



34

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*Complete Collection of all Questions
asked in last 34 years' in NEET & CBSE AIPMT*





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Arihant Prakashan (Series), Meerut



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PREFACE

Whenever a student decides to prepare for any examination his/her first and foremost curiosity is to know about the type of questions that are expected in the exam. This becomes more important in the context of competitive entrance examinations where there is neck-to-neck competition.

We feel great pleasure in presenting before you this book containing Error Free Chapterwise Topicwise Solutions of **CBSE AIPMT/NEET Biology Questions** from the years 1988 to 2021.

It has been our efforts to provide correct solutions to the best of our knowledge and opinion. Detailed explanatory discussions follow the answers. Discussions are not just sketchy—rather, have been drafted in a manner that the students will surely be able to answer some other related questions too ! Going through this book, the students would be able to have the complete idea of the questions being asked in the test.

We hope this chapterwise solved papers would be highly beneficial to the students. We would be grateful if any discrepancies or mistakes in the questions or answers are brought to our notice so that these could be rectified in subsequent editions.

Publisher

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SYLLABUS

CLASS 11th

UNIT I Diversity in Living World

What is living? ; Biodiversity, Need for classification, Three domains of life, Taxonomy and Systematics, Concept of species and taxonomical hierarchy, Binomial nomenclature, Tools for study of Taxonomy – Museums, Zoos, Herbaria, Botanical gardens. Five kingdom classification, salient features and classification of Monera, Protista and Fungi into major groups, Lichens, Viruses and Viroids. Salient features and classification of plants into major groups-Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms (three to five salient and distinguishing features and at least two examples of each category), Angiosperms-classification up to class, characteristic features and examples). Salient features and classification of animals-nonchordate upto phyla level and chordate up to classes level (three to five salient features and at least two examples).

UNIT II Structural Organisation in Animals and Plants

Morphology and modifications, Tissues, Anatomy and functions of different parts of flowering plants, Root, stem, leaf, inflorescence- cymose and racemose, flower, fruit and seed (To be dealt along with the relevant practical of the Practical Syllabus). Animal tissues, Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect (cockroach). (Brief account only)

UNIT III Cell Structure and Function

Cell theory and cell as the basic unit of life Structure of prokaryotic and eukaryotic cell, Plant cell and animal cell, Cell envelope, cell membrane, cell wall, Cell organelles-structure and function, Endomembrane system-endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles, mitochondria, ribosomes, plastids, micro bodies, Cytoskeleton, cilia, flagella, centrioles (ultra structure and function), Nucleus-nuclear membrane, chromatin, nucleolus. Chemical constituents of living cells Biomolecules-structure and function of proteins, carbohydrates, lipids, nucleic acids, Enzymes-types, properties, enzyme action. B Cell division Cell cycle, mitosis, meiosis and their significance.

UNIT IV Plant Physiology

Transport in plants Movement of water, gases and nutrients, Cell to cell transport-Diffusion, facilitated diffusion, active transport, Plant- water relations – Imbibition, water potential, osmosis, plasmolysis, Long distance transport of water – Absorption, apoplast, symplast, transpiration pull, root pressure and guttation, Transpiration-Opening and closing of stomata, Uptake and translocation of mineral nutrients-Transport of food, phloem transport, Mass flow hypothesis, Diffusion of gases (brief mention).

Mineral nutrition Essential minerals, macro and micronutrients and their role, Deficiency symptoms, Mineral toxicity, Elementary idea of Hydroponics as a method to study mineral nutrition, Nitrogen metabolism Nitrogen cycle, biological nitrogen fixation.

Photosynthesis Photosynthesis is as a means of Autotrophic nutrition, Site of photosynthesis take place, pigments involved in Photosynthesis (Elementary idea), Photochemical and biosynthetic phases of photosynthesis, Cyclic and non-cyclic and photophosphorylation, Chemiosmotic hypothesis, Photorespiration C₃ and C₄ pathways, Factors affecting photosynthesis.

Respiration Exchange gases, Cellular respiration-glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic), Energy relations Number of ATP molecules generated, Amphibolic pathways, Respiratory quotient.

Plant growth and development Seed germination, Phases of Plant growth and plant growth rate, Conditions of growth, Differentiation, dedifferentiation and redifferentiation, Sequence of developmental process in a plant cell, Growth regulators-auxin, gibberellin, cytokinin, ethylene, ABA Seed dormancy, Vernalisation, Photoperiodism.

UNIT V Human Physiology

Digestion and absorption, Alimentary canal and digestive glands, Role of digestive enzymes and gastrointestinal hormones, Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, Caloric value of proteins, carbohydrates and fats, Egestion, Nutritional and digestive disorders – PEM, indigestion, constipation, vomiting, jaundice, diarrhea.

Breathing and Respiration Respiratory organs in animals (recall only), Respiratory system in humans, Mechanism of breathing and its regulation in humans-Exchange of gases, transport of gases and regulation of respiration Respiratory volumes, Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders.

Body fluids and circulation Composition of blood, blood groups, coagulation of blood, Composition of lymph and its function, Human circulatory system-Structure of human heart and blood vessels, Cardiac cycle, cardiac output, ECG, Double circulation, Regulation of cardiac activity, Disorders of circulatory system-Hypertension, Coronary artery disease, Angina pectoris, Heart failure.

Excretory products and their elimination Modes of excretion- Ammonotelism, ureotelism, uricotelism, Human excretory system-structure and function, Urine formation, Osmoregulation, Regulation of kidney function-Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus, Role of other organs in excretion, Disorders, Uraemia, Renal failure, Renal calculi, Nephritis, Dialysis and artificial kidney.

Locomotion and Movement Types of movement- ciliary, flagellar, muscular, Skeletal muscle- contractile proteins and muscle contraction, Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus), Joints, Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout.

Neural control and coordination Neuron and nerves, Nervous system in humans- central nervous system, peripheral nervous system and visceral nervous system, Generation and conduction of nerve impulse, Reflex action, Sense organs, Elementary structure and function of eye and ear.

Chemical coordination and regulation Endocrine glands and hormones, Human endocrine system-Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads, Mechanism of hormone action (Elementary Idea), Role of hormones as messengers and regulators, Hypo- and hyperactivity and related disorders (Common disorders e.g., Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease). (Important, Diseases and disorders mentioned above to be dealt in brief.)

CLASS 12th

UNIT I Reproduction

Reproduction in organisms Reproduction, a characteristic feature of all organisms for continuation of species, Modes of reproduction– Asexual and sexual, Asexual reproduction, Modes-Binary fission, sporulation, budding, gemmule, fragmentation, vegetative propagation in plants.

Sexual reproduction in flowering plants Flower structure, Development of male and female gametophytes, Pollination-types, agencies and examples, Outbreeding devices, Pollen-Pistil interaction, Double fertilization, Post fertilization events- Development of endosperm and embryo, Development of seed and formation of fruit, Special modes-apomixis, parthenocarpy, polyembryony, Significance of seed and fruit formation.

Human Reproduction Male and female reproductive systems, Microscopic anatomy of testis and ovary, Gametogenesis- spermatogenesis and oogenesis, Menstrual cycle, Fertilisation, embryo development upto blastocyst formation, implantation, Pregnancy and placenta formation (Elementary idea), Parturition (Elementary idea), Lactation (Elementary idea).

Reproductive health Need for reproductive health and prevention of sexually transmitted diseases (STD), Birth control-Need and Methods, Contraception and Medical Termination of Pregnancy (MTP), Amniocentesis, Infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (Elementary idea for general awareness).

UNIT II Genetics and Evolution

Heredity and variation Mendelian Inheritance, Deviations from Mendelism-Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy, Elementary idea of polygenic inheritance, Chromosome theory of inheritance, Chromosomes and genes, Sex determination-In humans, birds, honey bee, Linkage and crossing over, Sex linked inheritance-Haemophilia, Colour blindness, Mendelian disorders in humans-Thalassemia, Chromosomal disorders in humans, Down's syndrome, Turner's and Klinefelter's syndromes.

Molecular basis of Inheritance Search for genetic material and DNA as genetic material, Structure of DNA and RNA, DNA packaging, DNA replication, Central dogma, Transcription, genetic code, translation, Gene expression and regulation-Lac Operon, Genome and human genome project, DNA finger printing.

Evolution Origin of life, Biological evolution and evidences for biological evolution from Paleontology, comparative anatomy, embryology and molecular evidence), Darwin's contribution, Modern Synthetic theory of Evolution, Mechanism of evolution-Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection, Gene flow and genetic drift, Hardy-Weinberg's principle, Adaptive Radiation, Human evolution.

UNIT III Biology and Human Welfare

Health and Disease, Pathogens, parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm), Basic concepts of immunology-vaccines, Cancer, HIV and AIDS, Adolescence, drug and alcohol abuse.

Improvement in food production Plant breeding, tissue culture, single cell protein, Biofortification, Apiculture and Animal husbandry. Microbes in human welfare In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers.

UNIT IV Biotechnology and Its Applications

Principles and process of Biotechnology Genetic engineering (Recombinant DNA technology). Applications of Biotechnology in health and agriculture Human insulin and vaccine production, gene therapy, Genetically modified organisms-Bt crops, Transgenic Animals, Biosafety issues-Biopiracy and patents.

UNIT V Ecology and Environment

Organisms and environment Habitat and niche, Population and ecological adaptations, Population interactions-mutualism, competition, predation, parasitism, Population attributes-growth, birth rate and death rate, age distribution.

Ecosystem Patterns, components, productivity and decomposition, Energy flow, Pyramids of number, biomass, energy, Nutrient cycling (carbon and phosphorous), Ecological succession, Ecological Services-Carbon fixation, pollination, oxygen release.

Biodiversity and its conservation Concept of Biodiversity, Patterns of Biodiversity, Importance of Biodiversity, Loss of Biodiversity, Biodiversity conservation, Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries.

Environmental issues Air pollution and its control, Water pollution and its control, Agrochemicals and their effects, Solid waste management, Radioactive waste management, Greenhouse effect and global warning, Ozone depletion, Deforestation, Any three case studies as success stories addressing environmental issues.

01

The Living World

TOPIC 1

Diversity and Taxonomy

01 The contrasting characteristics generally in a pair used for identification of animals in taxonomic key are referred to as

[NEET (Odisha) 2019]

- (a) lead (b) couplet
(c) doublet (d) alternate

Ans. (b)

Couplet is the contrasting characteristic generally in a pair used for identification of animals in taxonomic key. It represents the choice made between two opposite options, each half of a couplet is called lead. Separate taxonomic keys are required for each taxonomic category like family, genus species.

02 Match the items given in Column I with those in Column II and select the **correct** option given below

[NEET 2018]

Column I	Column II
1. Herbarium	(i) It is a place having a collection of preserved plants and animals.
2. Key	(ii) A list that enumerates methodically all the species found in an area with brief description aiding identification.

Column I	Column II
3. Museum	(iii) It is a place where dried and pressed plant specimens mounted on sheets are kept.
4. Catalogue	(iv) A booklet containing a list of characters and their alternates which are helpful in identification of various taxa.

- 1 2 3 4
(a) (ii) (iv) (iii) (i)
(b) (iii) (ii) (i) (iv)
(c) (i) (iv) (iii) (ii)
(d) (iii) (iv) (i) (ii)

Ans. (d)

Herbarium is a place where dried and pressed plant specimens, mounted on sheets are kept systematically. It is a repository or store house for future use. **Key** is a booklet containing list of characters and their alternates which are helpful in identification of various taxa-class, order, family, genus and species.

Museum is an institution where artistic and educational materials are exhibited to the public. The materials available for observation and study are called a collection.

Catalogue is a list or register that enumerates methodically all the species found in a particular place. It often possesses brief description of species that aids in identification. Therefore, option (d) is correct.

03 The label of a herbarium sheet does not carry information on

[NEET 2016, Phase II]

- (a) date of collection
(b) name of collector
(c) local names
(d) height of the plant

Ans. (d)

Herbarium is a collection of plants that usually have been dried, pressed, preserved plant on sheets and are arranged in accordance with any accepted system of classification for future reference and study. It does not have information on height of the plant.

04 Study the four statements (I-IV) given below and select the two correct ones out of them :

[NEET 2016, Phase II]

- I. Definition of biological species was given by Ernst Mayr.
- II. Photoperiod does not affect reproduction in plants.
- III. Binomial nomenclature system was given by RH Whittaker.
- IV. In unicellular organisms, reproduction is synonymous with growth.

The two correct statements are

- (a) II and III (b) III and IV
(c) I and IV (d) I and II

Ans. (c)

Statements I and IV are correct. The correct form of II and III are as follows:

- (II) Photoperiod does affect the reproduction in plants.
(III) Binomial nomenclature was given by Carolus Linnaeus.

05 Biological organisation starts with

[CBSE AIPMT 2007]

- (a) sub-microscopic molecular level
- (b) cellular level
- (c) organismic level
- (d) atomic level

Ans. (a)

Biological organisation starts with sub-microscopic molecular level, where four types of molecules, i.e. carbohydrates, lipids, proteins and nucleic acids are organised into organelles of cell.

06 The living organisms can be un-exceptionally distinguished from the non-living things on the basis of their ability for

[CBSE AIPMT 2007]

- (a) responsiveness to touch
- (b) interaction with the environment and progressive evolution
- (c) reproduction
- (d) growth and movement

Ans. (b)

All living organisms interact with their environment and shows progressive evolution. They can sense and respond to environmental uses. On the other hand reproduction, growth and movement cannot be all inclusive defining properties of living organisms.

07 Which one of the following is an example of negative feedback loop in humans?

[CBSE AIPMT 2007]

- (a) Constriction of skin blood vessels and contraction of skeletal muscles when it is too cold
- (b) Secretion of tears after falling of sand particles into the eye
- (c) Salivation of mouth at the sight of delicious food
- (d) Secretion of sweat glands and constriction of skin blood vessels when it is too hot

Ans. (a)

Skin blood vessels constrict and skeletal muscles contract due to the cold is an example of negative feedback mechanism of homeostasis.

08 Carbohydrates the most abundant biomolecules on earth, are produced by

[CBSE AIPMT 2005]

- (a) all bacteria, fungi and algae
- (b) fungi, algae and green plant cells
- (c) some bacteria, algae and green plant cells
- (d) viruses, fungi and bacteria

Ans. (c)

Some photosynthetic bacteria such as Rhodospseudomonas can prepare carbohydrates. But during this type of food synthesis O_2 is not evolved because, in this case hydrogen donor is other than H_2O .

Algae (green and blue-green) and all green plant cells prepare their food (carbohydrate) through photosynthesis. Here, hydrogen ions are donated by water molecules by the process of photolysis of water, i.e. O_2 is released during this type of food synthesis.

09 More than 70% of world's fresh water is contained in

[CBSE AIPMT 2005]

- (a) antarctica
- (b) greenland
- (c) glaciers and mountains
- (d) polar ice

Ans. (d)

Three fourth surface of earth (about 71% of total) is occupied by oceans which contain 97.5% of total water. This is marine water with about 3.5% salt contents.

Rest water, i.e. 2.5% is freshwater which occurs on land. Most amount of this water (about 1.97%) occurs as Frozen ice caps and glaciers and 0.5% fresh water occurs as ground water.

10 There is no life on moon due to the absence of

[CBSE AIPMT 2002]

- (a) O_2
- (b) water
- (c) light
- (d) temperature

Ans. (b)

Water is an essential constituent of cytoplasm of all living organisms. It helps in distribution of substances within the organism, elimination of waste products, maintenance of body temperature, etc. It is absent on the moon.

Anaerobic organisms that can live in the absence of O_2 . Light and temperature are already known to exist on the moon.

11 The most important feature of all living systems is to

[CBSE AIPMT 2000]

- (a) utilise oxygen to generate energy
- (b) replicate the genetic information
- (c) produce gametes
- (d) utilise solar energy for metabolic activities

Ans. (b)

Reproduction is necessary for continuity of life. However, production of gametes is not only method for this. A number of organisms reproduce asexually. In any case, cell division is necessary which involves replication of DNA.

12 Homeostasis is

[CBSE AIPMT 1991]

- (a) tendency to change with change in environment
- (b) tendency to resist change
- (c) disturbance in regulatory control
- (d) plants and animals extracts used in homeopathy

Ans. (b)

Homeostasis (Gr. homeos = similar; stasis = standing) is the tendency of maintaining a relatively stable internal physiological environment in an organism, or steady-state equilibrium in a population or ecosystem. It is carried out by regulatory mechanisms which coordinate internal functions such as providing nutrients to cells and transporting substances.

13 Employment of hereditary principles in the improvement of human race is

[CBSE AIPMT 1990]

- (a) Euthenics
- (b) Eugenics
- (c) Euphenics
- (d) Ethnology

Ans. (b)

Eugenics refers to improvement of human race by modifying fertility or employing the hereditary principles.

TOPIC 2

Binomial Nomenclature

- 14** Select the correctly written scientific name of Mango which was first described by Carolus Linnaeus. **[NEET (National) 2019]**
- (a) *Mangifera indica* Linn
 (b) *Mangifera indica*
 (c) *Mangifera Indica*
 (d) *Mangifera indica* Car. Linn.

Ans. (a)

The correct form of writing the scientific name of mango as described by Carolus Linnaeus is *Mangifera indica* Linn.

As per binomial nomenclature rules, the name of an organism contains a generic and specific name. The former begins with capital letter while the later begins

with small letter. The name of taxonomist is written in Roman script and it is written in abbreviated form.

- 15** Which of the following is against the rules of ICBN? **[NEET (Odisha) 2019]**
- (a) Handwritten scientific names should be underlined
 (b) Every species should have a generic name and a specific epithet
 (c) Scientific names are in Latin and should be italicised
 (d) Generic and specific names should be written starting with small letters

Ans. (d)

Statement (d) is against the rules of ICBN because the universal rule of nomenclature is that the first word denoting the genus starts with a

capital letter while the specific epithet starts with a small letter. It can be illustrated with the example of *Mangifera indica*.

- 16** Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature? **[NEET 2016, Phase I]**
- (a) The first word in a biological name represents the genus name and the second is a specific epithet
 (b) The names are written in Latin and are italicised
 (c) When written by hand, the names are to be underlined
 (d) Biological names can be written in any language

Ans. (d)

Biological names originate from latin language and are printed in italics.

02

Biological Classification

TOPIC 1

Kingdom-Monera

01 Which of the following statement is correct? [NEET 2021]

- (a) Fusion of two cells is called karyogamy
- (b) Fusion of protoplasm between two motile or non-motile gametes is called plasmogamy
- (c) Organisms that depend on living plants are called saprophytes
- (d) Some of the organisms can fix atmospheric nitrogen in specialised cells called sheath cells

Ans. (b)

Statement in option (b) is correct. Plasmogamy, the fusion of two protoplasts (the contents of the two cells), brings together two compatible haploid nuclei. At this point, two parent cells are present in the same cell, but the nuclei have not yet fused. Incorrect statements can be corrected as Organisms that can fix atmospheric nitrogen in specialised cells are called heterocyst.

Karyogamy is nothing but the fusion of two nuclei means production of diploid cell ($2n$ condition).

Organisms that depends on living plants are called heterotrophs.

02 The size of Pleuropneumonia Like Organism (PPLLO) is [NEET (Oct.) 2020]

- (a) $0.02\ \mu\text{m}$
- (b) $1-2\ \mu\text{m}$
- (c) $10-20\ \mu\text{m}$
- (d) $0.1\ \mu\text{m}$

Ans. (d)

The size of various organisms/cells are
Pleuropneumonia Like Organism (PPLLO)- $0.1\ \mu\text{m}$
Viruses- $0.02-0.2\ \mu\text{m}$
Bacterial cell- $1-2\ \mu\text{m}$
Eukaryotic cell- $10-20\ \mu\text{m}$

03 Which of the following is incorrect about cyanobacteria? [NEET (Oct.) 2020]

- (a) They are photoautotrophs
- (b) They lack heterocysts
- (c) They often form blooms in polluted water bodies
- (d) They have chlorophyll-*a* similar to green plants

Ans. (b)

Cyanobacteria or blue-green algae are photosynthetic organisms which perform oxygenic photosynthesis. They have the ability of nitrogen fixation due to the presence of large pale cells called heterocyst in their filaments. Due to the presence of thick walls, heterocysts are impermeable to oxygen.

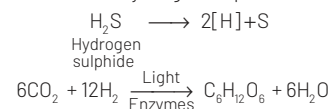
04 Oxygen is **not** produced during photosynthesis by [NEET 2018]

- (a) *Cycas*
- (b) *Nostoc*
- (c) Green sulphur bacteria
- (d) *Chara*

Ans. (c)

Green sulphur bacteria are anaerobic bacteria. They do not evolve oxygen during photosynthesis. Such type of photosynthesis is known as anoxygenic photosynthesis.

They do not use water as a source of reducing power. Instead, hydrogen is obtained from hydrogen sulphide.



Concept Enhancer Green sulphur bacteria, e.g. *Chlorobium limicola*, possesses bacteriopheophytin as photosynthetic pigment.

Cycas is a gymnosperm, *Nostoc* is a blue-green algae and *Chara* is a green algae. All of these produce oxygen during photosynthesis.

05 Which of the following organisms are known as chief producers in the oceans? [NEET 2018]

- (a) Cyanobacteria
- (b) Diatoms
- (c) Dinoflagellates
- (d) Euglenoids

Ans. (b)

Diatoms are chief producers in the oceans and they contribute 40% of marine primary productivity. They constitute a major group of unicellular eukaryotic microalgae and are among the most common types of phytoplanktons.

The other given organisms also exhibit autotrophic mode of nutrition.

06 Which of the following are found in extreme saline conditions? [NEET 2017]

- (a) Archaeobacteria
- (b) Eubacteria
- (c) Cyanobacteria
- (d) Mycobacteria

Ans. (a)

Archaeobacteria are the most primitive form of bacteria. These live in diverse habitat, e.g. extreme hot temperature, saline condition, variable pH, etc. Saline bacteria are called Halophiles (e.g. *Halobacterium*, *Halococcus*).

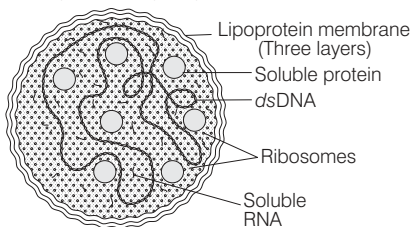
Concept Enhancer The ability of archaeobacteria to survive in such conditions is due to the presence of branched lipid chain in their membrane, which reduces the fluidity of their membrane.

07 Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? [NEET 2017]

- (a) *Bacillus*
- (b) *Pseudomonas*
- (c) *Mycoplasma*
- (d) *Nostoc*

Ans. (c)

Mycoplasma is triple layered smallest living cells. It does not have definite cell wall. It is an anaerobic organism. It cause diseases in plants (little leaf of brinjal) as well as in animals (pleuropneumonia in man).



08 The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the [NEET 2016 Phase I]

- (a) thermoacidophiles
- (b) methanogens
- (c) eubacteria
- (d) halophiles

Ans. (b)

Methanogens are group of obligate anaerobic ancient and primitive bacteria. They are involved in methanogenesis and produce methane gas in ruminant of cattles.

09 Which one of the following statements is wrong? [NEET 2016 Phase I]

- (a) Golden algae are also called desmids
- (b) Eubacteria are also called false bacteria
- (c) *Phycomycetes* are also called algal fungi
- (d) Cyanobacteria are also called blue-green algae

Ans. (b)

Eubacteria are true bacteria which exhibit all true characteristic features of group Eubacteria.

10 Methanogens belong to [NEET 2016 Phase II]

- (a) eubacteria
- (b) archaeobacteria
- (c) dinoflagellates
- (d) slime moulds

Ans. (b)

Methanogens belong to archaeobacteria. It contains three major classes of primitive bacteria, i.e. methanogens, halophilic and thermoacidophilic.

Methanogens are strict anaerobes, present in the gut of several ruminant animals (e.g. cows, etc.) and are responsible for production of methane gas from the dung of these animals.

Concept Enhancer Halophilic bacteria usually occur in salt rich substrate like salt marshes, etc. and are aerobic chemoheterotrophs. Thermophilic bacteria have the dual ability to tolerate high temperature as well as high acidity. These are basically chemosynthetic.

11 Chromatophores take part in [CBSE AIPMT 2015]

- (a) photosynthesis
- (b) growth
- (c) movement
- (d) respiration

Ans. (a)

Chromatophores are found in members of phototrophic bacteria. They contain bacteriochlorophyll pigments and carotenoids and take part in photosynthesis. In purple bacteria, such as *Rhodospirillum rubrum*, the light-harvesting proteins are intrinsic to the chromatophore membranes. However, in green sulphur bacteria, they are arranged in specialised antenna complexes called chlorosomes.

12 Archaeobacteria differ from eubacteria in [CBSE AIPMT 2014]

- (a) cell membrane structure
- (b) mode of nutrition
- (c) cell shape
- (d) mode of reproduction

Ans. (a)

Archaeobacteria different from eubacteria in that eubacteria have cell membrane composed mainly of glycerol-ester lipids, while archaeobacteria have membrane made up of glycerol-ether lipid.

Ether lipids are chemically more resistant than ester lipids. This stability helps archaeobacteria to survive at high temperature and in very acidic or alkaline environment.

13 Besides paddy fields, cyanobacteria are also found inside vegetative part of [NEET 2013]

- (a) *Pinus*
- (b) *Cycas*
- (c) *Equisetum*
- (d) *Psilotum*

Ans. (b)

Cyanobacteria within the coralloid roots of *Cycas* are chemoheterotrophic and specifically adapted to life in symbiosis. Only a few species of cyanobacteria form associations with *Cycas*. *Pinus* is a gymnosperm. *Equisetum* belongs to vascular plants and to horse tail family. *Psilotum* belongs to division-Pteridophyta and is a fern-like plant.

14 Pigment-containing membranous extensions in some cyanobacteria are [CBSE AIPMT 2012]

- (a) heterocysts
- (b) basal bodies
- (c) pneumatophores
- (d) chromatophores

Ans. (d)

Cyanobacteria contain chlorophyll but the chlorophyll is not located in chloroplasts, rather it is found in chromatophores which are infolding of the plasma membrane, where photosynthesis is carried out. Heterocysts are specialised nitrogen fixing cells formed by some filamentous cyanobacteria such as *Nostoc*. A basal body is an organelle formed from a centriole and a short cylindrical array of microtubules.

Pneumatophores are lateral roots that grow upward for varying distance and function as the site of oxygen intake for the submerged primary roots of mangrove plants.

- 15** Which of the following are likely to be present in deep sea water? [CBSE AIPMT 2012]

(a) Archaeobacteria
(b) Eubacteria
(c) Blue-green algae
(d) Saprophytic fungi

Ans. (a)

Archaeobacteria can flourish in hot springs and deep sea hypothermal vents. Eubacteria are true bacteria, characterised by the presence of rigid cell wall and if motile a flagellum. Most fungi are heterotrophic and absorb soluble organic matter from dead substrates and hence, are called saprophyte. The cyanobacteria have chlorophyll-*a* similar to green plants and are photosynthetic autotrophs.

- 16** The cyanobacteria are also referred to as [CBSE AIPMT 2012]

(a) protists
(b) golden algae
(c) slime moulds
(d) blue-green algae

Ans. (d)

Cyanobacteria, also known as blue-green algae (BGA) are most primitive prokaryotic organisms. These are considered to be the most ancient of all the chlorophyll bearing organisms on earth.

- 17** Nuclear membrane is absent in [CBSE AIPMT 2012]

(a) *Penicillium* (b) *Agaricus*
(c) *Volvox* (d) *Nostoc*

Ans. (d)

Nostoc is a prokaryote. Prokaryotic cells lack membrane bound organelles and well organised nucleus, i.e. nuclear envelope is absent.

Penicillium, *Agaricus* and *Volvox* are eukaryotic.

- 18** In eubacteria, a cellular component that resembles eukaryotic cells is [CBSE AIPMT 2011]

(a) nucleus
(b) ribosomes
(c) cell wall
(d) plasma membrane

Ans. (d)

The plasma membrane of eubacteria resembles to that of eukaryotic cell. It is made of phospholipid, protein and some amount of polysaccharides. However, it lacks sterol, the characteristic of eukaryotic cell membrane. Instead, there is sterol like compounds called hopanoid.

- 19** Organisms called methanogens are most abundant in a [CBSE AIPMT 2011]

(a) cattle yard (b) polluted stream
(c) hot spring (d) sulphur rock

Ans. (a)

Methanogens are present in the gut of several ruminants animals such as cows and buffaloes and they are responsible for the production of methane (biogas) from the dung of these animals. Thus, they are most abundant in a cattle yard.

- 20** A prokaryotic autotrophic nitrogen fixing symbiont is found in [CBSE AIPMT 2011]

(a) *Cycas* (b) *Cicer* (c) *Pisum* (d) *Alnus*

Ans. (a)

The coralloid root of *Cycas* is symbiotically associated with nitrogen fixing blue-green algae, *Anabaena cycadae* and *Nostoc punctiforme*. These blue green-algae (cyanobacteria) are prokaryotic, photosynthetic and autotrophic.

- 21** Maximum nutritional diversity is found in the group [CBSE AIPMT 2010]

(a) Fungi (b) Animalia
(c) Monera (d) Plantae

Ans. (c)

Maximum nutritional diversity is shown by the members of kingdom-Monera. Some of them are autotrophic (e.g. photosynthetic autotrophic or chemosynthetic autotrophic) while the vast majority are heterotrophs (e.g. saprotrophic or parasitic). Ecologically, these may be producers or decomposers.

- 22** Some hyperthermophilic organisms that grow in highly acidic habitats belong to the two groups called [CBSE AIPMT 2010]

(a) eubacteria and archaea
(b) cyanobacteria and diatoms

(c) protists and mosses
(d) liverworts and yeasts

Ans. (a)

Thermophiles live in very hot places, with temperature ranging from 60°-80°C. Many thermophiles (some eubacteria and archaeobacteria) are autotrophs and have metabolisms based on sulphur.

Some thermophilic archaeobacteria form the basis of food webs around deep-sea thermal vents, where they must withstand extreme temperature and pressures. Archaeobacteria can grow in highly acidic (pH = 0.7) and very basic (pH = 11) environments.

- 23** *Thermococcus*, *Methanococcus* and *Methanobacterium* exemplify [CBSE AIPMT 2008]

(a) archaeobacteria that contain protein homologous to eukaryotic core histones
(b) archaeobacteria that lack any histones resembling those found in eukaryotes but whose DNA is negatively supercoiled
(c) bacteria whose DNA is relaxed or positively supercoiled but which have a cytoskeleton as well as mitochondria
(d) bacteria that contain a cytoskeleton and ribosomes

Ans. (a)

Inspection of domain Archaea shows that two sub-divisions exist, the Euryarchaeota and the Crenarchaeota. The Euryarchaeota includes *Methanobacterium*, *Methanococcus*, *Thermococcus*.

- 24** Bacterial leaf blight of rice is caused by a species of [CBSE AIPMT 2008]

(a) *Xanthomonas*
(b) *Pseudomonas*
(c) *Alternaria*
(d) *Erwinia*

Ans. (a)

Disease	Causing Organism
Leaf blight of rice	— <i>Xanthomonas oryzae</i>
Red strip of suga	— <i>Pseudomonas cane rubrilineans</i>
Fire blight of apple	— <i>Erwinia amylovora</i>
Early blight of potato	— <i>Alternaria solani</i>

25 Which one of the following statements about *Mycoplasma* is wrong? [CBSE AIPMT 2007]

- (a) They are also called PPL0
- (b) They are pleomorphic
- (c) They are sensitive to penicillin
- (d) They cause disease in plants

Ans. (c)

Penicillin acts on cell wall and *Mycoplasma* lacks cell wall. Thus *Mycoplasma* is not sensitive to penicillin. *Mycoplasma* are inhibited by metabolic inhibitors like chloramphenicol and tetracyclin.

26 Barophilic prokaryotes [CBSE AIPMT 2005]

- (a) grow slowly in highly alkaline frozen lakes at high altitudes
- (b) occur in water containing high concentrations of barium hydroxide
- (c) grow and multiply in very deep marine sediments
- (d) readily grown and divides in sea water enriched in any soluble salt of barium

Ans. (c)

Barophilic prokaryotes grow and multiply in very deep marine sediments.

27 A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is

[CBSE AIPMT 2004]

- (a) *Tolypothrix*
- (b) *Chlorella*
- (c) *Nostoc*
- (d) *Anabaena*

Ans. (d)

Anabaena is a free living nitrogen fixing cyanobacterium which can form symbiotic association with water fern *Azolla*.

28 Chromosomes in a bacterial cell can be 1-3 in number and [CBSE AIPMT 2003]

- (a) can be circular as well as linear within the same cell
- (b) are always circular
- (c) are always linear
- (d) can be either circular or linear, but never both within the same cell

Ans. (b)

Bacterial chromosomes are circular DNA molecules.

29 Organisms which obtain energy by the oxidation of reduced inorganic compounds are called [CBSE AIPMT 2002]

- (a) homoautotrophs
- (b) chemoautotrophs
- (c) saprozoic
- (d) coproheterotrophs

Ans. (b)

The organisms obtaining energy by chemical reactions independent of light are called chemotrophs. The reductants obtained from the environment may be inorganic (in case of chemoautotrophs) or organic (in case of chemoheterotrophs).

Photoautotrophs organisms that make their own food by photosynthesis, using the light energy.

Saprozoic organisms obtain food from dead and decaying matter.

30 In bacteria, plasmid is [CBSE AIPMT 2002]

- (a) extra-chromosomal material
- (b) main DNA
- (c) non-functional DNA
- (d) repetitive gene

Ans. (a)

Plasmid is an extrachromosomal material capable of replicating independently from the main chromosome. Plasmids usually possess antibiotic resistance genes.

31 What is true for archaebacteria? [CBSE AIPMT 2001]

- (a) All halophiles
- (b) All photosynthetic
- (c) All fossils
- (d) Oldest living beings

Ans. (d)

The archaebacteria are able to flourish in extreme conditions of environment that are believed to have existed on the primitive earth. It is believed that these represent the early forms of life. Hence, archaebacteria are called "oldest living beings".

32 What is true for cyanobacteria? [CBSE AIPMT 2001]

- (a) Oxygenic with nitrogenase
- (b) Oxygenic without nitrogenase
- (c) Non-oxygenic with nitrogenase
- (d) Non-oxygenic without nitrogenase

Ans. (a)

Cyanobacteria (Gk. *Kyanos* = dark blue; *bakterion* = a staff) also known as blue-green algae. It is a very important group of photosynthetic bacteria in the history of life on earth.

The cyanobacteria fix atmospheric nitrogen through the help of enzyme nitrogenase and also show oxygenic photosynthesis.

33 What is true for photolithotrophs? [CBSE AIPMT 2001]

- (a) Obtain energy from radiations and hydrogen from organic compounds
- (b) Obtain energy from radiations and hydrogen from inorganic compounds
- (c) Obtain energy from organic compounds
- (d) Obtain energy from inorganic compounds

Ans. (b)

Photolithotrophs used light as energy and inorganic electron donor (like H_2 , H_2S) as hydrogen source. Purple and green sulphur bacteria are examples of photolithotrophs.

34 Photosynthetic bacteria have pigments in [CBSE AIPMT 1999]

- (a) leucoplasts
- (b) chloroplasts
- (c) chromatoplasts
- (d) chromatophores

Ans. (d)

In photosynthetic bacteria, small particles of 60 μm diameter, called chromatophores, are present. These are attached to the inner surface of the cell membrane, have no limiting membrane and possess bacteriochlorophyll.

Chloroplast, leucoplast and chromoplasts are plastids present in eukaryotic cells.

- (a) **Chromoplasts** Coloured plastids except green, give different type of colour appearance to different parts of the plant.
- (b) **Chloroplasts** Green plastids take part in the process of photosynthesis.
- (c) **Leucoplasts** Colourless plastids, mainly function as store house of various types of food.

- 35** A few organisms are known to grow and multiply at temperatures of 100–105°C. They belong to
[CBSE AIPMT 1998]

(a) marine archaeobacteria
(b) thermophilic sulphur bacteria
(c) hot-spring blue-green algae (cyanobacteria)
(d) thermophilic, subaerial fungi

Ans. (a)

The cell membrane of archaeobacteria is consists of branched chain lipids, long chain branched alcohols, phytanals, ether linked to glycerol. This helps them to withstand extreme conditions and temperature.

- 36** The hereditary material present in the bacterium *Escherichia coli* is
[CBSE AIPMT 1997, 98]

(a) single stranded DNA
(b) deoxyribose sugar
(c) double stranded DNA
(d) single stranded RNA

Ans. (c)

Bacterial chromosome is single circular, double-stranded DNA molecule.

- 37** Bacterium divides every 35 minutes. If a culture containing 10^5 cells per mL is grown for 175 minutes, what will be the cell concentration per mL after 175 minutes?
[CBSE AIPMT 1998]

(a) 5×10^5 cells (b) 35×10^5 cells
(c) 32×10^5 cells (d) 175×10^5 cells

Ans. (c)

$$1 \times 10^5 \xrightarrow{35 \text{ min}} 2 \times 10^5 \xrightarrow{70 \text{ min}} 4 \times 10^5 \\ \xrightarrow{105 \text{ min}} 8 \times 10^5 \xrightarrow{140 \text{ min}} 16 \times 10^5 \\ \xrightarrow{175 \text{ min}} 32 \times 10^5$$

- 38** The site of respiration in bacteria is
[CBSE AIPMT 1997]

(a) episome
(b) mesosome
(c) ribosome
(d) micrososome

Ans. (b)

The cytoplasmic membrane of bacteria is invaginated at certain places into the cytoplasm in the form of tubules, which are called mesosomes; on their surface are found enzymes associated with respiration.

Mesosome works as mitochondria in bacterial cell.

- 39** In bacterial chromosomes, the nucleic acid polymers are
[CBSE AIPMT 1996]

(a) linear DNA molecule
(b) circular DNA molecule
(c) of two types – DNA and RNA
(d) linear RNA molecule

Ans. (b)

Nucleoid or chromatin body or genophore in bacteria occupies 10–20% of cell, is present near the centre of cell. It consists of a single, circular DNA molecule in which all the genes are linked. It is over a thousand times longer than the cell itself and is, therefore, highly folded. It lacks the histone proteins.

- 40** Sex factor in bacteria is
[CBSE AIPMT 1996]

(a) chromosomal replicon
(b) F-replicon
(c) RNA
(d) sex-pilus

Ans. (b)

Bacterial strains such as of *E. coli* show sexual differences. Each male cell possesses a sex factor or fertility factor called F-factor. Infact, it is a small circular piece of DNA, self-replicating like bacterial chromosome but only 1/100 in size. The F-factor codes for the protein of a special type of pilus, the sex pilus which enables cell to cell contact and transfer of genetic material through a conjugation tube.

- 41** The plasmid [CBSE AIPMT 1995]

(a) helps in respiration
(b) genes found inside nucleus
(c) is a component of cell wall of bacteria
(d) is the genetic part in addition to DNA in microorganisms

Ans. (d)

Plasmids are small, self-replicating, extrachromosomal, non-essential genetic elements in bacteria. Each plasmid has a ring of circular, supercoiled, double stranded DNA. They carry genes for replication and for one or more cellular non-essential functions. These are also called minichromosomes or dispensable autonomous elements.

- 42** Temperature tolerance of thermal blue-green algae is due to
[CBSE AIPMT 1994]

(a) cell wall structure
(b) cell organisation
(c) mitochondrial structure
(d) homopolar bonds in their proteins

Ans. (a)

Cyanobacteria provide a good example of the adaptability of life to extremes of environment (high temperature of hot springs and low temperature of polar regions). It is due to their gelatinous sheath, that can withstand long periods of desiccation. The compactness of protein molecules and their bonds in the protoplasm also help the cells to face the extremes.

- 43** *Escherichia coli* is used extensively in biological research as it is
[CBSE AIPMT 1993]

(a) easily cultured (b) easily available
(c) easy to handle
(d) easily multiplied in host

Ans. (a)

Escherichia coli, a commensal bacterium is most studied bacterium and widely used in research because it is easily cultured on minimal medium and has fast rate of multiplication and short generation time.

- 44** Genophore bacterial genome or nucleoid is made of
[CBSE AIPMT 1993]

(a) histones and non-histones
(b) RNA and histones
(c) a single double stranded DNA
(d) a single stranded DNA

Ans. (c)

In bacteria nucleoid or genophore is haploid and consists of single, naked, double stranded, circular ring like highly folded supercoiled DNA with no free ends, no histone proteins.

The nucleoid of *E. coli* has a central core of RNA surrounded by about 50 super coils of DNA which is then associated with some basic proteins but never histones. Some proteins like polyamines rich in alanine are also found associated with DNA.

- 45** Bacteria lack alternation of generation because there is
[CBSE AIPMT 1992, 91]

(a) neither syngamy nor reduction division
(b) distinct chromosomes are absent

- (c) no conjugation
- (d) no exchange of genetic material

Ans. (a)

Bacteria reproduces asexually by transverse binary fission, conidia, budding, cyst and sporulation. No true sexual reproduction (involving formation of gametes, their fusion and meiosis) is known to occur in bacteria.

However, in bacteria the transfer of genetic material from donor to recipient cell to bring genetic recombinations/ variations is reported that occurs not through gametes/sex cells, but by other methods like conjugation, transduction and transformation. It does not result in any multiplication of cells.

46 Which one belongs to the Monera? **[CBSE AIPMT 1990]**

- (a) *Amoeba*
- (b) *Escherichia*
- (c) *Gelidium*
- (d) *Spirogyra*

Ans. (b)

The kingdom-Monera (Gr. *monera* = simple) includes simple, prokaryotic primitive organisms. It includes bacteria, archaeobacteria, Actinomycetes, *Mycoplasma*, spirochaetes, rickettsiae, chlamydiae and cyanobacteria. *Escherichia coli* is the most studied bacterium. *E. coli* is an enteric bacteria, found in entire colon, secretes vitamin-K, B₃, B₆, B₁₂ and folic acid.

TOPIC 2 Kingdom-Protista

47 Ciliates differ from all other protozoans in **[NEET 2018]**

- (a) using pseudopodia for capturing prey
- (b) having a contractile vacuole for removing excess water
- (c) using flagella for locomotion
- (d) having two types of nuclei

Ans. (d)

Ciliates differ from all other protozoans in having two types of nuclei.

These two nuclei are usually of different size, i.e. one is meganucleus and the other is micronucleus. The former controls metabolism whereas the latter is concerned with reproductions, e.g. *paramecium*.

In other protozoans, like *Amoeba*, single nucleus is present which is involved in metabolism and reproduction.

Other options are incorrect because Ciliates use filtre feeding mechanism for obtaining food.

Like other protozoans, they also possess contractile vacuoles.

Ciliates use cilia for locomotion.

48 Chrysophytes, euglenoids, dinoflagellates and slime moulds are included in the kingdom **[NEET 2016, Phase I]**

- (a) Protista
- (b) Fungi
- (c) Animalia
- (d) Monera

Ans. (a)

All single celled eukaryotic organisms like chrysophytes [diatoms and desmids], euglenoids [*Euglena*], dinoflagellates and slime moulds are included in kingdom-Protista.

49 Select the wrong statement. **[NEET 2016, Phase II]**

- (a) The walls of diatoms are easily destructible
- (b) 'Diatomaceous earth' is formed by the cell walls of diatoms
- (c) Diatoms are chief producers in the oceans
- (d) Diatoms are microscopic and float passively in water

Ans. (a)

Diatoms are single celled plant like protists that produce intricately structured cell walls made of nano(-) silica (SiO₂). Thus, the walls are indestructible. Hence, only option (a) is wrong and rest of the options are correct.

50 Pick up the wrong statement. **[CBSE AIPMT 2015]**

- (a) Cell wall is absent in Animalia
- (b) Protista have photosynthetic and heterotrophic modes of nutrition
- (c) Some fungi are edible
- (d) Nuclear membrane is present in Monera

Ans. (d)

In Protista kingdom members exhibit both autotrophic as well as heterotrophic nutrition. Animal cells lack cell wall and there are a few fungi that are edible. Monera is the kingdom that contains unicellular organisms with a prokaryotic cell organisation, i.e. which lacks nuclear membrane and other membrane bound organelles.

51 In which group of organisms the cell walls form two thin overlapping shells which fit together? **[CBSE AIPMT 2015]**

- (a) Chrysophytes
- (b) Euglenoids
- (c) Dinoflagellates
- (d) Slime moulds

Ans. (a)

Chrysophytes are placed under the kingdom- Protista. This group includes diatoms and golden algae (desmids). Most of them are photosynthetic. In diatoms, the cell walls form two thin overlapping cells, which fit together as in a soap box.

52 What is common about *Trypanosoma*, *Noctiluca*, *Monocystis* and *Giardia*? **[CBSE AIPMT 2006]**

- (a) These are all unicellular protists
- (b) They have flagella
- (c) They produce spores
- (d) These are all parasites

Ans. (a)

Trypanosoma, *Noctiluca*, *Monocystis* and *Giardia* are all unicellular protists. *Trypanosoma gambiense* is the single celled, parasitic zooflagellate causing **trypanosomiasis** or **sleeping sickness**. *Giardia* or the 'Grand old man of the intestine' is a parasitic flagellate occurring in the intestine of man and other animals and causes giardiasis or diarrhoea (i.e. very loose and frequent stool containing large quantity of fat). *Noctiluca* is a marine, colourless dinoflagellate. It is a voracious predator and has a long, motile tentacle, near the base of which, its single short flagellum emerges.

Monocystis is a microscopic, unicellular endoparasitic protozoan found in the coelom and seminal vesicles of earthworm. As it is an endoparasite, it does not possess any special structure for locomotion.

53 Auxospores and hormocysts are formed respectively by **[CBSE AIPMT 2005]**

- (a) several diatoms and a few cyanobacteria
- (b) several cyanobacteria and several diatoms
- (c) some diatoms and several cyanobacteria
- (d) some cyanobacteria and many diatoms

Ans. (a)

Auxospores and hormocysts are formed by several diatoms and a few cyanobacteria respectively. Bacillariophyceae members (diatoms) are microscopic, eukaryotic, unicellular or colonial coccoid algae. These algae are sexually reproduced by the formation of auxospores in most cases.

Bozi (1914) and **Fermi** (1930) reported that short sections of living cells at the tips of the trichomes of *Wertiella lanosa* become invested by a thick, lamellated, pigmented sheath. Such multicellular spore like structures function as perennating bodies. They are specially modified hormogones and are called hormospores or hormocysts.

- 54** Which of the following unicellular organism has a macro-nucleus for trophic function and one or more micro-nuclei for reproduction?

[CBSE AIPMT 2005]

- (a) *Euglena* (b) *Amoeba*
(c) *Paramecium* (d) *Trypanosoma*

Ans. (c)

Paramecium is a heterokaryotic organism, i.e. it has two nuclei near the cytostome (oral-shaped opening called mouth). The macronucleus, which is a conspicuous larger ellipsoidal vegetative nucleus, divides amitotically and controls the vegetative characters and micronucleus is a small compact reproductive nucleus which divides mitotically and controls the reproduction.

- 55** When a freshwater protozoan possessing a contractile vacuole is placed in a glass containing marine water, the vacuole will

[CBSE AIPMT 2004]

- (a) increase in number
(b) disappear
(c) increase in size
(d) decrease in size

Ans. (b)

Fresh water protozoans live in hypotonic environment so, for regulation of excess of water which comes in the protoplasm through the process of endosmosis, contractile vacuoles have developed. When these protozoans are placed in marine water, i.e. hypertonic water, the contractile vacuoles become disappear because the process of endosmosis does not occur and thus, water does not come in the protoplasm.

- 56** The chief advantage of encystment to an *Amoeba* is

[CBSE AIPMT 2003]

- (a) the chance to get rid of accumulated waste products
(b) the ability to survive during adverse physical conditions
(c) the ability to live for some time without ingesting food
(d) protection from parasites and predators

Ans. (b)

Encystment of *Amoeba* is occurred regularly to tide over unfavourable conditions like drought and extreme temperature, etc. During these conditions, the *Amoeba* forms a covering or cyst wall around itself. Thus, it is an adaptation to sunrise during adverse conditions (extranuclear inheritance adverse condition).

- 57** In which animal, dimorphic nucleus is found?

[CBSE AIPMT 2002]

- (a) *Amoeba*
(b) *Trypanosoma gambiense*
(c) *Plasmodium vivax*
(d) *Paramecium caudatum*

Ans. (d)

Paramecium is heterokaryotic, it possesses a dimorphic nuclear apparatus (a single large macronucleus which controls metabolism and one or more small micronuclei concerned with reproduction).

- 58** Extranuclear inheritance occurs in

[CBSE AIPMT 2001]

- (a) killer strain in *Paramecium*
(b) colour blindness
(c) phenylketonuria
(d) Tay Sachs disease

Ans. (a)

Paramecium exhibits cytoplasmic inheritance due to the presence of Kappa particles (self replicating bodies that produce toxin called paramycin). Besides binary fission and conjugation other reproductive processes that occurs in *Paramecium* are autogamy, endomixis and cytogamy.

Tay Sachs disease It is a rare autosomal recessive genetic disorder.

Colour blindness It is X-chromosome related disease. So, it is a sex-linked disease.

PKU autosomal recessive genetic disorder characterised by homozygous or compound heterozygous mutation in the gene.

- 59** Which of the following organisms possesses characteristics of both a plant and an animal?

[CBSE AIPMT 1995]

- (a) Bacteria (b) *Mycoplasma*
(c) *Euglena* (d) *Paramecium*

Ans. (c)

Euglena is a connecting link between animals and plants. *Euglena* contains chlorophyll, yet it resembles animals, because it feeds like animals in the absence of sunlight. It resembles the ancestral form from which the plants and animals evolved.

- 60** Macro and micronucleus are the characteristic feature of

[CBSE AIPMT 1995, 2002, 05]

- (a) *Paramecium* and *Vorticella*
(b) *Opelina* and *Nicthothirus*
(c) *Hydra* and *Ballantidium*
(d) *Vorticella* and *Nicthothirus*

Ans. (a)

Paramecium and *Vorticella* have dimorphic nuclei (heterokaryotic). **Micronucleus** that is inactive except during cell division and houses the master copy of the genome.

Macronucleus controls daily synthetic activities or on going metabolic functions of the cell and asexual reproduction. Macronucleus contains multiple copies of DNA.

- 61** When a freshwater protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will

[CBSE AIPMT 2004]

- (a) increase in number
(b) disappear
(c) increase in size
(d) decrease in size

Ans. (b)

Freshwater protozoans live in hypotonic solution so, for regulation of excess of water which comes in the protoplasm through the process of endosmosis, contractile vacuoles have developed.

When these protozoans are placed in marine water, i.e. hypertonic water, the contractile vacuoles disappear because the process of endosmosis does not happen and thus, water does not come in the protoplasm.

62 In Protozoa like *Amoeba* and *Paramecium*, an organelle is found for osmoregulation which is
[CBSE AIPMT 2002]

- (a) contractile vacuole
- (b) mitochondria
- (c) nucleus
- (d) food vacuole

Ans. (a)

Unicellular organisms such as *Amoeba*, *Paramecium* have some organelles called contractile vacuole for excretion. These are freshwater animals, i.e. they live in hypotonic solution. Therefore, water flows from outside to inside of the body of the organism.

The contractile vacuoles in these organisms collect this excess water and gradually increase in size. When the vacuoles reach a critical size they contract, squeezing out their contents through the process of simple diffusion.

63 Excretion in *Amoeba* occurs through
[CBSE AIPMT 1995]

- (a) lobopodia
- (b) uroid portion
- (c) plasma membrane
- (d) contractile vacuole

Ans. (d)

Endoplasm of *Amoeba* in the posterior part contains a single clear rounded and pulsating contractile vacuole. Contractile vacuole is analogous to uriniferous tubules of frog, it functions in excretion and osmoregulation.

64 Protistan genome has
[CBSE AIPMT 1994]

- (a) membrane bound nucleoproteins embedded in cytoplasm
- (b) free nucleic acid aggregates
- (c) gene containing nucleoproteins condensed together in loose mass
- (d) nucleoprotein in direct contact with cell substance

Ans. (a)

Eukaryotic (e.g. protistan) genome is organised in the form of nucleus. It is differentiated into nuclear envelope, chromatin, one or more nucleoli and nucleoplasm. Nuclear DNA is linear, associated with histone proteins. A small quantity of DNA is also found in the plastids and mitochondria. In contrast, prokaryotic (bacterial) DNA is circular and lies freely in the cytoplasm.

65 *Entamoeba coli* causes
[CBSE AIPMT 1994]

- (a) pyorrhoea
- (b) diarrhoea
- (c) dysentery
- (d) None of these

Ans. (d)

Entamoeba coli is the common parasitic genera of phylum—Protozoa. It harbours the upper part of large intestine (colon) and very often in the liver, brain and testes and causes constipation.

66 Protists obtain food as
[CBSE AIPMT 1994]

- (a) photosynthesisers, symbionts and holotrophs
- (b) photosynthesisers
- (c) chemosynthesisers
- (d) holotrophs

Ans. (a)

Protistans have variable modes of nutrition. They are photosynthetic heterotrophic, i.e. saprophytic, parasitic and ingestive.

67 African sleeping sickness is due to
[CBSE AIPMT 1991]

- (a) *Plasmodium vivax* transmitted by tse-tse fly
- (b) *Trypanosoma lewisi* transmitted by bed bug
- (c) *Trypanosoma gambiense* transmitted by *Glossina palpalis*
- (d) *Entamoeba gingivalis* spread by house fly

Ans. (c)

The disease African sleeping sickness is caused by *Trypanosoma gambiense* and this is transmitted by tse-tse fly (*Glossina palpalis*).

68 In *Amoeba* and *Paramecium* osmoregulation occurs through
[CBSE AIPMT 1991, 95, 2002]

- (a) pseudopodia
- (b) nucleus
- (c) contractile vacuole
- (d) general surface

Ans. (c)

Amoeba and *Paramecium* contains two contractile vacuoles (anterior and posterior, the latter being faster) for osmoregulation, i.e. maintaining water balance in the body.

69 Genetic information in *Paramecium* is contained in
[CBSE AIPMT 1990]

- (a) micronucleus
- (b) macronucleus
- (c) Both (a) and (b)
- (d) mitochondria

Ans. (a)

Ciliates (*Paramecium*) show nuclear dimorphism, large macronucleus controls metabolic activities and growth. It is called vegetative nucleus. Micronucleus contains genetic information and thus, takes part in reproduction.

70 *Plasmodium*, the malarial parasite, belongs to class
[CBSE AIPMT 1990]

- (a) Sarcodina
- (b) Ciliata
- (c) Sporozoa
- (d) Dinophyceae

Ans. (c)

Plasmodium, the malarial parasite belongs to class—**Sporozoa**. Sporozoans are intracellular parasites, reproduce by multiple fission and life cycle may include the two different hosts.

71 What is true about *Trypanosoma*?
[CBSE AIPMT 1990]

- (a) Polymorphic
- (b) Monogenetic
- (c) Facultative parasite
- (d) Non-pathogenic

Ans. (a)

Trypanosoma is an obligate parasite, it is digenetic polymorphic (*Trypanosoma* is adult form in human, whereas, crithidal and leptomonas are developmental forms in tse-tse fly).

72 *Trypanosoma* belongs to class
[CBSE AIPMT 1989]

- (a) Sarcodina
- (b) Zooflagellata
- (c) Ciliata
- (d) Sporozoa

Ans. (b)

Zooflagellates are protozoan parasites which possess one to several flagella for locomotion. They are generally uninucleate (occasionally multinucleate), body is covered by a firm pellicle, e.g. *Trypanosoma*, *Leishmania*, *Trichomonas*, etc.

TOPIC 3

Kingdom–Fungi

73 Select the **wrong** statement. [NEET 2018]

- (a) Pseudopodia are locomotory and feeding structures in sporozoans
- (b) Mushrooms belong to Basidiomycetes
- (c) Cell wall is present in members of Fungi and Plantae
- (d) Mitochondria are the powerhouse of the cell in all kingdoms except Monera

Ans. (a)

Sporozoans are endoparasites. They lack locomotory organelles like cilia, flagella, pseudopodia, etc., e.g. *Plasmodium*. Pseudopodia are found in amoeboid protozoans, e.g., *Amoeba*, *Entamoeba*, etc. Therefore, statement (a) is wrong while rest of the statements are correct.

74 Which of the following would appear as the pioneer organisms on bare rocks? [NEET 2016, Phase I]

- (a) Liverworts (b) Mosses
- (c) Green algae (d) Lichens

Ans. (d)

In primary succession on rocks, lichens secrete acids to dissolve rock, helps in weathering and soil formation. So, lichens are pioneer species to colonise the bare rock.

75 One of the major components of cell wall of most fungi is [NEET 2016, Phase I]

- (a) peptidoglycan (b) cellulose
- (c) hemicellulose (d) chitin

Ans. (d)

Cell wall of most fungi is made up of chitin. Chemically it is N-acetyl glucosamine. It is also found in the exoskeleton of insects.

76 Which one of the following is wrong for fungi? [NEET 2016, Phase II]

- (a) They are eukaryotic
- (b) All fungi possess a purely cellulosic cell wall
- (c) They are heterotrophic
- (d) They are both unicellular and multicellular

Ans. (b)

In fungi, cell wall contains chitin or cellulose along with other polysaccharides, proteins and lipids. Only in some fungi, e.g. *Phytophthora* or other oomycetes a purely cellulosic cell wall is present. Hence, only option (b) is wrong, rest of the options are correct.

Concept Enhancer Chitin is chemically N-acetyl glucosamine. The exoskeleton of insects also contains this chemical.

77 Choose the wrong statement. [CBSE AIPMT 2015]

- (a) *Penicillium* is multicellular and produces antibiotics
- (b) *Neurospora* is used in the study of biochemical genetics
- (c) Morels and truffles are poisonous mushrooms
- (d) Yeast is unicellular and useful in fermentation

Ans. (c)

All statements are correct, except statement (c), which can be corrected as Morels and truffles are edible and members of Ascomycetes in fungi.

78 The imperfect fungi which are decomposers of litter and help in mineral cycling belong to [CBSE AIPMT 2015]

- (a) Deuteromycetes (b) Basidiomycetes
- (c) Phycomycetes (d) Ascomycetes

Ans. (a)

The imperfect fungi which are decomposers of litter and help in mineral cycling belong to Deuteromycetes. They are fungi which do not fit into the commonly established taxonomic classification of fungi. They include all those fungi in which the perfect stage (sexual stage) is not reported.

79 The highest number of species in the world is represented by [CBSE AIPMT 2012]

- (a) fungi (b) mosses
- (c) algae (d) lichens

Ans. (a)

Fungi represent the highest number of species in the world. Around 100000 species of fungi have been formally described by taxonomists but the global biodiversity of kingdom–Fungi is not fully understood.

80 Which one of the following has haplontic life cycle? [CBSE AIPMT 2009]

- (a) *Funaria*
- (b) *Polytrichum*
- (c) *Ustilago*
- (d) Wheat

Ans. (c)

Ustilago has haplontic life cycle. In their sexual phase, only zygospore is diploid structure. All others are haploid, such a sexual cycle is termed as haploid or haplontic.

81 Which one is the wrong pairing for the disease and its causal organism? [CBSE AIPMT 2009]

- (a) Late blight of potato
– *Alternaria solani*
- (b) Black rust of wheat
– *Puccinia graminis*
- (c) Loose smut of wheat
– *Ustilago nuda*
- (d) Root-knot of vegetables
– *Meloidogyne* sp.

Ans. (a)

The causative agent of late blight of potato is fungus *Phytophthora infestans*, class–Oomycetes, order–Peronosporales, family–Pythiaceae. In India, the late blight of potato is a seed borne disease.

82 *Trichoderma harzianum* has proved a useful microorganism for [CBSE AIPMT 2008]

- (a) bioremediation of contaminated soils
- (b) reclamation of wastelands
- (c) gene transfer in higher plants
- (d) biological control of soil-borne plant pathogens

Ans. (d)

Some common fungal inhabitants of soil help to combat diseases caused by soil borne plant pathogens. These include *Trichoderma harzianum* which are found in damp soils. They have an inhibitory effect on the growth of the mycelium of *Pythium*. They serve to suppress fungi causing damping off disease of the seedlings and thereby influence favourably the growth of crops.

83 Cellulose is the major component of cell walls of [CBSE AIPMT 2008]

- (a) *Pythium* (b) *Xanthomonas*
(c) *Pseudomonas* (d) *Saccharomyces*

Ans. (a)

Cellulose does occur in cell walls of Oomycetes (e.g. *Pythium*) and Hyphochytridiomycetes. Fungal cell wall contains 80–90% carbohydrates, the remainder being proteins and lipids. The typical feature of fungal cell wall is presence of chitin.

84 Which of the following is a slime mold? [CBSE AIPMT 2007]

- (a) *Rhizopus* (b) *Physarum*
(c) *Thiobacillus* (d) *Anabaena*

Ans. (b)

The genus *Physarum* with about 100 species is the largest and best-studied slime mold in the class-Myxomycetes.

85 Ergot of rye is caused by a species of [CBSE AIPMT 2007]

- (a) *Phytophthora* (b) *Ucinula*
(c) *Ustilago* (d) *Claviceps*

Ans. (d)

The fungus *Claviceps purpurea* is responsible for ergot disease of rye which lowers the yield of rye plant.

86 Which pair of the following belongs to Basidiomycetes? [CBSE AIPMT 2007]

- (a) Birds nest fungi and puff balls
(b) Puff balls and *Claviceps*
(c) *Peziza* and stink horns
(d) *Morchella* and mushrooms

Ans. (a)

Birds nest fungi (Nidulariales) and puff ball fungi (Lycoperdales) belongs to Basidiomycetes. The common example of class-Basidiomycetes are smut, rusts, the mushrooms, the toad stools, the puff balls and the pore fungi.

87 The thalloid body of a slime mold (Myxomycetes) is known as [CBSE AIPMT 2006]

- (a) *Plasmodium* (b) fruiting body
(c) mycelium (d) protonema

Ans. (a)

The thalloid body of a slime mould is known as *Plasmodium*. The members of

Myxomycetes are called slime molds because they contain and secrete slime. They are included in lower fungi. Their somatic phase is a multinucleate, diploid holocarpic *Plasmodium* (a product of syngamy).

In *Plasmodium*, propagation occurs through fission or thick walled cysts or sclerotium like structures.

Reproduction takes place by the formation of uninucleate, thick walled resting spores which are produced within minute fruiting bodies like structures, i.e. the sporangia.

Fruiting bodies and mycelium are absent in lower fungi. Protonema is not formed in fungi.

88 Which of the following environmental conditions are essential for optimum growth of *Mucor* on a piece of bread? [CBSE AIPMT 2006]

- (i) Temperature of about 25°C
(ii) Temperature of about 5°C
(iii) Relative humidity of about 5%
(iv) Relative humidity of about 95%
(v) A shady place
(vi) A brightly illuminated place

Choose the answer from the following options

- (a) (i), (iv) and (v) only
(b) (ii), (iv) and (v) only
(c) (ii), (iii) and (vi) only
(d) (i), (iii) and (v) only

Ans. (a)

Mucor shows the best growth on a piece of bread at a temperature of about 25°C, relative humidity of about 95% in a moist and shady place. *Mucor* is a saprophytic fungus belonging to the order-Mucorales and family-Mucoraceae and grows on decaying dung and on some food stuffs.

89 There exists a close association between the alga and the fungus within a lichen. The fungus [CBSE AIPMT 2005]

- (a) provides protection, anchorage and absorption for the alga
(b) provides food for the alga
(c) fixes the atmospheric nitrogen for the alga
(d) release oxygen for the alga

Ans. (a)

Lichen is a symbiotic association between a fungus and an algae. The fungal partner of lichen helps in the absorption of water and mineral to algal partner. It also provides protection and anchorage to algal partner of lichen. In exchange of this, the fungal partner absorbs prepared food material from algal partner. This food material is prepared by the algal partner of lichen through the process of photosynthesis.

90 Lichens are well known combination of an alga and a fungus where fungus has [CBSE AIPMT 2004]

- (a) a saprophytic relationship with the alga
(b) an epiphytic relationship with the alga
(c) a parasitic relationship with the alga
(d) a symbiotic relationship with the alga

Ans. (d)

Lichen is a symbiotic association between a fungus and an alga. The fungal part is called mycobiont while the algal part is called **phycobiont**. The fungi absorb mineral and water to algae and the algae synthesise food by photosynthesis.

91 During the formation of bread it becomes porous due to the release of CO₂ by the action of [CBSE AIPMT 2002]

- (a) yeast (b) bacteria
(c) virus (d) protozoans

Ans. (a)

Strains of *Saccharomyces cerevisiae* are extensively used for leavening of bread. During fermentation, the yeasts produce alcohol and CO₂ which leaves the bread porous.

92 Which fungal disease spreads by seed and flowers? [CBSE AIPMT 2002]

- (a) Loose smut of wheat
(b) Corn stunt
(c) Covered smut of barley
(d) Soft rot of potato

Ans. (a)

Fungal disease, loose smut of wheat spreads by seed and flowers. The causal organism of this disease is *Ustilago* fungus. It is an internal parasite. It has a dikaryotic mycelium which remains within the intercellular spaces of the host tissue.

This fungus infects the ovary of the host flower as a result of which the masses of teliospores or brand spores are formed in place of grains. Teliospores are not surrounded by any wall hence, called loose smut.

93 Plant decomposers are
[CBSE AIPMT 2001]

- (a) Monera and Fungi
- (b) Fungi and Plants
- (c) Protista and Animalia
- (d) Animalia and Monera

Ans. (a)

Decomposers are living components chiefly the bacteria and fungi that breakdown the complex compounds of dead protoplasm of producers and consumers absorb some products and release others.

94 Adhesive pad of fungi penetrates the host with the help of
[CBSE AIPMT 2001]

- (a) mechanical pressure and enzymes
- (b) hooks and suckers
- (c) softening by enzymes
- (d) only by mechanical pressure

Ans. (a)

Cell wall degrading enzymes (cellulolytic, pectolytic) as well as mechanical pressure of adhesive pad (appressorium) help the fungus in penetrating the host.

95 In fungi stored food material is
[CBSE AIPMT 2000]

- (a) glycogen
- (b) starch
- (c) sucrose
- (d) glucose

Ans. (a)

Glycogen, also known as 'animal starch', is the chief storage polysaccharide of animal cells and most of the fungi (though food is also stored as oil globules in some fungi).

Starch is a complex water insoluble polysaccharide carbohydrate chiefly found in green plants as their principal energy (food) source.

Glucose is the most widely distributed hexose sugar. It is an aldohexose reducing sugar. It is found in blood muscles and brain and works as energy fuel.

Sucrose is a non-reducing disaccharide consists of one glucose and one fructose molecules. It is one of the abundant transport sugar in plants.

96 Black rust of wheat is caused by
[CBSE AIPMT 2000]

- (a) *Puccinia*
- (b) *Mucor*
- (c) *Aspergillus*
- (d) *Rhizopus*

Ans. (a)

Black rust of wheat is caused by *Puccinia graminis tritici*. This is the potential cause of enormous economic loss in all wheat growing regions of the world. *Puccinia graminis tritici* usually passes its life cycle on two different hosts, wheat and barberry.

97 Which of the following is the use of lichens in case of pollution?
[CBSE AIPMT 1999]

- (a) Lichens are not related with pollution
- (b) They act as bioindicators of pollution
- (c) They treat the polluted water
- (d) They promote pollution

Ans. (b)

Growth of lichens on trees is inhibited by air pollution. Hence, atmospheric pollution causes decrease in their populations. So, lichens are biological indicators of pollution.

98 Columella is a specialised structure found in the sporangium of
[CBSE AIPMT 1999]

- (a) *Ulothrix*
- (b) *Rhizopus*
- (c) *Spirogyra*
- (d) None of these

Ans. (b)

In *Rhizopus*, the central non-sporiferous region of sporangium is called columella.

99 *Puccinia* forms [CBSE AIPMT 1998]

- (a) uredia and aecia on wheat leaves
- (b) uredia and telia on wheat leaves
- (c) uredia and aecia on barberry leaves
- (d) uredia and pycnia on barberry leaves

Ans. (b)

Puccinia graminis tritici (fungus) causes black rust of wheat. It forms Urediospores (uredia) and teleutospores (telia) on wheat leaves.

100 Most of the lichens consist of
[CBSE AIPMT 1997]

- (a) blue-green algae and Basidiomycetes
- (b) blue-green algae and Ascomycetes
- (c) red algae and Ascomycetes
- (d) brown algae and Phycmycetes

Ans. (b)

Lichens consist of the fungal component mycobiont, mainly Ascomycotina (only a few Basidiomycotina and Deuteromycotina) and the algal component, phycobiont which are mostly blue-green algae (*Nostoc*, *Scytonema*) or green algae (*Trebouxia*, *Trentophila*, etc.)

101 Which one of the following is not true about lichens?
[CBSE AIPMT 1996]

- (a) Their body is composed of both algal and fungal cells
- (b) Some form food for reindeers in Arctic regions
- (c) Some species can be used as pollution indicators
- (d) These grow very fast at the rate of about 2 cm per year

Ans. (d)

Statement (d) is incorrect because lichens show very slow growth. Their size and slow rate of growth suggest that some lichens in the Arctic are 4000 years ago.

102 Which of the following is not correctly matched?
[CBSE AIPMT 1995]

- (a) Root knot disease
– *Meloidogyne javanica*
- (b) Smut of bajra
– *Tolysporium penicillariae*
- (c) Covered smut of barley
– *Ustilago nuda*
- (d) Late blight of potato
– *Phytophthora infestans*

Ans. (c)

Option 'c' is mismatched because the smuts in which sori are covered by the membranous covering or peridium are called covered smuts. These are caused by *Ustilago hordei*, in which the sorus or smut ball is covered by a peridium of host cells. *Ustilago nuda* is responsible for causing loose smut of barley.

103 The chemical compounds produced by the host plants to protect themselves against fungal infection is [CBSE AIPMT 1995]

- (a) phytotoxin (b) pathogen
(c) phytoalexins (d) hormone

Ans. (c)

Phytoalexins are chemical substances produced by plants in response to fungal infection and are toxic to fungi.

104 White rust disease is caused by [CBSE AIPMT 1995]

- (a) *Claviceps*
(b) *Alternaria*
(c) *Phytophthora*
(d) *Albugo candida*

Ans. (d)

Albugo candida (Oomycetes) is an obligate parasite commonly found parasitising a wide range of crucifers. It causes a disease called white rust or blister rust of crucifers resulting in economically significant losses in the yield of turnip, rape and mustard.

105 *Ustilago* caused plant diseases are called smuts because [CBSE AIPMT 1994]

- (a) they parasitise cereals
(b) *Mycelium* is black
(c) they develop sooty masses of spores
(d) affected parts become completely black

Ans. (c)

The genus *Ustilago* (*L. ustus* = burnt) includes the group of fungi producing black, sooty powder mass of spores on the host plant parts imparting them a 'burnt' appearance, hence, the name, the black dusty masses of spores produced by these fungi resemble soot or smut, so these are also known as smut fungi.

106 Mycorrhiza represents [CBSE AIPMT 1994, 96, 2003]

- (a) antagonism (b) endemism
(c) symbiosis (d) parasitism

Ans. (c)

Mycorrhiza (*mykes* = mushroom + *rhiza* = root) represents a symbiotic association of fungi with the roots of higher plant. Mycorrhiza meaning fungus root is an infected root system arising from the rootlets of a seed plant.

In ectomycorrhiza, the ultimate absorbing rootlets of the root system are completely surrounded by a distinct mantle or sheath of fungal tissue. In endomycorrhiza, there is no such sheath. Most of the fungus is within the root and may be intracellular as well as intercellular.

107 Absorptive heterotrophic nutrition is exhibited by [CBSE AIPMT 1990]

- (a) algae (b) fungi
(c) bryophytes (d) pteridophytes

Ans. (b)

Fungi are heterotrophic, e.g. these require an organic source of carbon, also require some source of nitrogen, inorganic ions (K^+ , Mg^{2+}), trace elements (Fe, Zn, Cu) and growth factors like vitamins. Fungi may act as saprobes and parasites. They obtain nutrition from host by means of special structures called haustoria and exhibit absorptive or holophytic type of nutrition.

108 Lichens indicate SO_2 pollution because they [CBSE AIPMT 1989, 92]

- (a) show association between algae and fungi
(b) grow faster than others
(c) are sensitive to SO_2
(d) flourish in SO_2 rich environment

Ans. (c)

Lichens, the composite organisms consist of a specific fungus living in symbiotic association with one or sometimes, two species of algae. Lichens are world-wide in distribution. These are pioneer colonisers of barren rocks and mountains. Being extremely sensitive to SO_2 , the lichens especially epiphytic lichens serve as bioindicators air pollution.

TOPIC 4 Virus and Viroids

109 Which of the following statements about inclusion bodies is incorrect? [NEET (Sep.) 2020]

- (a) These are involved in ingestion of food particles
(b) They lie free in the cytoplasm
(c) These represent reserve material in cytoplasm
(d) They are not bound by any membrane

Ans. (a)

Option (b),(c) and (d) are correct whereas option (a) is incorrect because Inclusion bodies are nuclear or cytoplasmic aggregates of proteins. They represent sites of viral multiplication in a bacterium or a eukaryotic cell and usually consist of viral capsid proteins. These are not involved in ingestion of food particles.

110 Which of the following statements is incorrect? [NEET (National) 2019]

- (a) Viruses are obligate parasites
(b) Infective constituent in viruses is the protein coat
(c) Prions consist of abnormally folded proteins
(d) Viroids lack a protein coat

Ans. (b)

The statement "infective constituent in viruses is protein coat" is incorrect. The correct information about the statement is as follows. Viruses infect their host organisms through their genetic material, i.e either DNA or RNA and not protein. They take over the biosynthetic machinery of the host cell and produce chemicals required for their own multiplication. Rest statements are correct.

111 Viroids differ from viruses in having [NEET 2017]

- (a) DNA molecules with protein coat
(b) DNA molecules without protein coat
(c) RNA molecules with protein coat
(d) RNA molecules without protein coat

Ans. (d)

Viroids differ from viruses in having RNA molecules without protein coat. Viruses on the other hand possess DNA or RNA with a protein coat as their genetic material.

Viruses can infect a wide range of organisms including plants, animals or bacteria, while viroids infect only plants.

112 Which of the following statements is wrong for viroids? [NEET 2016 Phase I]

- (a) They are smaller than viruses
(b) They cause infections
(c) Their RNA is of high molecular weight
(d) They lack a protein coat

Ans. (c)

Viroids are infectious, non-protein-coding, highly structured with small circular RNA's, which have the ability to replicate autonomously. These contain RNA of low molecular weight and induce diseases in higher plants.

113 Select wrong statement.

[CBSE AIPMT 2015]

- (a) The viroids were discovered by DJ Ivanowski
- (b) WM Stanley showed that viruses could be crystallised
- (c) The term '*Contagium vivum fluidum*' was coined by MW Beijerinck
- (d) Mosaic disease in tobacco and AIDS in human being are caused by viruses

Ans. (a)

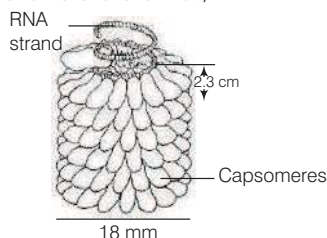
All statements are correct except the statement (a), which can be corrected as Viroids were discovered by TO Diener in 1971 as a new infectious agent that was smaller than virus.

114 Which of the following shows coiled RNA strand and capsomeres? [CBSE AIPMT 2014]

- (a) Polio virus
- (b) Tobacco mosaic virus
- (c) Measles virus
- (d) Retrovirus

Ans. (b)

In TMV RNA is single stranded (ss) helically coiled structure containing about 2130 capsomeres, which is a basic subunit of capsid (an outer covering of protein that protects the genetic material of a virus).



There are about 16 capsomeres present in each helical turn.

115 Which statement is wrong for viruses? [CBSE AIPMT 2012]

- (a) All are parasites
- (b) All of them have helical symmetry

- (c) They have ability to synthesise nucleic acids and proteins
- (d) Antibiotics have no effect on them

Ans. (b)

The nucleocapsids of viruses are constructed in highly symmetric ways. Two types of symmetry are recognised in viruses, which correspond to the two primary shapes, rod and spherical. Rod-shaped viruses have helical symmetry and spherical viruses have icosahedral symmetry.

116 Virus envelope is known as

[CBSE AIPMT 2010]

- (a) capsid
- (b) virion
- (c) nucleoprotein
- (d) core

Ans. (a)

Structurally viruses are very diverse varying widely in size, shape and chemical composition. The nucleic acid of virus is always located within the virion particle and surrounded by a protein shell called capsid.

The protein coat is composed of a number of individual protein molecules called structural subunits. The complete complex of nucleic acid and proteins, packaged in the virion is called the virus nucleocapsid.

117 TO Diener discovered a

[CBSE AIPMT 2009]

- (a) free infectious RNA
- (b) free infectious DNA
- (c) infectious protein
- (d) bacteriophage

Ans. (a)

Viroids are small, circular, single stranded free infectious RNA molecules that are the smallest known pathogens. The extracellular form of the viroid is naked RNA, i.e. there is no protein capsid of any kind.

These RNA molecule contains no protein encoding genes and therefore, the viroid is totally dependent on host for its replication. No viroid diseases of animals are known and the precise mechanisms by which viroids cause plant diseases remain unclear.

118 Viruses that infect bacteria, multiply and cause their lysis are called [CBSE AIPMT 2004]

- (a) lysozymes
- (b) lytic
- (c) lipolytic
- (d) lysogenic

Ans. (b)

When bacteriophage infects a bacterium, it entirely depends on the host for its multiplication. It utilises the host machinery for replication and produce a large number of progeny (phage particles). The bacterium cell undergoes lysis and dies to liberate a large number of these phage particles which are ready to start another cycle by infecting new bacterial cell. This cycle is known as lytic cycle.

119 Which of the following statements is not true for retroviruses?

[CBSE AIPMT 2004]

- (a) DNA is not present at any stage in the life cycle of retroviruses
- (b) Retroviruses carry gene for RNA dependent DNA polymerase
- (c) The genetic material in mature retroviruses is RNA
- (d) Retroviruses are causative agents for certain kinds of cancer in man

Ans. (a)

Retroviruses are so, named because they contain enzyme reverse transcriptase or **RNA dependent DNA polymerase**. The genetic material of these viruses is RNA, e.g. Rous Sarcoma Virus.

120 Viruses are no more 'alive' than isolated chromosomes because

[CBSE AIPMT 2003]

- (a) both require the environment of a cell to replicate
- (b) they require both RNA and DNA
- (c) they both need food molecules
- (d) they both require oxygen for respiration

Ans. (a)

Viruses are non-cellular obligate parasite. In the free state they are just like the particles. They do not have their own metabolic machinery and use host's machinery for multiplication.

121 Which one of the following statements about viruses is correct? [CBSE AIPMT 2003]

- (a) Nucleic acid of viruses is known as capsid
- (b) Viruses possess their own metabolic system
- (c) All viruses contain both RNA and DNA
- (d) Viruses are obligate parasites

Ans. (d)

Viruses are **non-cellular, obligate parasites**. They have DNA or RNA as genetic material (never both). Genetic material of virus is covered in protein coat, known as **capsid**. Viruses do not contain their own metabolic system instead they occupy host's metabolic system after entrance in them.

122 Tobacco mosaic virus is a tubular filament of size [CBSE AIPMT 2003]

- (a) 700 × 30 nm
- (b) 300 × 10 nm
- (c) 300 × 5 nm
- (d) 300 × 18 nm

Ans. (d)

TMV is elongated rod-like, 3000Å (300 nm) long and 180Å (18 nm) in diameter.

123 Interferons are synthesised in response to [CBSE AIPMT 2001]

- (a) Mycoplasma
- (b) bacteria
- (c) viruses
- (d) fungi

Ans. (c)

Cells infected by virus produce interferon which is an antiviral protein. It spreads to neighbouring cells and makes them resistant to virus infections by inhibiting viral growth.

124 Cauliflower mosaic virus contains [CBSE AIPMT 2001]

- (a) ssRNA
- (b) dsRNA
- (c) dsDNA
- (d) ssDNA

Ans. (c)

Caulimovirus (Cauliflower Mosaic Virus) contains double stranded (ds) DNA.

Influenza virus contains single stranded RNA (ssRNA).

Parvovirus contains single stranded DNA (ssDNA).

125 Which one of the following statements about viruses is correct? [CBSE AIPMT 1997]

- (a) Viruses possess their own metabolic system
- (b) Viruses contain either DNA or RNA
- (c) Viruses are facultative parasites
- (d) Viruses are readily killed by antibiotics

Ans. (b)

Viruses contain only one type of nucleic acid DNA or RNA. These are obligate parasites; do not possess metabolic machinery and are not readily killed by antibiotics.

126 Influenza virus has [CBSE AIPMT 1996]

- (a) DNA
- (b) RNA
- (c) Both (a) and (b)
- (d) Only proteins and no nucleic acids

Ans. (b)

Influenza virus is single (-) stranded RNA virus, which cannot serve directly as mRNA but rather as templates for mRNA synthesis via a viral transcriptase. Influenza virus (orthomyxo virus) infects the respiratory tract and cause influenza.

127 Tobacco Mosaic Virus (TMV) genes are [CBSE AIPMT 1994]

- (a) double stranded RNA
- (b) single stranded RNA
- (c) polyribonucleotides
- (d) proteinaceous

Ans. (b)

Tobacco Mosaic Virus (TMV) is elongated, rod shaped, most thoroughly studied plant virus, with 95% protein and 5% RNA by weight. RNA is genomic, i.e. genetic material which is single stranded, linear, helically coiled, 5µ in length with 6500 nucleotides long.

03

Plant Kingdom

TOPIC 1

Algae

- 01** Which of the following algae contains mannitol as reserve food material? [NEET 2021]
(a) *Ectocarpus* (b) *Gracilaria*
(c) *Volvox* (d) *Ulothrix*

Ans. (a)

Ectocarpus is a cosmopolitan marine brown seaweed. Mannitol is stored as a food reserve in *Ectocarpus*.

Other options can be explained as :

- *Gracilaria* is also a type of red algae that is notable for its economic importance. Reserved food found in *Gracilaria* is in the form of floridean starch, which is similar to amylopectin and glycogen in structure.
- In *Volvox* (green algae), stored food material is starch and the major pigments are chlorophyll a and d. Some may store food as oil droplets.
- *Ulothrix* is a genus of non-branching filamentous green algae, starch molecule is the reserved food.

- 02** Which of the following algae produces carrageen? [NEET 2021]
(a) Green algae
(b) Brown algae
(c) Red algae
(d) Blue-green algae

Ans. (c)

Carrageen is a common name give to polysaccharides (carbohydrates) that are extracted from seaweeds like red algae. Carrageen is known for its gelling properties and it is one of the industrial source of carrageenan that is utilised as a stabilizer and thickner of milk products. It can be harmful to immune system, in severe cases it leads to internal bleeding.

- 03** Phycoerythrin is the major pigment in [NEET (Oct.) 2020]
(a) red algae
(b) blue-green algae
(c) green algae
(d) brown algae

Ans. (a)

Phycoerythrin is the major pigment in red algae or rhodophytes. The photosynthetic pigments in red algae include chlorophyll-*a*, carotenoids and phycobilins. Phycoerythrin belongs to the phycobilins. These pigments are soluble in water.

- 04** Which of the following pairs is of unicellular algae? [NEET (Sep.) 2020]
(a) *Gelidium* and *Gracilaria*
(b) *Anabaena* and *Volvox*
(c) *Chlorella* and *Spirulina*
(d) *Laminaria* and *Sargassum*

Ans. (c)

Chlorella and *Spirulina* are unicellular algae as they are rich in proteins and hence used as food supplements by space travellers. *Gelidium*, *Gracilaria*, *Laminaria* and *Sargassum* are multicellular. *Volvox* is colonial.

- 05** Which one is wrongly matched? [NEET 2018]
(a) Gemma cups – *Marchantia*
(b) Biflagellate zoospores – Brown algae
(c) Uniflagellate gametes – *Polysiphonia*
(d) Unicellular organism – *Chlorella*

Ans. (c)

Polysiphonia is a red algae. In its sexual reproduction is of oogamous type. The male sex organ, spermatangium produces non-flagellate male gametes. In **Brown algae**, sexual reproduction varies from isogamy, anisogamy to

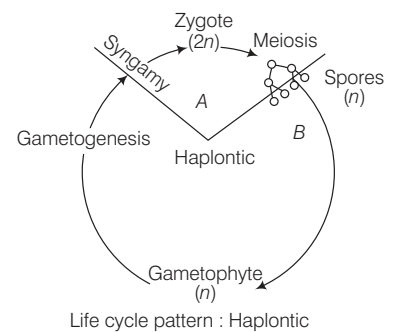
oogamy. In isogamy and anisogamy both the gametes are motile while in oogamy only male gametes are motile. These motile gametes have two unequal laterally attached flagella.

Chlorella is a unicellular organism. It is green algae belonging to class Chlorophyta. In **Marchantia**, gemma cups are found on its dorsal surface. It contains gammae which help in vegetative propagation.

- 06** Zygotic meiosis is characteristic of [NEET 2017]
(a) *Marchantia* (b) *Fucus*
(c) *Funaria* (d) *Chlamydomonas*

Ans. (d)

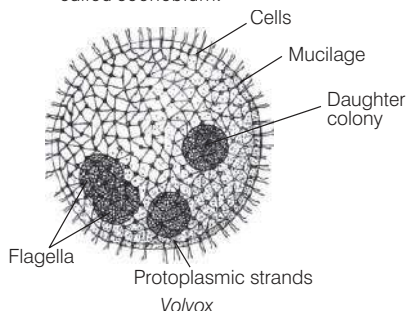
Zygotic meiosis is represented in the haplontic life cycle of many algae including *Chlamydomonas*. In such a life cycle, all cells are haploid except zygote. This is because meiosis occurs in the zygote itself resulting into four haploid cells that give rise to haploid plants.



- 07** An example of colonial alga is [NEET 2017]
(a) *Chlorella*
(b) *Volvox*
(c) *Ulothrix*
(d) *Spirogyra*

Ans. (b)

Volvox is a fresh water green hollow ball-like colonial alga. Its colony has a fixed number of cells (500-60000). It is called coenobium.



08 Which one of the following statements is wrong ?

[NEET 2016, Phase II]

- (a) Algae increase the level of dissolved oxygen in the immediate environment
- (b) Algin is obtained from red algae and carrageenan from brown algae
- (c) Agar-agar is obtained from *Gelidium* and *Gracilaria*
- (d) *Laminaria* and *Sargassum* are used as food

Ans. (b)

Algin extracted from brown algae, e.g. *Laminaria*, etc. is a hydrocolloid used in shaving creams, jellies, flameproof plastic, etc. Carrageenan is extracted from red algae like *Chondrus* and used as emulsifier and clearing agent. Thus, only option (b) is incorrect and all other options are correct.

09 Which one is a wrong statement? [CBSE AIPMT 2015]

- (a) Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms
- (b) *Mucor* has biflagellate zoospores
- (c) Haploid endosperm is typical feature of gymnosperms
- (d) Brown algae have chlorophyll-*a* and *c*, and fucoxanthin

Ans. (b)

All the statements are correct except the statement (b). *Mucor* (fungus) belongs to the class—Zygomycetes. The members of Zygomycetes bear non-motile non-flagellated gametes.

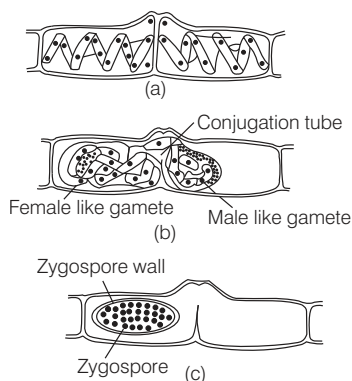
10 Which one of the following shows isogamy with non-flagellated gametes? [CBSE AIPMT 2014]

- (a) *Sargassum*
- (b) *Ectocarpus*
- (c) *Ulothrix*
- (d) *Spirogyra*

Ans. (d)

Isogamy with non-flagellated gametes is seen in *Spirogyra*. It can reproduce both by sexual and asexual (vegetative) means.

They reproduce sexually by conjugation in which two non-flagellated morphologically similar but physiologically different gametes (isogamous) fuse together. One filament acts as male gamete and passes through the conjugation tube of another filament which acts as female gamete.



11 Which one of the following is wrong about *Chara*?

[CBSE AIPMT 2014]

- (a) Upper oogonium and lower round antheridium
- (b) Globule and nucule present on the same plant
- (c) Upper antheridium and lower oogonium
- (d) Globule is male reproductive structure

Ans. (c)

Both antheridium and oogonium are the male and the female reproductive structures respectively. They have sterile jackets on their surface. In *Chara* globule (antheridium) is present on lower side, while the nucule (oogonium) is present on upper side of sterile vegetative (leaf-like) structure.

12 An alga which can be employed as food for human being is

[CBSE AIPMT 2014]

- (a) *Ulothrix*
- (b) *Chlorella*
- (c) *Spirogyra*
- (d) *Polysiphonia*

Ans. (b)

Chlorella is a potential food source because it is high in protein and other essential nutrients when dried, it contains about 45% protein, 20% fat, 20% carbohydrate, 5% fibre and 10% minerals and vitamins.

13 Select the wrong statement.

[NEET 2013]

- (a) Isogametes are similar in structure, function and behaviour
- (b) Anisogametes differ either in structure, function and behaviour
- (c) In oomycetes female gamete is smaller and motile, while male gamete is larger and non-motile
- (d) *Chlamydomonas* exhibits both isogamy and anisogamy and *Fucus* shows oogamy

Ans. (c)

Statement (c) is wrong as oomycetes include water moulds, white rusts and downy mildews. In these, female gamete is large and non-motile, whereas, male gamete is small and non-motile. Isogametes are found in algae like *Ulothrix*, *Chlamydomonas*, *Spirogyra*, etc. which are similar in structure, function and behaviour. Anisogametes are found in *Chlamydomonas* in which one gamete is larger and non-motile and the other one is motile and smaller.

Oogamy is the fusion of non-motile egg with motile sperm. The gametes, differ both morphologically as well as physiologically. It occurs in *Chlamydomonas*, *Fucus*, *Chara*, *Volvox*, etc.

14 Algae have cell wall made up of [CBSE AIPMT 2010]

- (a) cellulose, galactans and mannans
- (b) hemicellulose, pectins and proteins
- (c) pectins, cellulose and proteins
- (d) cellulose, hemicellulose and pectins

Ans. (a)

Algae have cell wall made up of cellulose, galactans and mannans. Like plants, algae have cell walls containing either polysaccharides such as cellulose (a glucan) or a variety of glycoproteins or both. The inclusion of additional polysaccharide in algal cell walls is used as a feature for algal taxonomy. Mananas form microfibrils in the cell walls of a number of marine green algae including those from the genera *Codium*, *Acetabularia* as well as in the walls of some red algae like *Porphyra*.

15 Mannitol is the stored food in
[CBSE AIPMT 2009]

- (a) *Chara* (b) *Porphyra*
(c) *Fucus* (d) *Gracilaria*

Ans. (c)

Fucus belongs to class—Phaeophyceae, in which reserve food is found in form of laminarin, mannitol and oil.

Chara belongs to class—Chlorophyceae, in which reserve food is found in form of starch and oil.

Porphyra and *Gracilaria* belongs to class—Rhodophyceae, in which reserve food is found in form of floridean starch and Galactan-SO₄ polymers.

16 If you are asked to classify the various algae into distinct groups, which of the following characters you should choose?
[CBSE AIPMT 2007]

- (a) Types of pigments present in the cell
(b) Nature of stored food materials in the cell
(c) Structural organisation of thallus
(d) Chemical composition of the cell wall

Ans. (a)

Types of pigments present in the cell of algae is the most important character for classification.

17 Sexual reproduction in *Spirogyra* is an advanced feature because it shows
[CBSE AIPMT 2003]

- (a) physiologically differentiated sex organs
(b) different size of motile sex organs
(c) same size of motile sex organs
(d) morphologically different sex organs

Ans. (a)

In *Spirogyra*, the sexual reproduction involves the fusion of two morphologically identical isogametes and physiologically dissimilar anisogametes. This is a case of primitive anisogamy. In this the active gamete is known as the male and the passive as the female.

18 A research student collected certain alga and found that its cells contained both chlorophyll-*a, b, c* and chlorophyll-*d* as well as phycoerythrin. The alga belongs to
[CBSE AIPMT 2000]

- (a) Rhodophyceae (b) Bacillariophyceae
(c) Chlorophyceae (d) Phaeophyceae

Ans. (a)

Members of Rhodophyceae (red algae) contains Chlorophyll-*a, d*, *r*-phycoerythrin, *r*-phycocyanin, α and β -carotene pigments.

Members of Chlorophyceae (green algae) contain chlorophyll-*a, b* and β -carotene pigments.

Members of Bacillariophyceae (diatoms) contain chlorophyll-*a, c*, β -carotene, α -carotene pigments.

Members of Cyanophyceae (cyanobacteria, blue-green algae) contain chlorophyll-*a, c*-phycocyanin, *c*-phycoerythrin and β -carotene pigments.

19 *Ulothrix* can be described as a
[CBSE AIPMT 1998]

- (a) non-motile colonial alga lacking zoospores
(b) filamentous alga lacking flagellated reproductive stages
(c) membranous alga producing zoospores
(d) filamentous alga with flagellated reproductive stages

Ans. (d)

Ulothrix is a freshwater, filamentous green algae, found in rather cold flowing water. Sexual reproduction in *Ulothrix* is isogamous type, i.e. it takes place between two morphological similar motile, flagellated male and female gametes which come from different filaments.

20 *Ulothrix* filaments produce
[CBSE AIPMT 1997]

- (a) isogametes
(b) anisogametes
(c) heterogametes
(d) basidiospores

Ans. (a)

Ulothrix belongs to green algae. Sexual reproduction in *Ulothrix* takes place by the union of isogametes which are motile, biflagellate, morphologically similar gametes. Approximately 8-32 isogametes are produced from a mother cell. Two gametes come from two different filament, fuse and form a diploid zygote.

21 Brown algae is characterised by the presence of
[CBSE AIPMT 1997]

- (a) phycocyanin
(b) phycoerythrin
(c) fucoxanthin
(d) haematochrome

Ans. (c)

In addition to chlorophyll-*a*, brown algae possess special carotenoids and fucoxanthin. It is due to the fucoxanthin (brown pigment) that these algae appear brown.

Phycocyanin and phycoerythrin are phycobilins which are found in red algae (phycocyanin-*r*, phycoerythrin-*r*) and blue-green algae (phycocyanin-*c*, phycoerythrin-*c*).

22 An alga very rich in protein is
[CBSE AIPMT 1997]

- (a) *Spirogyra*
(b) *Ulothrix*
(c) *Oscillatoria*
(d) *Chlorella*

Ans. (d)

Dried *Chlorella pyrenoidosa* contains approximately 50-55% crude protein (more than that in dried beef, soyabean meal and dried yeast).

23 Blue-green algae belong to
[CBSE AIPMT 1996]

- (a) eukaryotes
(b) prokaryotes
(c) Rhodophyceae
(d) Chlorophyceae

Ans. (b)

Blue-green algae or cyanobacteria are the largest Gram negative, aerobic, photoautotrophic, nitrogen-fixing, simplest chlorophyll containing thallophytes/prokaryotes. They neither have a definite nucleus nor definite plastid with grana. They also lack flagella, chlorophyll-*b*, mesosome, meiosis and membrane bound organelles (except ribosome of 70S type).

- 24** Agar is commercially obtained from [CBSE AIPMT 1995]
 (a) red algae (b) green algae
 (c) brown algae (d) blue-green algae

Ans. (a)

Agar is a gelatinous, sulphated non-nitrogenous, tasteless, odourless mucopolysaccharide obtained from middle lamella of cell wall of marine red algae like *Gracillaria*, *Gelidium*, *Gigartina*, etc. commonly known as agarophytes. It is used as solidifying agent in the culture medium, as luxative stabiliser or thickener in preparing jams, jellies, creams, ice creams, bakery products and as luxative in drug industry.

- 25** The absence of chlorophyll, in the lowermost cell of *Ulothrix*, shows [CBSE AIPMT 1995]

- (a) functional fission
 (b) tissue formation
 (c) cell characteristic
 (d) beginning of labour division

Ans. (d)

Ulothrix is an advanced alga, with three types of cells—green dome-shaped apical cell, green intercalary cell and basal non-green cell called holdfast. Holdfast or basal cell is for attachment, it has nucleus and cytoplasm, its presence shows the beginning of division of labour.

- 26** In Chlorophyceae, sexual reproduction occurs by [CBSE AIPMT 1994]

- (a) isogamy and anisogamy
 (b) isogamy, anisogamy and oogamy
 (c) oogamy only
 (d) anisogamy and oogamy

Ans. (b)

In Chlorophyceae, three types of sexual reproduction occurs, i.e. isogamy, anisogamy and oogamy.

Isogamy involves the fusion of those gametes which are similar in size, shape and structure, e.g. *Chlamydomonas debaryana*.

In anisogamy gametes differ morphologically and also behave differently, e.g. *Chlamydomonas braunii*.

In oogamy, fusion between motile and non-motile gametes takes place, e.g. *Chlamydomonas coccifera*.

- 27** Which of the following cannot fix nitrogen? [CBSE AIPMT 1994]
 (a) *Nostoc* (b) *Azotobacter*
 (c) *Spirogyra* (d) *Anabaena*

Ans. (c)

Spirogyra is a free floating, filamentous, green, freshwater alga, popularly called pond silk. It has no role in nitrogen fixation. It forms a green slimy mass on the surface of standing and stagnant water of ponds during spring season, hence also called pond scum.

Whereas, blue-green algae like *Nostoc*, *Anabaena* are the important nitrogen fixing cyanobacteria, so these are used as biofertiliser. *Azotobacter* is the aerobic free living/non-symbiotic nitrogen fixer.

- 28** Chloroplast of *Chlamydomonas* is [CBSE AIPMT 1993]

- (a) stellate (b) cup-shaped
 (c) collar-shaped (d) spiral

Ans. (b)

In *Chlamydomonas*, chloroplast is single and cup-shaped. Chloroplasts are the pigment (chl-*a* and chl-*b*) containing bodies present in green algae. The green colouration of the members of chlorophyta is due to the presence of excess of chlorophyll in the chloroplasts. The chloroplasts are well defined bodies met within every cell of the members of this class, though number and shape of the chloroplasts varies in different orders of the class.

- 29** In *Ulothrix/Spirogyra*, reduction division (meiosis) occurs at the time of [CBSE AIPMT 1993]

- (a) gamete formation
 (b) zoospore formation
 (c) zygospore germination
 (d) vegetative reproduction

Ans. (c)

In *Ulothrix/Spirogyra*, meiosis takes place at the time of zygospore germination. It takes place when (+) and (-) plants/filaments results in the formation of diploid zygote (2x). Zygote is tetraflagellated, it secretes a thick wall and becomes non-motile to form diploid zygospore.

Under favourable conditions, zygospore undergoes zygotic meiosis to form motile tetraflagellated zoomeiospores or non-motile aplanomeiospores. Each meiospore (haploid) germinates to new filament of (+)(-) strain.

- 30** Pyrenoids are the centres for formation of [CBSE AIPMT 1993]
 (a) porphyrin (b) enzymes
 (c) fat (d) starch

Ans. (d)

Pyrenoid is a seat of synthesis and storage of starch present in the chloroplast of algae. A pyrenoid has a core of protein around which starch is deposited as layers.

- 31** A plant in which sporophytic generation is represented by zygote is [CBSE AIPMT 1992]

- (a) *Pinus* (b) *Selaginella*
 (c) *Chlamydomonas* (d) *Dryopteris*

Ans. (c)

In *Chlamydomonas*, the plant body is haploid, and represents gametophyte. It reproduces asexually through the formation of zoospores and sexually through gametes. Gametes (haploid) fuse to produce diploid zygote, representing the sporophytic generation. The zygote secretes a wall around it to become a resting zygospore (diploid). The zygote and zygospore are the only diploid structure which represents the diplophase.

- 32** The product of conjugation in *Spirogyra* or fertilisation of *Chlamydomonas* is [CBSE AIPMT 1991]

- (a) zygospore (b) zoospore
 (c) oospore (d) carpospore

Ans. (a)

Zygospore (zygote) is the fusion product of two gametes. It infact, represents the resting stage formed after withdrawal of flagella and formation of a thick wall around the freshly formed zygote. Zygospore is spherical with thick, smooth or stellate wall and contains fats and reserve food materials other than starch. It can resist unfavourable conditions.

In *Chlamydomonas*, zygospore is the resultant of isogamy, anisogamy or oogamy. In *Spirogyra* sexual reproduction occurs through conjugation, which may be scalariform or lateral. The resulting zygote secretes a thick wall called zygospore (having 3 layers thick wall, diploid nucleus and abundant food reserves in the form of oil and starch).

- 33** Sexual reproduction involving fusion of two cells in *Chlamydomonas* is [CBSE AIPMT 1988]
 (a) isogamy (b) homogamy
 (c) somatogamy (d) hologamy