. (a) *Archaeopteryx* is a genus of dinosaur that is closely related to birds. It demonstrates the evidence of origin of birds from reptiles.

19. (c) Vitamin K is a group structurally similar to fat-soluble vitamins that are essential for the synthesis of certain proteins needed for blood coagulation or clotting. (c) In chemistry, pH measures the acidity or alkalinity of an aqueous solution. pH is normally measured in a range of 0-14. pH value of some common materials:

20. (c)

Material	pH value
Sea water	8.4
Human blood	7.4
Milk	6.4
Human urine	6.0
Alcohol	2.8

21. (c) Due to lower atmospheric pressure, N_2 gets mixed with O_2 to form such oxide which is inhaled by the passengers or crew.

22. (b) Antibiotics are very effective medicines that treat bacterial infections. They are ineffective against viral infection as viruses have different genetic makeup as compared to bacteria.

23. (a) Secretin and cholecystokinin activate pancreas and gall bladder to discharge their secretions.

24. (b) Blood group B can provide blood to blood Groups B and AB and gets from Group B and Group O.

25. (b) If human blood becomes acidic (low pH), The amount of CO_2 is increased and O_2 carrying capacity of haemoglobin is reduced.

PREVIOUS YEAR QUESTIONS ASKED IN AFCAT EXAMINATION

1. Animals active at night are called **[2016-II]**
(a) Diurnal
(b) Nocturnal
(c) Parasites
(d) Nacto-diurnal

2. Lines joining places of equal temperature are called **[2016-II]**
(a) Isotherms
(b) Isohyets
(c) Isomers
(d) Isobars

3. Sir C.V. Raman was awarded Noble Prize for his work connected with which of the following phenomenon of radiation? **[2016-II]**
(a) Scattering
(b) Diffraction
(c) Interference
(d) Polarization

4. Natural radioactivity was discovered by **[2016-II]**
(a) Marie Curie
(b) Earnest Rutherford
(c) Henry Bacquerel
(d) Enrico Fermi

5. Which one of the following is the petroleum wax? **[2016-1]**
(a) Paraffin wax
(b) Jonoba wax
(c) Carnauba wax
(d) Bees wax

6. Natural radioactivity was discovered by [**2016-1]**
(a) Marie Curie
(b) Earnest Rutherford
(c) Henry Bacquerel
(d) Enrico Fermi

7. The branch of science that studies cells is called **[2015-I]**
(a) Cytology
(b) Entomology
(c) Homoplastic
(d) Hormonology

8. Sir CV Raman was awarded Nobel Prize for his work connected with which of the following phenomenon of radiation? **[2015-I]**
(a) Scattering
(b) Diffraction
(c) Interference
(d) Polarisation

9. Algae often float on surface of water during day but sink during night due to: **[2014-II]**
(a) evolution and trapping of oxygen bubbles during the day in their photosynthesis process
(b) Becoming light as they consume most of their food in the night
(c) warming action of sun during the day
(d) Release of absorbed air by warming of water

10. When body is accelerated: **[2014-I]**
(a) Its velocity never changes
(b) Its speed will always changes
(c) Its direction always changes
(d) Its speed may or may not change

11. Which of the following is not a unit of energy? **[2014-I]**
(a) Calorie
(b) Joule
(c) Electron volt
(d) Watt

12. Which is the longest bone in the human body? **[2014-I]**
(a) Fibula
(b) Radius
(c) Stapes
(d) Femur

13. A US team of scientists has found that the mechanism responsible for the ageing process is located **[2014-I]**
(a) inside the face
(b) inside the skin
(c) inside the brain
(d) inside the heart

14. The outer most layer of the Sun is known as **[2014-I]**
(a) Corona
(b) Photosphere
(c) Chromosphere
(d) Granule

15. Indian Institute of Science, Bangalore was founded by **[2014-I]**

(a) CV Raman
(b) Jamsetji Tata
(c) Vikram Sarabhai
(d) None of these

16. The elements which have low value of ionization potential are strong **[2013-I]**
(a) oxidising agents
(b) reducing agents
(c) oxidising and Reducing agents depending upon the reactants
(d) none of these

17. Limonitic ore is the ore of which metal? **[2013-I]**
(a) Iron (b) Aluminium
(c) Zinc (d) Cobalt

18. _____ is a thyroid hormone which controls the balance of calcium in the body **[2013-I]**
(a) Calcitonin
(b) Thyroxine
(c) Calmodulin
(d) All of these

19. The cell wall in plants is interrupted by narrow pores carrying fine strands of cytoplasm which interlink the contents of the cells. These strands are called: - **[2013-I]**
(a) Plasmohole
(b) Microvilli
(c) Plasmodesmata
(d) Plasmalemma

20. The transport phenomenon occurs only in ____ state of a gas and is_____. **[2013-I]**
(a) non-equilibrium, irreversible
(b) non-equilibrium, reversible
(c) equilibrium, irreversible
(d) equilibrium, reversible

21. Which of the following compounds form nitrites with nitrous acid? **[2013-I]**
(a) Primary amines
(b) Secondary amines
(c) Tertiary amines
(d) All of these

22. Haematite ores is the ore of which metal? **[2012-II]**
(a) Iron
(b) Aluminium
(c) Zink
(d) Cobalt

23. Vertebrates have two endocrine glands associated with the brain, namely **[2012-II]**
(a) Thyroid, Thymus
(b) Pituitary, Pancreas
(c) Pituitary, Pineal
(d) Pancreas, Pineal

24. The layer common to two adjacent plant cells called Middle Lamella is composed of
(a) Calcium Phosphate **[2012-II]**
(b) Calcium Sulphate
(c) Calcium Carbonate
(d) Calcium Pectate

25. With the increase of the effective nuclear charge, the size of the atom or ion **[2012-II]**
(a) increases
(b) decreases
(c) remain the same, since it has no bearing on size
(d) it will depend on period to period and group to group

26. On which of the following statements, is the kinetic theory of matter base? **[2012-II]**
(a) Matter is made up of molecules
(b) Molecules are in rapid motion
(c) Molecules experience forces of attraction between one another
(d) All of the above

27. When heated with chloroform, secondary amines and tertiary amines **[2012-II]**
(a) gives isocyanides
(b) gives cyanides
(c) do not give isocyanides
(d) Both (a) and (b)

28. Which one of the following statement regarding the sun is correct? **[2012-I]**
(a) The sun is composed mainly of hydrogen.
(b) Its energy is generated by nuclear collision in its interior
(c) It is calculated that the sun consumes about a trillion pounds of hydrogen every second.
(d) All of the above.

29. Supersonic speed is speed greater than the speed of sound (in air at sea level) that is to say around_____ miles/hour. **[2012-I]**
(a) 760
(b) 860
(c) 960
(d) 1060

30. An aeroplane rises because **[2012-I]**
(a) Of upward reaction of air.
(b) The density of air above the plane is less than below it.
(c) the pressure above its wings is less than the pressure below them
(d) Its nose points upwards.

31. The pioneer of Atomic energy in India is **[2012-I]**
(a) Homi J Bhabha
(b) Vikram Sarabhai
(c) C.V. Raman
(d) C.K. Naidu

32. India tops the world in production of **[2011-II]**
(a) Aluminium
(b) Copper
(c) Chromite
(d) Mica

33. DPT vaccine does not give protection to a child from **[2011-II]**
(a) Tetanus
(b) Polio
(c) Diphtheria
(d) Whooping Cough

34. What will be the color of a red rose when it is seen through green glass? **[2011-II]**
(a) White
(b) Black
(c) Pink
(d) Brown

35. Which one of the following crops enriches nitrogen content in the soil? **[2011-II]**
(a) Pea
(b) Sunflower
(c) Potato
(d) Wheat

36. Vitamin necessary to prevent prolonged bleeding is **[2011-I]**
(a) Vitamin A
(b) Vitamin E
(c) Vitamin D
(d) Vitamin K

37. The term 'Carbon Credit' is associated with **[2011-I]**

(a) Coal reserve of a nation
(b) Reduction of Green House Gas emissions
(c) Fossil Fuel reserve
(d) Amount of CO2 an individual emits in a year

Previous Year Questions – Solutions

1. (b) Animals active at night are called Nocturnal.

2. (a) Isotherm is a line on the map connecting points having the same temperature at a given time.

3. (a) Sir C. V. Raman's ground-breaking work in the field of light scattering for which he was awarded the 1930 Nobel Prizes for physics.
4. (c) Henry Becquerel is associated with the discovery of Radioactivity.

5. (a) Paraffin wax is obtained from petroleum by dewaxing light lubricating oil stocks. It is used in candles, wax paper, polishes, cosmetics, and electrical insulators. It assists in extracting perfumes from flowers, forms a base for medical ointments, and supplies a waterproof coating for wood. In wood and paper matches, it helps to ignite the matchstick by supplying an easily vaporized hydrocarbon fuel.

6. (a) Natural Radio activity was discovered by Henry Becquerel in 1895.

7. (a) The branch of science that studies cells is called Cytology.

8. (a) Sir Chandrasekhara Venkata Raman, was an Indian physicist, whose ground-breaking work in the field of light scattering earned him the 1930 Nobel Prize for Physics. He discovered that, when light traverses a transparent material, some of the deflected light changes in wavelength. This phenomenon is now called Raman scattering and is the result of the Raman Effect.

9. (a) The reason of algae float to the surface during the day & sink at night is due to photosynthesis. In Day time, the algae is producing oxygen. When enough Oxygen is produced during the day, it gets trapped in bubbles and it can lift the clumps up to the surface. In night, this oxygen is consumed and CO2 is produced. So algae sinks.

10. (b) When body is accelerated, then its speed will always change.

11. (d) The watt is a derived unit of power in the International System of Units, named after the Scottish engineer James Watt. The unit defined as one joule per second, measures the rate of energy conversion or transfer.

12. (d) The head of the femur articulates with the acetabulum in the pelvic bone forming the hip joint, while the distal part of the femur articulates with the tibia and patella forming the knee

joint. By most measures the femur is the strongest bone in the body. The femur is also the longest bone in the body.

13. (c) The US team of scientists found the mechanism in the hypothalamus- which is located deep inside the brain and showed that it is responsible for the ageing process. Scientists carried out a series of experiments to find that they could extend the lives of mice by a fifth, without the problems such as animals suffering from muscle weakness, bone loss or memory problems associated with old age.

14. (b) The visible surface of the Sun, the photosphere, is the layer below which the Sun becomes opaque to visible light. Above the photosphere visible sunlight is free to propagate into space, and its energy escapes the Sun entirely.

15. (b) Indian Institute of Science (IISC) is a public university for scientific research and higher education located in Bengaluru (formerly Bangalore), India. Established in 1899 with active support from Jamshetji Tata it is also locally known as the "Tata Institute". It acquired the status of a Deemed University in 1958. IISC is widely regarded as India's finest institution in its field, and has made significant contribution to advanced computing, space, and nuclear technologies.

16. (b) Elements with a low ionization energy tend to be reducing agents and form cations.

17. (a) Limonite is an iron ore consisting of a mixture of hydrated iron(III) oxide-hydroxides in varying composition.

18. (a) The thyroid also produces calcitonin, which plays a role in calcium homeostasis.

19. (c) Plasmodesmata (singular: plasmodesma) are microscopic channels which traverse the cell walls of plant cells and some algal cells, enabling transport and communication between them. Plasmodesmata evolved independently in several lineages, and species that have these structures.

20. (a) The aim of statistical mechanics is the interpretation and prediction of the observed macroscopic properties of matter in terms of the mechanical properties of the constituent molecules and the nature of the interaction among them. It is restricted to the non-equilibrium statistical mechanics of non-reacting gases that is to the theory of transport phenomena.

21. (d)

22. (a) Hematite, also spelled as haematite, is the mineral form of iron oxide, one of several iron oxides. Hematite crystallizes in the rhombohedral lattice system, and it has the same crystal structure as ilmenite and corundum.

23. (c) The endocrine system refers to the collection of glands of an organism that secrete hormones directly into the circulatory system to be carried toward a distant target organ. The major endocrine glands include the pineal gland, pituitary gland, pancreas, ovaries, testes, thyroid gland, parathyroid gland, hypothalamus, gastrointestinal tract and adrenal glands.

24. (d) The middle lamella is a pectin layer which cements the cell walls of two adjoining cells together. Plants need this to give them stability and so that they can form plasmodesmata between the cells. It is the first formed layer which is deposited at the time of cytokinesis. The cell plate that is formed during cell division itself develops into middle lamella or lamellum. The middle lamella is made up of calcium and magnesium pectates. In plants, the pectins form a unified and continuous layer between adjacent cells.

25. (d) The effective nuclear charge is the net positive charge experienced by an electron in a multi-electron atom. The term "effective" is used because the shielding effect of negatively charged electrons prevents higher orbital electrons from experiencing the full nuclear charge by the repelling effect of inner-layer electrons. The effective nuclear charge experienced by the outer shell electron is also called the core charge. It is possible to determine the strength of the nuclear charge by looking at the oxidation number of the atom.

26. (c) Molecules experience forces of attraction between one another is the kinetic theory of matter base.

27. (b) When heated with chloroform, secondary amines and tertiary amines gives Cyanides.

28. (d) All the options are correct regarding the Sun.

29. (a) Supersonic speed is approximately 343.2 m/s, 1,125 ft/s, 768 mph, 667 knots, or 1,235 km/h.

30. (c) An aeroplane rises because the pressure above its wings is less than the pressure below them.

31. (a) Homi J. Bhabha was the eminent scientist who played a key role in the development of the Indian atomic energy program. He is also considered as the father of India's nuclear program. He also established the Atomic Energy Commission of India in 1948.

32. (d) The British Geological Survey reported that as of 2005, Koderma district in Jharkhand state in India had the largest deposits of mica in the world.

33. (b) DPT (also DTP and DTwP) refers to a class of combination vaccines against three infectious diseases in humans: diphtheria, pertussis (whooping cough), and tetanus.

34. (b) Black, because red and green are two primary colours which when mixed together gives black colour in terms of light and wavelength.

35. (a) Many legumes (alfalfa, clover, peas, beans, lentils, soybeans, peanuts and others) contain symbiotic bacteria called Rhizobia within root nodules of their root systems. These bacteria have the special ability of fixing nitrogen from atmospheric, molecular nitrogen (N2) into ammonia (NH3).

36. (d) Vitamin K is a group of structurally similar, fat-soluble vitamins that the human body needs for modification of certain proteins that are required for blood coagulation, and in bone and other tissue.

37. (c) The term Carbon Credit is associated with Reduction of Green House Gas emissions in the atmosphere.

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