

Youth Competition Times

Conduct by Railway Recruitment Board

CIVIL AND ALLIED ENGINEERING

[English Medium]

RRB JE

CBT Stage-II

Solved Paper

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SYLLABUS

**Government of India, Ministry of Railways,
Railway Recruitment Boards
CENTRALISED EMPLOYMENT NOTICE (CEN) No.03/2018
Recruitment of Junior Engineer (JE), Junior Engineer (Information Technology) [JE(IT)],
Depot Material Superintendent (DMS)**

2nd Stage CBT : Short listing of Candidates for the 2nd Stage CBT exam shall be based on the normalized marks obtained by them in the 1st Stage CBT Exam. Total number of candidates to be shortlisted for 2nd Stage shall be 15 times the community wise total vacancy of Posts notified against the RRB as per their merit in 1st Stage CBT. However, Railways reserve the right to increase/decrease this limit in total or for any specific category(s) as required to ensure availability of adequate candidates for all the notified posts.

Duration : 120 minutes (160 Minutes for eligible PwBD candidates accompanied with Scribe)

No of Questions : 150

Syllabus : The Questions will be of objective type with multiple choices and are likely to include questions pertaining to General Awareness, Physics and Chemistry, Basics of Computers and Applications, Basics of Environment and Pollution Control and Technical abilities for the post. The syllabus for General Awareness, Physics and Chemistry, Basics of Computers and Applications, Basics of Environment and Pollution Control is common for all notified posts under this CEN as detailed below:-

- a) **General Awareness :** Knowledge of Current affairs, Indian geography, culture and history of India including freedom struggle, Indian Polity and constitution, Indian Economy, Environmental issues concerning India and the World, Sports, General scientific and technological developments etc.
- b) **Physics and Chemistry:** Up to 10th standard CBSE syllabus.
- c) **Basics of Computers and Applications:** Architecture of Computers; input and Output devices; Storage devices, Networking, Operating System like Windows, Unix, Linux; MS Office; Various data representation; Internet and Email; Websites & Web Browsers; Computer Virus.
- d) **Basics of Environment and Pollution Control:** Basics of Environment; Adverse effect of environmental pollution and control strategies; Air, water and Noise pollution, their effect and control; Waste Management, Global warming; Acid rain; Ozone depletion.
- e) **Technical Abilities:** The educational qualifications mentioned against each post shown in Annexure-A, have been grouped into different exam groups as below. Questions on the Technical abilities will be framed in the syllabus defined for various Exam Groups given at Annexure-VII-A, B, C, D, E, F & G.

The section wise Number of questions and marks are as below :

Subjects	No. of Questions	Marks for each Section
	Stage-II	Stage-II
General Awareness	15	15
Physics & Chemistry	15	15
Basics of Computers and Applications	10	10
Basics of Environment and Pollution Control	10	10
Technical Abilities	100	100
Total	150	150
Time in Minutes	120	

The section wise distribution given in the above table is only indicative and there may be some variations in the actual question papers.

Minimum percentage of marks for eligibility in various categories: UR -40%, OBC-30%, SC-30%, ST -25%. This percentage of marks for eligibility may be relaxed by 2% for PwBD candidates, in case of shortage of PwBD candidates against vacancies reserved for them.

Virtual calculator will be made available on the Computer Monitor during 2nd Stage CBT.

2nd Stage Syllabus for Civil and Allied Engineering Exam Group – JE

- 1 **Engineering Mechanics-** Force (resolution of force, moment of force, force system, composition of forces), Equilibrium, Friction, Centroid and Center of gravity, Simple machines.
- 2 **Building Construction-** Building components (substructure, superstructure), type of structure (load bearing, framed and composite structures).
- 3 **Building materials-** Masonry materials (stones, bricks, and mortars), Timber and miscellaneous materials (glass, plastic, fiber, aluminum steel, galvanized iron, bitumen, PVC, CPVC, and PPF).
- 4 **Construction of substructure-** job layout, earthwork, foundation (types, dewatering, coffer dams, bearing capacity).
- 5 **Construction of superstructure-** stone masonry, brick masonry, Hollow concrete block masonry, composite masonry, cavity wall, doors and windows, vertical communication (stairs, lifts, escalators), scaffolding and shoring.
- 6 **Building finishes-** Floors (finishes, process of laying), walls (plastering, pointing, painting) and roofs (roofing materials including RCC).
- 7 **Building maintenance-** Cracks (causes, type, repairs- grouting, guniting, epoxy etc.), settlement (causes and remedial measures), and re-baring techniques.
- 8 **Building drawing-** Conventions (type of lines, symbols), planning of building (principles of planning for residential and public buildings, rules and byelaws), drawings (plan, elevation, section, site plan, location plan, foundation plan, working drawing), perspective drawing.
- 9 **Concrete Technology-** Properties of various types/grades of cement, properties of coarse and fine aggregates, properties of concrete (water cement ratio, properties of fresh and hardened concrete), Concrete mix design, testing of concrete, quality control of concrete (batching, formwork, transportation, placing, compaction, curing, waterproofing), extreme weather concreting and chemical admixtures, properties of special concrete (ready mix, RCC, pre-stressed, fiber reinforced, precast, high performance).
- 10 **Surveying-** Types of survey, chain and cross staff survey (principle, ranging, triangulation, chaining, errors, finding area), compass survey (principle, bearing of line, prismatic compass, traversing, local attraction, calculation of bearings, angles and local attraction) leveling (dumpy level, recording in level book, temporary adjustment, methods of reduction of levels, classification of leveling, tilting level, auto level, sources of errors, precautions and difficulties in leveling), contouring (contour interval, characteristics, method of locating, interpolation, establishing grade contours, uses of contour maps), area and volume measurements, plane table survey (principles, setting, method), theodolite survey (components, adjustments, measurements, traversing), Tacheometric survey, curves (types, setting out), advanced survey equipment, aerial survey and remote sensing.
- 11 **Computer Aided Design-** CAD Software (AutoCAD, Auto Civil, 3D Max etc.), CAD commands, generation of plan, elevation, section, site plan, area statement, 3D view.
- 12 **Geo Technical Engineering-** Application of Geo Technical Engineering in design of foundation, pavement, earth retaining structures, earthen dams etc., physical properties of soil, permeability of soil and seepage analysis, shear strength of soil, bearing capacity of soil, compaction and stabilization of soil, site investigation and sub soil exploration.
- 13 **Hydraulics-** properties of fluid, hydrostatic pressure, measurement of liquid pressure in pipes, fundamentals of fluid flow, flow of liquid through pipes, flow through open channel, flow measuring devices, hydraulic machines.
- 14 **Irrigation Engineering-** Hydrology, investigation and reservoir planning, percolation tanks, diversion head works.
- 15 **Mechanics of Structures-** Stress and strain, shear force and bending moment, moment of inertia, stresses in beams, analysis of trusses, strain energy.
- 16 **Theory of structures-** Direct and bending stresses, slope and deflection, fixed beam, continuous beam, moment distribution method, columns.
- 17 **Design of Concrete Structures-** Working Stress method, Limit State method, analysis and design of singly reinforced and doubly reinforced sections, shear, bond and development length, analysis and design of T Beam, slab, axially loaded column and footings.
- 18 **Design of Steel Structures-** Types of sections, grades of steel, strength characteristics, IS Code, Connections, Design of tension and compression members, steel roof truss, beams, column bases.
- 19 **Transportation Engineering-** Railway Engineering (alignment and gauges, permanent way, railway track geometrics, branching of tracks, stations and yards, track maintenance), Bridge engineering (site selection, investigation, component parts of bridge, permanent and temporary bridges, inspection and maintenance), Tunnel engineering (classification, shape and sizes, tunnel investigation and surveying, method of tunneling in various strata, precautions, equipment, explosives, lining and ventilation).
- 20 **Highway Engineering-** Road Engineering, investigation for road project, geometric design of highways, construction of road pavements and materials, traffic engineering, hill roads, drainage of roads, maintenance and repair of roads.
- 21 **Environmental Engineering-** Environmental pollution and control, public water supply, domestic sewage, solid waste management, environmental sanitation, and plumbing.
- 22 **Advanced Construction Techniques and Equipment-** Fibers and plastics, artificial timber, advanced concreting methods (under water concreting, ready mix concrete, tremix concreting, special concretes), formwork, pre-fabricated construction, soil reinforcing techniques, hoisting and conveying equipment, earth moving machinery (exaction and compaction equipment), concrete mixers, stone crushers, pile driving equipment, working of hot mix bitumen plant, bitumen paver, floor polishing machines.
- 23 **Estimating and Costing-** Types of estimates (approximate, detailed), mode of measurements and rate analysis.
- 24 **Contracts and Accounts-** Types of engineering contracts, Tender and tender documents, payment, specifications.



Railway Recruitment Board (RRB) Junior Engineer Civil (CBT-II) Exam-2019

Date- 28-Aug-2019

Time- 10:00-12:00

1. A _____ is a system designed to prevent unauthorized access to or from a private network.

- (a) Server (b) Packet
(c) Firewall (d) Web page

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Firewall solution are a key component of such a security policy, which designed to prevent unwithout access to or from a private network.

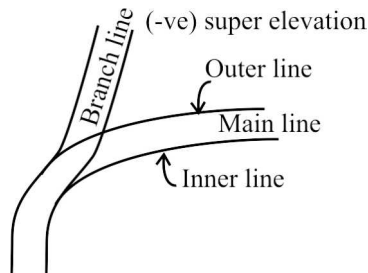
2. In horizontal curves of Railway Tracks, Negative Super elevation means-

- (a) Both the outer and inner rails are at the same level
(b) Outer rail is at a higher level than the inner rail
(c) Negative super elevation is not at all possible in any curve
(d) Outer rail is at a lower level than the inner rail

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : In horizontal curves of Railway Tracks, Negative Super elevation means outer rail is at a lower level than the inner rail.

➤ When a main line on a curve has a turnout of opposite curvature leading to the branch line, the level of outer rail in branch line is always kept lower than level of inner rail. This leads to -ve super elevation for breadth line -ve super elevation.

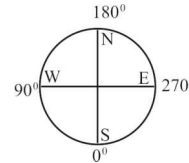


3. The zero of the graduated circle of a prismatic compass is located at

- (a) South end (b) East end
(c) West end (d) North end

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : The zero graduation in a prismatic compass is marked in the south end of the circle.



4. Match the following:

List-I

List-II

- | | |
|------------------------------------|----------------------------|
| (A) Type of beam connection | 1. Connecting members used |
| (B) Framed Connection | 2. Flange cleat only |
| (C) Un-stiffened seated Connection | 3. Flange and web clips |
| (D) Stiffened seated Connection | 4. Web cleat only |
- (a) A-3; B-1; C-4; D-2 (b) A-4; B-3; C-2; D-1
(c) A-1; B-3; C-2; D-4 (d) A-3; B-2; C-1; D-4

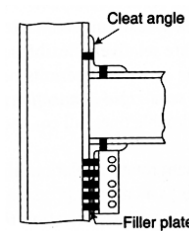
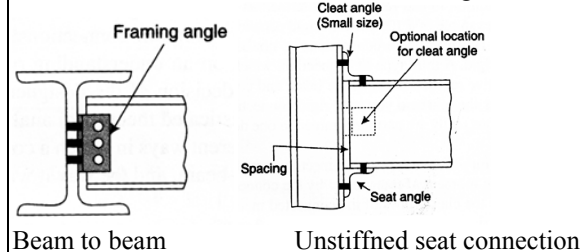
RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Type of beam connection—Two or more beams at a junction are connected each other using flange or web clips.

Framed connection—Framed connection are usually connected through web cleat only.

Unstiffened connection—Flange cleat only.

Stiffened connection—Used for connecting member.



5. Which of the following is the dimensional formula for the specific speed of a turbine?

- (a) $M^{\frac{1}{2}}L^{\frac{3}{4}}T^{-\frac{3}{2}}$ (b) $M^{\frac{1}{2}}L^{\frac{-1}{4}}T^{-\frac{5}{2}}$
 (c) $L^{\frac{3}{4}}T^{-\frac{3}{2}}$ (d) $M^{\frac{1}{2}}L^{\frac{-3}{4}}T^{-\frac{5}{2}}$

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Specific speed of turbine (S) = $\frac{N\sqrt{P}}{H^{5/4}}$

Dimensional formula per number of revolutions (N) = $[T^{-1}]$

Dimensional formula for power (P) = $[ML^2T^{-3}]$

Dimensional formula for head 'h' = $[L]$

So, Dimensional formula of specific speed of turbine

$$= \frac{[T^{-1}][ML^2T^{-3}]^{1/2}}{[L]^{5/4}} = M^{\frac{1}{2}}L^{\frac{-3}{4}}T^{-\frac{5}{2}}$$

6. The height of the pilot's eye above the runway surface is assumed as

- (a) 5 m (b) 1 m
 (c) 3 m (d) 4 m

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : The height of the pilot's eye above the runway surface is assumed as 3 m. The height of the drivers eye above the road surface is assumed is 1.2 m.

7. According to Archimedes principle, the upward force experienced by a body immersed in a fluid is equal to which of the following?

- (a) Total weight of the body and the fluid
 (b) Weight of the fluid displaced by the body
 (c) Weight of the body
 (d) Weight of the total fluid

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : As per the Archimedes principle, the upward buoyant force that is exerted on a body immersed in a fluid, whether partially or fully submerged, is equal to the weight of the fluid that the body displaces and acts in the upward direction at the centre of mass of the displaced fluid.

8. According to the concept of limit state design as per IS-456 : 2000, the probability of failure of a structure is:

- (a) 0.08 (b) 0.9
 (c) 0.8 (d) 0.0975

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : According to clause 6.1.1-

The characteristic strength is defined as the strength of material below which not more than 5% of the test results are expected to fall.

Changes of no failure = $100 - 5 = 95\% = 0.95$

Probability of failure = $[1 - P^2] = 1 - (0.95)^2 = 0.0975$

9. When an object is viewed from different directions and from different distances, the appearance of the object will be different. Such a view is called _____.

- (a) Axonometric projection
 (b) Isometric projection
 (c) Perspective view
 (d) Oblique projection

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Perspective view is two-dimensional representation of a three-dimensional space, where the appearance size of an object decreases as its distance from the viewer increases.

10. Which of the following gases is obtained when metals react with dilute acids?

- (a) Nitrogen (b) Hydrogen
 (c) Oxygen (d) Carbon dioxide

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Hydrogen gas is obtained when metal reacts with dilute acids.

Acid + Metal → Salt + Hydrogen Gas

$2HCl + Na \rightarrow NaCl(\text{Salt}) + H_2$

When an acid reacts with metal then we get salt and hydrogen gas [H_2] as a by product.

11. The rear wheels do not follow the same path as that of the front wheels. This phenomenon is called

- (a) Extra widening (b) Transition curve
 (c) Off tracking (d) Coning of wheel

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : When the rear wheel of vehicle don't follow the same path as that of the front wheel is called off tracking while negotiating the horizontal curve.

$$W_m = \frac{nl^2}{2R}$$

where, W_m = mechanical widening,

n = number of traffic lanes,

l = length of wheel base(m),

R = Radius of curve (m),

12. Arrange the following media - solids, liquids and gases, in descending order of speed of sound through them.

- (a) Solids, liquids, gases
 (b) Gases, liquids, solids
 (c) Liquids, solids, gases
 (d) Solids, gases, liquids

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Speed of sound depends on the medium in which it travels, sound can not travel through vacuum. Sound travels faster in liquid than in gases, and faster in solids than in liquids.

Descending order : Solid > Liquid > Gas.

13. The restoring force per unit area set up inside a body is called

- (a) Stress (b) Elasticity
(c) Mass (d) Strain

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Stress is the internal restoring force acting per unit area of cross section of the deformed body. Stress is given by Force/Area

$$\sigma = \frac{P}{A}$$

14. The densification of a soil by means of mechanical manipulation is called

- (a) Compaction (b) Soil stabilization
(c) Compressibility (d) Compression

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Densification or compaction method involve rearranging of soil particle into a dense configuration results, increase in density and increase in shear strength.

15. The stability of sub-grade in a pavement is influenced by

- (a) Water contact (b) Compaction
(c) Materials used (d) Rigidity

RRB JE CBT-II 28-08-2019 (morning)

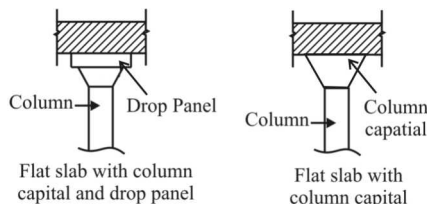
Ans. (a) : Subgrade is the foundation layer, the structure which must eventually support all the loads which come on the pavement, stability of the sub grades is influenced by soil texture, water content, density, frost action shrinkage and swelling and other climate factors.

16. Drop panel is a structural component in:

- (a) Flat slab (b) Flat plate
(c) Grid floor (d) Slab-beam system

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Drop panel is structural component in flat slab



Drop Panel—The thickened part of a flat slab over it supporting column is technically known as drop panel.

Uses of drop panel—

- (1) Drop panel increase the shear strength of the flat slab floor.
- (2) Drop panels increase the flat slab negative moment capacity.
- (3) Drop panels reduce deflection by stiffening the flat slab.

17. Which of the following is required to create an HTML document?

- (a) Search engine (b) Internet
(c) Text editor (d) Browser

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : **Text Editor**—It is a free app that allows to create, open and edit text files on the computer and google drive.

18. Which Chess championship title did grandmaster Viswanathan Anand with in the tournament held in Riyadh, Saudi Arabia in 2017?

- (a) Candidates Tournament
(b) World Senior Chess Championship
(c) Chess World Cup
(d) World Rapid chess Championship

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Anand won the world rapid chess championship in 2017 in Riyad by beating Vladimir Fedosew 2-0. In the final tie-break Viswanathan Anand is an Indian chess grandmaster and a former world chess champion. He became the first grandmaster from India in 1998. Anand is a five-time world chess champion.

Headquarters of chess federation— **Switzerland**

CEO – **Geoffrey D. Bory**

He is also the first Asian to win FIDE world chess championship from 2000-2002.

19. Castigliano's theorem falls under the category of

- (a) Force method
(b) Stiffness method
(c) Displacement method
(d) Equilibrium method

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : First theorem is applicable to linearly or non-linearly elastic structure in which the temperature is constant and the support are unyielding. Castigliano's theorem falls the category of force method.

➤ It is also called compressibility method, method of consistent deformation, flexibility method.

20. Centre lines and section lines are drawn using ___ pencil.

- (a) HB (b) H
(c) 3H or 4H (d) 2H

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Centre lines, section lines are drawn using 3H or 4H pencil, outlines, dotted lines section plane lines dimension line and arrow heads are drawn using 2H.

21. If a beam or column becomes weak or found to be insufficient, the most effective way to increases its strength is by

- (a) Plate Bonding (b) Jacketing
(c) Grouting (d) Micro concreting

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : **Jacketing**—It is a technique used to increase the strength of existing structural member (column, beam) by providing a Jacket of additional material around the existing member.

22. In which of the following states is the festival 'Chapchar Kut' celebrated?
 (a) Meghalaya (b) Sikkim
 (c) Assam (d) Mizoram

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : The Chapchar Kut is a festival of Mizoram, India. It is the biggest and most important festival in Mizoram. Chapchar Kut literally means = a festival held during the period when the bamboos and trees that have been cut down are being awaited to dry to be burnt for swimming. It is celebrated every year in the month of March after the completion of the Jhum cultivation. The festival has been estimated to have started in 1450-1700 AD in a village called Suaipui. The celebration was revised in the year 1962. Jhum cultivation is the process of growing crops by first clearing the land of trees and vegetation and burning them.

23. Major compound responsible for the destruction of stratospheric ozone layer is-

- (a) Oxygen
 (b) Carbon dioxide
 (c) Methane
 (d) Chlorofluorocarbon (CFC)

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Chlorofluorocarbon (CFC) have been identified as the main cause of the destruction of stratospheric ozone layer but there are also compound containing bromine, other halogen compounds and also nitrogen oxides with cause damage. CFCs were discovered by Thomas Midgeley in the 1930, as a cheap, non-flammable coolant for refrigerators. CFCs rise and gradually accumulate in the stratosphere where they are broken down by the sun's ultraviolet light, so releasing chlorine atoms.

24. Which of the following is Quicklime?

- (a) CaCl_2 (b) Ca(OH)_2
 (c) CaO (d) CaCO_3

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : CaO (Calcium oxide) is a quicklime calcium oxide is an ionic compound with the formula CaO . It is also known as burnt lime it exists as white crystalline solid at room temperature. It is obtained by thermal decomposition of calcium carbonate (CaCO_3). It is widely used in the manufacturing of cement, paper and steel. It is also used in the water treatment plant as an acidity control agent.

Chemical compound	Formula	Uses
Calcium carbonate	CaCO_3 / Limestone	Dietary Construction Neutralizing the acidic soil

25. Intermixing of particles of two different types of matter on their own is called _____.

- (a) Diffusion (b) Effusion
 (c) Condensation (d) Fission

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Mixing ink in water is diffusion.

RRB JE Civil CBT-II 28-Aug-2019

26. Fresh and pure snow reflectance:

- (a) Is very high in visible region
 (b) All of the options
 (c) Remains low for longer wave lengths
 (d) Falls off steeply in the near-IR region

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Fresh pure snow reflection is very high (>90%) in the visible region and relatively independent of wave length, the reflection fall off steeply in the near-IR (0.8 to 1.5 μm) and remain generally low for longer wavelength.

27. The chloride content of public water supplies should NOT exceed-

- (a) 150 mg/L (b) 250 mg/L
 (c) 80 mg/L (d) 50 mg/L

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : As per IS 10500 - 2012, the chloride content of public water supplies should NOT exceed 250 mg/L. 150-200 mg/l for sulphate.

28. Which of the following characteristics of ballast makes it unsuitable for use?

- (a) High modulus
 (b) High water absorption
 (c) High stability
 (d) High resilience

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : For higher modulus value, the ballast will provide better elasticity to the railway track and increased ability to bear loads.

➤ For the higher stability, the ballast can hold sleeper in position and will provide better resistance to vibrations, shocks and impact loading.

➤ Due to high resilience, ballast can resist the dynamic behaviour of train, It can store or with stand high impact energy.

➤ High water absorption makes ballast weak and reduces its crushing strength.

As per IS 2386-1963 water absorption should not be more than 1%.

29. As per IS codes, the characteristic yield strength for hot rolled high yield deformed bars is

- (a) 250 N/mm^2 (b) 550 N/mm^2
 (c) 500 N/mm^2 (d) 415 N/mm^2

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : As per IS codes, the characteristic yield value of steel.

HYSD/CTD bar – $f_y = 415 \text{ N/mm}^2$

TMT bar – $f_y = 415 \text{ N/mm}^2$

Mild steel – $f_y = 250 \text{ N/mm}^2$

30. To get a diminished, virtual and erect image of a tall building, which mirror is used?

- (a) Concave mirror
 (b) Convex mirror
 (c) Plane mirror
 (d) Both concave and plane mirror

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Convex mirror–The convex mirror gives virtual erect and diminished images of the objects.

31. Which of the following countries won the Badminton Asia Mixed Team Championships, 2019?

- (a) China (b) Malaysia
(c) India (d) Sweden

RRB JE CBT-II 28–08–2019 (morning)

Ans. (a) : China were crowned Badminton Asia mixed team championships winners after edging Japan in a closely fought final in Hong Kong. The 2019 Badminton Asia Championships was a badminton tournament which took place at the Wuhan sports center Gymnasium in China from 23 to 28 April 2019. They beat Japan in men's doubles, women's singles and men's single to climb the title for the 11th time. In the latest men's singles match Shi Yuqi Stunned world champion kento momota 15-21, 21-5, 21-11 Japan has never won the Sudirman cup.

32. In MS-Excel, how to use Format Painter multiple times?

- (a) By clicking on Lock Format Painter Icon
(b) By double clicking on the Format Painter Icon
(c) By single clicking on the Format Painter Icon
(d) Format Painter cannot be used multiple times

RRB JE CBT-II 28–08–2019 (morning)

Ans. (b) : In MS-Excel, By double clicking on the Format Painter Icon to use Format Painter multiple times

33. Which soil will take years and decades to undergo full settlement after the new building is constructed?

- (a) Silt (b) Sand
(c) Clay (d) Gravel

RRB JE CBT-II 28–08–2019 (morning)

Ans. (c) : Clay soil will take years and decades to full settlement as comparable to sand soil,
• Sandy soil has immediate settlement but clay soil take time to settlement due to elastic settlement and consolidation process.

34. The ratio of the moment of inertia to the span length is called

- (a) Carry over factor
(b) Distribution factor
(c) Relative stiffness
(d) Stiffness of the member

RRB JE CBT-II 28–08–2019 (morning)

Ans. (c) : The ratio of the moment of inertia to the span length is called relative stiffness.

35. Which finishing covers with a new protective layer over the whole surface area of walls constructed by brick or block Masonry?

- (a) Pointing (b) Plastering
(c) Grouting (d) False Ceiling

RRB JE CBT-II 28–08–2019 (morning)

RRB JE Civil CBT-II 28-Aug-2019

Ans. (b) : Plastering is the process of covering rough walls and uneven surface so as to have an even; smooth, regular, clean and durable finish, it is done on the both side of walls ratio (we use cement, sand and lime)

- **Pointing**–Only joints are filled with mortar we use only cement, it is done outside of wall.
- **False ceiling (Dropped ceiling)** - is a secondary ceiling hung below the main ceiling. Ex. Office.

36. The default position of the UCS Icon is positioned at ____ on the AutoCAD grid.

- (a) 0, 0, 0 (b) 10, 10, 10
(c) 30, 30, 30 (d) 20, 20, 20

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Ans. (a) : The default position of the UCS icon is positioned at 0,0,0 on the autocad grid.

37. PIEV represents

- (a) Passenger-Intersection-Entry/Exit-velocity
(b) Process-Intimation-Execution-Valuation/
(c) Passenger Information for Emergency Vehicle
(d) Perception-Intellection-Emotion-Volition

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Ans. (d) : Important terms used in Highway Engineering.

PIEV – Perception Intellection Emotion Volition

CRRI – Central Road Research Institute

NHDP – National Highway Development Project

SSD – Stopping sight Distance

OSD – Overtaking sight Distance

PCE – Passenger Car Equivalent

PCU – Passenger Car Unit

38. Scattering of sunlight occurs due to the presence of

- (a) Crust (b) Atmosphere
(c) Mantle (d) Core

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Ans. (b) : When sunlight enters the atmosphere of the earth, the atoms and molecules of different gasses present in the air absorb the light. Then, these atoms re-emit light in all directions and this process is known as scattering of light.

39. Long narrow diameter steel pipes are used for conveying fresh concrete down to deep depths, especially below water bodies, These pipes are called as

- (a) Pumping Pipes (b) Tremie Pipe
(c) Down Pipe (d) Transaction Pipe

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Ans. (b) : Long narrow diameter steel pipes are used for conveying fresh concrete down to deep depths, especially below water bodies, These pipes are called as **tremie Pipe**. It is suitable for underwater concreting.

40. Which of the following is/are an example of piezoelectric material?

- (a) Barium titanate
- (b) All of the options
- (c) Lithium niobate
- (d) Lead zirconate titanate

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Ans. (b) : The most commonly produced piezoelectric ceramics are lead zirconate titanate, barium titanate and lead titanate.

41. Who is the Chairman of the National Commission for Backward Classes?

- (a) Thalloju Achary
- (b) Bhagwan Lal Sahni
- (c) Kaushalendra Singh Patel
- (d) Sudha Yadav

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Ans. (b) : Bhagwan Lal Sahni is the chairman of the National Commission for backward classes. It was established on 14th August 1993. It is a constitutional body under the Ministry of social Justice and empowerment. It was formed under the National commission for backward classes Act 1993. This commission was formed as an initiative for investigating the conditions and difficulties of the socially and educationally backward classes. Headquarters NBC – New Delhi.

42. Engine Sheds are used for

- (a) Help to change engine
- (b) To help for sideway shifting
- (c) Help to change direction
- (d) Maintenance and repair

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Ans. (d) : Engine Sheds are used for maintenance and repair.

43. If the harmful salt present in the soil is Sodium carbonate, it can be neutralized by the addition of

- (a) Calcium sulphate
- (b) Calcium carbonate
- (c) Magnesium sulphate
- (d) Magnesium carbonate

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Ans. (a) : Gypsum (Calcium Sulphate) is used to neutralize the soil containing salt the solid salt from the soil react the Gypsum and leach out from the soil.

44. Mild steel is used in the manufacture of

- (a) Compression members
- (b) Cutting tools
- (c) Rolled steel Sections
- (d) Tension members

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Ans. (c) : Mild steel is ductile which makes it good in absorbing tensile stresses. Hence, it is used in beams, joint and girders.

➤ It can be used for manufacturing rolled steel sections. It is used for manufacturing of reinforced bar, sheet pile and roof covering.

45. Up to which element was the law of Octaves found to be applicable?

- (a) Cobalt
- (b) Potassium
- (c) Oxygen
- (d) Calcium

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Ans. (d) : The law of Octaves are applicable upto atomic number 20, which is of Calcium. Newlands, an English Scientist, arranged the known elements in the order of increasing atomic masses.

46. What is the formula of Ammonium Sulphate?

- (a) NH_4SO_3
- (b) NH_4SO_4
- (c) NH_3SO_4
- (d) $(\text{NH}_4)_2\text{SO}_4$

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Ans. (d) : The formula of ammonium sulphate is $(\text{NH}_4)_2\text{SO}_4$. It is prepared by treating ammonia, often as a by product from coke, with sulfuric acid.

47. The primary cause of acid rain around the world is

- (a) Ozone
- (b) Sulphur dioxide
- (c) Carbon dioxide
- (d) Carbon monoxide

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Ans. (b) : Sulphur dioxide is the primary cause of acid rain around the world. Acid rain is caused by emissions of sulphur dioxide and nitrogen oxide, which react with the water molecules in the atmosphere to produce acids. Acid rain has been shown to have adverse impacts on forests, fresh water, soils, microbes, insects and aquatic life-forms.

48. A flip-flop is a binary cell capable of storing of information.

- (a) Byte
- (b) One bit
- (c) Eight bit
- (d) Zero bit

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Ans. (b) : A flip-flop is a binary cell capable of storing One bit of information.

49. As per Indian Standard, the modular size of bricks is

- (a) $25 \text{ cm} \times 22 \text{ cm} \times 22 \text{ cm}$
- (b) $21 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm}$
- (c) $19 \text{ cm} \times 9 \text{ cm} \times 9 \text{ cm}$
- (d) $18 \text{ cm} \times 9 \text{ cm} \times 9 \text{ cm}$

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Ans. (c) :

(i) Modular size– $19 \text{ cm} \times 9 \text{ cm} \times 9 \text{ cm}$

Nominal size– $20 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm}$

(ii) Non-modular brick

Modular size – $22.9 \text{ cm} \times 11.2 \text{ cm} \times 7 \text{ cm}$

Nominal size – $22.9 \text{ cm} \times 11.4 \text{ cm} \times 7.6 \text{ cm}$

50. When did Chernobyl nuclear disaster occur?

- (a) August 1987
- (b) April 1986
- (c) August 1989
- (d) April 1988

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Ans. (b) : Chernobyl nuclear disaster occurred on 26 April 1986 because of reactor design flaws and human error. It was one of the worst disasters in the history of nuclear power generation.

51. First of the major environmental protection act to be promulgated in India was

- The air act
- The water act
- The environment act
- Noise pollution rules

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Ans. (b) : First of the major environmental protection act to be promulgated in India was the water act 1974 and the air act 1981.

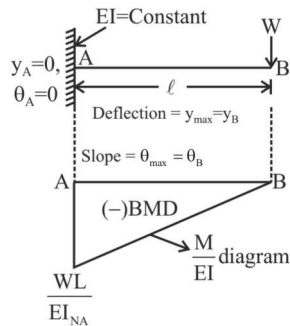
52. In the slope deflection method, the equations are derived using

- Castigliano theorems
- Moment area theorems
- Method of joints
- Double integration method

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Ans. (b) : In the slope deflection method, the equations are derived using moment area theorems.

Moment Area Method–



$$\theta_B - \theta_A = \text{Area of } \frac{M}{EI} \text{ diagram between A and B}$$

$$\theta_{\max} = \frac{Wl^2}{2EI} (\curvearrowright)$$

53. Which of the following contains a large number of solar cells joined together with silver wires in a definite pattern?

- Alkaline cell
- Solar cell panel
- Dry cell
- Lead acid battery

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Ans. (b) : Solar Cell Panel—A solar cell panel solar electric panel, photovoltaic module or solar panel is an assembly of photo-voltaic cell mounted in a framework for installation.

54. Maximum principal stress failure theory is also called _____ theory.

- Tsai Hill
- Tsai-Wu
- Rankine
- Tresca

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Ans. (c) : Maximum principal stress failure theory is also called Rankine theory, Lamé's theory or maximum stress theory.

➤ It is applicable for brittle material as brittle material fail under tension leading to fracture.

55. The most reliable field test to determine the bearing capacity of a soil is

- Plate load test
- Cone penetration test
- Direct shear test
- Sounding test

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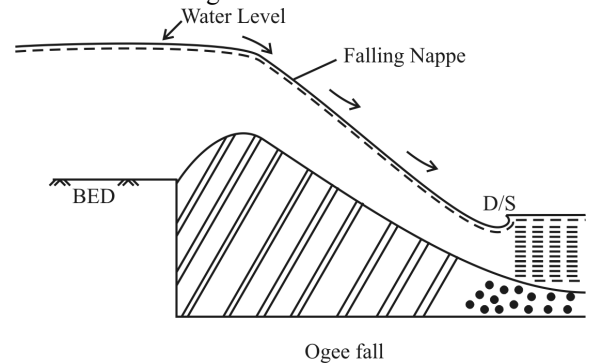
Ans. (a) : The most reliable field test as per option given to determine the bearing capacity is plate load test but up to the depth of twice of its width show true reflective characteristic of soil.

56. The fall which is used to minimise the disturbance and water impact at the fall is-

- Rapid falls
- Ogee falls
- Sarda Type falls
- English falls

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Ans. (b) : This type of fall provided for carrying the canal water from higher level to lower level.



57. The main function of a diversion head works of a canal from a river is

- To remove silt
- To control floods
- To store water
- To raise water level

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Ans. (d) : Diversion head works is a structure constructed across the river for the purpose of raising the water level in the river so that it can be diverted into the off taking canals. It is also known as canal head works and performs the following function.

- It raise the water level on upstream side.
- Other uses of this is to regulates the supply of water into canals.
- It controls the entry of silt into canals.
- It provides some pondage creating small pond.
- It helps in controlling the vagaries of river. Like- weir

The two type of DHW–

1. Temporary (DHW) ex.: spur or bunds
2. Permanent (DHW) ex.: Dams, weir, barrage.

58. Stress developed due to application of a load suddenly is _____ time that due to same load being applied gradually.
- (a) 2.0 (b) 4.0
(c) 1.0 (d) 0.5

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Ans. (a) : Stress developed due to application of a load suddenly is 2.0 time that due to same load being applied gradually.

59. Virtusa Corporation tied up with _____ to organize the grand finale of the Second Edition of Carbon Zero Challenge.
- (a) IIT Delhi
(b) IIT Bombay
(c) IIT Madras
(d) IIT Kharagpur

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Virtusa corporation tied up with IIT Madras to organize the grand finale of the second edition of carbon zero challenge. Its objective is to identify and curate practical innovative and indigenous solutions with a sound business case at scale to solve energy and environment problems in India. The challenge aims to create a global impact by combining three powerful factors, innovation and entrepreneurship, energy and enrolment.

60. Where are the Andaman and Nicobar Islands situated?
- (a) Red sea (b) Arabian sea
(c) Indian ocean (d) Bay of Bengal

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Ans. (d) : The Andaman and Nicobar Islands is located in the Bay of Bengal. The Andaman and the Nicobar Islands lie to the southeast of the Indian mainland in the Bay of Bengal. Andaman and Nicobar has its own rich culture and traditions. It is famous for the popular cellular jail. The Andaman and Nicobar Islands is a union territory of India consistency of 572 islands of which 38 are inhabited. The island chains are thought to be a submerged extension of the Arakan Mountains Port Blair is the optical of Andaman and Nicobar Island.

61. When an owner can borrow money against the security of property and interest is paid, then it is called as
- (a) Freehold Property
(b) Mortgage
(c) Leasehold property
(d) Lease

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Ans. (b) : Mortgage loan– Loan which is being raised by owner against its property is termed as mortgage loan.

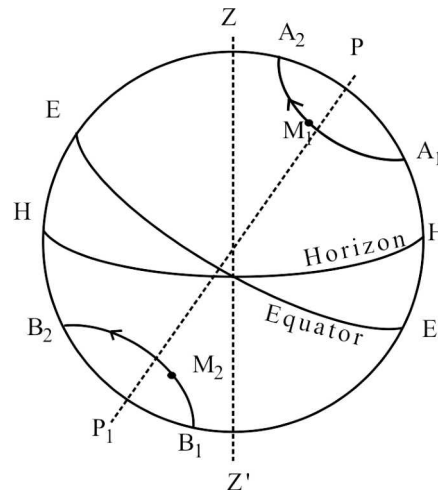
Freehold property–The free hold inherent the absolute owner of the property. He hold it without any payment in the nature of rent.

Leasehold property–The leaseholder is known as lessee and hold the physical possession of the property for the definite period under term and condition.

62. Which of the following represents a circumpolar star?
- (a) Altitude at upper culmination is minimum/
(b) Both upper and lower culmination above horizon
(c) Both upper and lower culmination below horizon
(d) Upper culmination above horizon, lower culmination below horizon

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Ans. (b) : Circumpolar star are those which are always above the horizon and which do not, therefore set. Such a star appear to the observer to describe a circle above the pole.



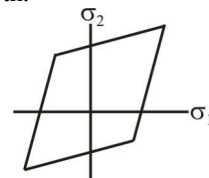
M_1 is circular cumpolor star having its path A_1A_2 which is always above the horizon. In order that the circumpolar star does not set similar M_2 .

63. According to which theory of failure does the ductile material begin to yield, when the maximum principal strain reaches the strain?
- (a) Rankine's theory (b) St. Venant's theory
(c) Guest theory (d) Haigh's theory

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Ans. (b) : St. Venant theory– According to St. Venant theory that the failure of a ductile material occurs when the principal tensile strain in the material reaches the strain at the elastic limit in simple tension.

• Safe boundary for maximum principle strain theory is Rhombus. This theory can be applied for ductile and brittle material both.



64. Who is the Chairman of the 13th Finance Commission?

- (a) N.N. Vohra (b) Bimal Jalan
(c) C. Rangarajan (d) Vijay Kelkar

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Ans. (d) : Dr. Vijay Kelkar was the chairman of the 13th Finance commission. The Finance commission is a constitutional body, that determines the method and formula for distributing the tax proceeds between the centre and states, and among the states as per the constitutional arrangement and present requirements. Under Article 280 of the constitution, the president of India, is required to constitute a Finance commission at an interval of five years or earlier.

- First finance was established in 1951 under the chairmanship of K.C. Neogy.
 - 14th Finance commission was established in 2013 under the chairmanship of Y.V. Reddy.
 - 12th Finance commission was established in 2002, under the chairmanship of Dr.C. Rangarajan.
- 15th Finance Commission is established in 2017 under the Chairmanship of Nand Kishore Singh.

65. A beam 10 m long, fixed at its ends, is subjected to a UDL of 10 kN/m. The fixed end moment is:

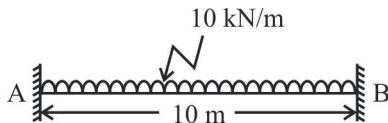
- (a) 125 kNm (b) 166.67 kNm
(c) 83.33 kNm (d) 100 kNm

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Ans. (c) : Given,

$$l = 10 \text{ m}$$

$$w = 10 \text{ kN/m}$$



$$\therefore \text{Moment at fixed end (M)} = \frac{wl^2}{12}$$

$$M = \frac{10 \times (10)^2}{12}$$

$$M = 83.33 \text{ kNm}$$

66. Keeping in view, the feasibility order of magnitude, the preliminary, conceptual or budget estimates, are prepared by

- (a) Construction manager
(b) Owner himself/herself
(c) All of the options
(d) Architect/engineer

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Ans. (b) : Owner himself / herself decide the preliminary conceptual or budget estimates preparation because he/she is the first decides to go for a project or not.

67. Helium atom has _____ electron(s) in its outermost shell.

- (a) One (b) Three
(c) Four (d) Two

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Ans. (d) : Helium has 2 electrons in its outermost shell thereby completing duplet configuration; as a result, valency is zero.

68. In building estimation, the specifications are classified as

- (a) General and detailed specifications
(b) General and preliminary specifications
(c) General and secondary specifications
(d) General and valued specifications

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Ans. (a) : In construction specification, they are two types—

1. **General specification**— In this a very brief specification about construction material and construction work made.

2. **Detail specification**— In this a detail explanation of material and work, complete knowledge of item each rate and quantity to labour cost and all in detail.

69. In roofing sheet terminology, CGI means

- (a) Corrugated Grating Iron
(b) Coated Grating Iron
(c) Corrugated Galvanized Iron
(d) Coated Galvanized Iron

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Ans. (c) : Roofing sheet terminology –

CGI – Corrugated Galvanized Iron

AC – Asbestos Cement

FC – Fibre Cement

MS – Mild Steel

NAPRC – Non-Asbestos Polypropylene Reinforced Cement

70. Which of the following members is/are subjected to compressive stress?

- (a) Pillars (b) All of the options
(c) Columns (d) Struts

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Ans. (b) : Pillars, columns are vertical, compressive members.

Strut— It is web member of a roof truss or brace frame subjected to light axial compressive loads.

71. Which is the natural satellite of planet Earth?

- (a) Kalpana - 1 (b) INSAT
(c) Aryabhata (d) Moon

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Ans. (d) : Moon is the natural satellite of planet earth. It is a natural satellite in any celestial body in space that orbits around a larger body. It is the largest natural satellite in the solar system. Ganymede is the largest moon in the solar system. Earth has only one moon.

72. In a fixed beam of span 'L', a concentrated load 'W' divides it as 'a' & 'b'. The fixed end moments are:

- (a) $(Wb^2a) / L^2$ & $(Wa^2b) / L^2$
(b) All of the options
(c) Wb/L & Wa/L
(d) $(Wb^2) / L$ & $(Wa^2) / L$

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80. The rate of construction of a hospital is expressed in terms of cost per head. This type of estimate is called as

- (a) Cubical content estimate
- (b) Plinth area estimate
- (c) Functional unit estimate
- (d) Approximate quantity estimate

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Ans. (c) : Functional unit estimate is a unit of measurement to represent the prime use of a building or art of building eg.: per bed, per house and per m² of retail area.

• Plinth area estimate are prepared on the basis of construction of plinth area, the rate are being calculated as the cost of construction (total) is divided with its area.

81. A flow is called hyper-sonic, if the Mach number is

- (a) More than 6
- (b) Less than unity
- (c) Unity
- (d) Between 1 and 4

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Ans. (a) : **Mach number** – The ratio of velocity of fluid is an undisturbed stream, to the celerity of the sound wave is known as mach number.

$$M_N = \frac{V}{C}$$

Hypersonic flow – When mach number > 6.

Super sonic flow – Mach number is between 1 and 6.

Sonic flow – Mach number is equal to unity.

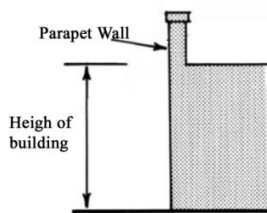
Subsonic flow – Mach number is less than unity.

82. The short height wall constructed above Roof Slab in open terrace is called as

- (a) Partition Wall
- (b) Plinth Wall
- (c) Parapet Wall
- (d) Boundary Wall

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Ans. (c) : The plain parapet wall is nothing but a vertical extension of the wall at the edge of roof, It is provided for safety concern.



83. Bar A and bar B are made up of the same material and are of same length. But bar A has diameter 'd' while bar B has diameter '2d'. If both are subjected to same axial load, the ratio of strain energy of bar A to strain energy of bar B is:

- (a) 4
- (b) 8
- (c) 1
- (d) 2

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Ans. (a) : Given that-

$$L_A = L_B, D_A = d, D_B = 2d, P_A = P_B$$

∴ Strain energy-

$$U = \frac{\sigma^2}{2E} \times V \quad \therefore \sigma = \frac{P}{A}$$

$$U = \frac{1}{2E} \times \frac{P^2}{A^2} \times A \times L \quad V = A \times L$$

$$U \propto \frac{1}{A}$$

$$\frac{U_A}{U_B} = \frac{A_B}{A_A} = \frac{\frac{\pi}{4}(2d)^2}{\frac{\pi}{4}(d)^2}$$

$$\frac{U_A}{U_B} = 4$$

84. Minimum voids in aggregates can be obtained by using-

- (a) Manufactured aggregates
- (b) Aggregates of varying sizes
- (c) Aggregates all of the same size
- (d) Aggregates of the same shape

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Ans. (b) : Minimum voids in aggregates can be obtained by using aggregates of all of the same size.

85. DPC means

- (a) Damp Prevention Course
- (b) Damp Plain Concrete
- (c) Dampness Permeable Concrete
- (d) Damp Proof Course

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Ans. (d) : **Damp proof course (D.P.C)** – Damp proofing in construction is a type of moisture control applied to building walls and floor's to prevent moisture from passing into the interior spaces.

➤ Thickness of DPC is 2.5-4 cm.

86. Out of the four processes listed, which is the last process?

- (a) Hardening
- (b) Evaporation
- (c) Compaction
- (d) Setting

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Ans. (a) : Compaction → Evaporation → Setting → Hardening

87. Which of the following statement is not correct?

- (a) In seperate system, the design of sewage system is economical
- (b) As the sewage is diluted by storm water in combined sewage system, cost of treatment is low

- (c) In separate system, self cleansing velocities are easily available and occasional flushing is required
- (d) In combined sewerage system, one set of sewers is laid for both sanitary sewage and storm water

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Ans. (c) :

Separate system	Combined system
Two separate system are provided, one for sewage and other for rain water including the surface washing of roads.	Only one sewer is provided to carry sewage and rain water.
Due to small size and thick concentrated sewage, sewers are likely to get clogged. Hence it is not easy to achieve self cleansing velocity.	Due to larger size there are less chance of checking hence self cleaning velocity are easily available.

88. Who presented the first Union Budget of Independent India?

- (a) Morarji Desai
 (b) John Mathai
 (c) N. K. Chandra
 (d) R. K. Shanmukham Chetty

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Ans. (d) : The Finance Minister R.K. Shanmukham Chetty present the first budget of a free and independent India it was presented on 26 November, 1947.

89. Combining two or more plots as a single plot is called

- (a) Bifurcation (b) Amalgamation
 (c) Building setback (d) Frontage

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Ans. (b) : Amalgamation – Combining of two or more plots as a single plot is called amalgamation.

Building setback– Minimum distance between any building or any structure from the boundary line of the plot.

90. Steam curing is used in

- (a) Long slabs and columns
 (b) Columns only
 (c) All of the options
 (d) Mass production of precast concrete/

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Ans. (d) : Steam curing of concrete is used if early strength gain is needed, where heat is required for hydration such as in cold weather.

• In precast and prestressed concrete, steam at atmospheric pressure provides high early strength, enabling rapid demoulding and reuse of form i.e., mass production.

91. In split test, the nature of testing is

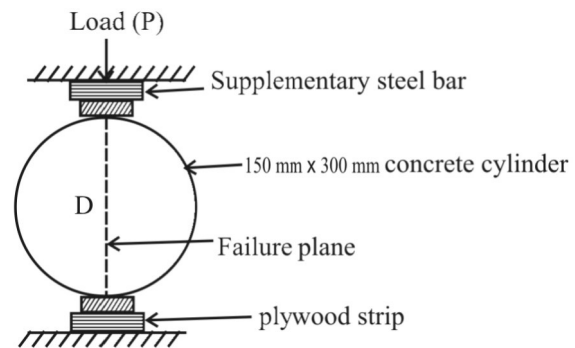
- (a) Cylindrical Specimen is subjected to axial compression on its cross sectional circular surface area
 (b) Cubical specimen is subjected to axial compression on its diagonal axis
 (c) Cylindrical Specimen is subjected to axial tension on its longitudinal curved surface area
 (d) Cylindrical specimen is subjected to axial compression on its longitudinal curved surface area

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Ans. (d) : In split test, the nature of testing is cylindrical specimen is subjected to axial compression on its longitudinal curved surface area.

Note (i) : Split-cylinder test, to determine the tensile strength of concrete in an indirect way, this test could be performed in accordance with IS 5816-1970.

Note (ii) : A standard test cylinder of concrete specimen (300 × 150 mmφ) is placed horizontally between the loading surface of compression testing. Machine the compression load is applied diametrically and uniformly along the length of cylinder until the failure of the cylinder along the vertical diameter.



Splitting tensile strength test

Concrete specimen (150 × 300) mm

92. The ratio of the head recovered to the head put in, is known as

- (a) Sensitivity
 (b) Modular limit
 (c) Flexibility
 (d) Efficiency

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Ans. (d) : Efficiency – In irrigation engineering, it is defined as the ratio of the head recovered to the head put in. Lesser in the head required for the functioning of the outlet more efficient the outlet will be. Efficiency is the measure of the conversion of the head by the outlet.

93. The hardest among the natural stones listed here is

- (a) Granite (b) Limestone
 (c) Marble (d) Slate

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Ans. (a) :

Particle material	Moh's hardness (natural stone)
Talc	1
Gypsum	2
Calcite	3
Flourite	4
Apalite	5
Quartzite/quartz	7
Granite/germstone	8
Corundum	9
Diamond	10

94. In order to determine the effects of a force acting on a body, we must know

- Nature of the force i.e. whether the force is push or pull
- Magnitude of the force
- All of the options
- Line of action of the force

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : The effect of a force acting on a body depends-

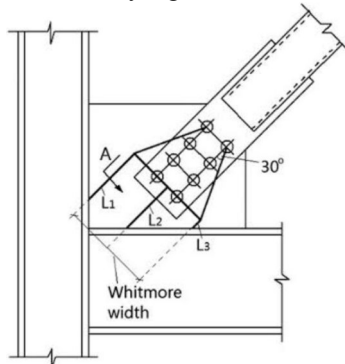
- Nature of force (whether tensile or compressive)
- Magnitude of force
- Line of action of force.

95. Under what situation will a gusseted base be provided in a column?

- Column size is larger
- Column carries lesser load
- Column size is smaller
- Column carries higher load

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Ans. (d) : Where as, the load on the column section is too large or when the axial load is accompanied with bending moment usually a gusseted base is provided.



- Gusset base consists of a base plate, two gusset plate and two gusset angles. The gusset plates and angles are placed on flanges.
- Gusset materials used in the base increase the bearing area, consequently reducing the thickness of the base plate as compared to the slab base.

96. Which method is adopted to develop an approximate or conceptual estimate for perimeter works for buildings from the following?

- Cost per linear metre method
- Base unit method
- Cost per square metre method
- Cost per function method

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Ans. (a) : Cost per linear metre method is used to develop an approximate or conceptual estimate for perimeter work for building.

- Cost area per square method is to estimated for area work for building.

97. Which of the following wall is constructed to resist the pressure of an earth filling?

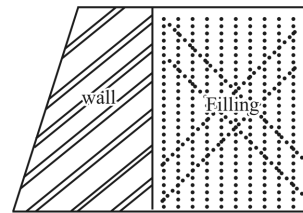
- Parapet wall
- Breast wall
- Buttress
- Retaining wall

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Ans. (d) : Retaining wall is construct to resist the pressure of an earth filling, they are rigid wall to supporting soil laterally.

- Breast wall is stone wall which is constructed at the hills side to support, the natural bank, this wall design to protect a freshly cut or old surface of a natural hill surface.

- A buttress wall is an exterior support projecting from a wall that is used to resist the later force arising out of the structure.



(Retaining wall)

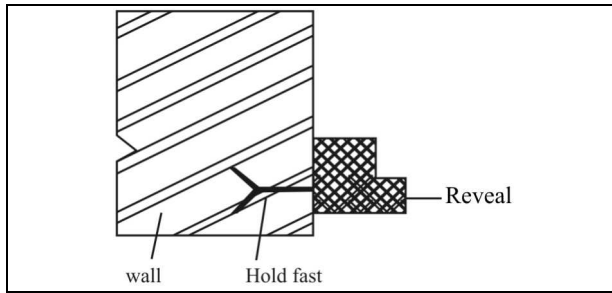
98. The type of hollow used when there is an elaborated window opening in the wall is

- Pillar block
- Partition block
- Jamb block
- Lintel block

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Ans. (c) : Jamb blocks are used when there is an elaborated window opening in the wall, they are connected stretcher and corner block, for the purpose of double hung window, jamb block are provided space for the casing member of window.

- Partition concrete block are generally used to build partition walls. It has larger height than width.
- Lintel bock/Beam block**- used for purpose of provision of beam or lintel beam. It has deep groove along the length after reinforce is placed this groove filled with concrete.
- Pillar Block is also called as double corner, they are used when two ends of the corner are visible.
- Frog Brick Block**-It has form on top of the brick.



99. The crossing angle at the level crossing of road-rail crossing should NOT be less than
- (a) 30° (b) 45°
(c) 20° (d) 25°

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Ans. (b) : All roads should preferably cross the railway line at right angles in special cases when modification is required to suit the road approaches the angle of crossing should not less than 45°.

100. _____ is the ratio of the volume of voids to the total volume of the given soil.
- (a) Void ratio
(b) Porosity
(c) Degree of saturation
(d) Air content

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Ans. (b) : Porosity(n) : Porosity is the ratio of the volume of voids 'V_v' to the total volume of soil (V).

$$n = \frac{V_v}{V}$$

- It is expressed as a percentage. The range of porosity is 0% < n < 100%.
- Void ratio (the ratio of volume of voids 'V_v' to the volume of solids V_s) and porosity are related as—

$$e = \frac{n}{1-n} \quad \text{and} \quad n = \frac{e}{1+e}$$

101. M10 grade of concrete mixing ratio is approximately
- (a) 1 : 3 : 6 (b) 1 : 1 : 2
(c) 1 : 2 : 4 (d) 1 : 5 : 10

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Ans. (a) : Grade of concrete and mixing ratio—

M 5 – 1 : 5 : 10

M 7.5 – 1 : 4 : 8

M 10 – 1 : 3 : 6

M 15 – 1 : 2 : 4

M 20 – 1 : 1 $\frac{1}{2}$: 3

M 25 – 1 : 1 : 2

102. What is the full form of BCD?

- (a) Binary Coded Decimal
(b) Binary Conduct Decimals
(c) Binary Characters Decimal
(d) Binary Coded Digitals

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Ans. (a) : BCD stands for Binary Coded Decimal. It is a system of writing numeral which assigns a four digit binary code to each digit 0 to 9 in a decimal (base 10) number.

103. The cheapest way to prevent the formation of diagonal bottom corner cracks in windows can be prevented by

- (a) Providing RCC frame all round the rectangular opening
(b) Using Concrete blocks for wall instead of bricks
(c) Providing circular shaped window openings instead of rectangular opening
(d) Providing Sill Beam

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Ans. (d) : Sill is the bottom surface of a door or a window.

➤ The main functioning of the sill is to prevent the formation of diagonal bottom corner crack in doors and windows.

104. Cavity wall is generally provided for

- (a) Prevention of dampness
(b) All of the options
(c) Heat insulation
(d) Sound insulation

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Function of cavity walls—

(i) **Damp prevention**— To eliminating the penetration of moisture from the outer leaf to the inner leaf and thus help keep inside of the building free from dampness.

(ii) **Heat insulation**— Air inside the cavity acts as an insulator or a non-conduct or of heat and hence minimizes the transmission off heat from the external face of the interior leaf.

(iii) **Sound insulation**— The air inside the cavity wall acts as a cushion for absorbing sound upto some extent.

105. Modular ratio is the ratio between the Young's modulus of

- (a) Sand and steel
(b) Steel and concrete
(c) Steel and cement
(d) Concrete and cement

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Modular ratio is the ratio between the Young's modulus of steel and concrete.

Modular ratio = $\frac{\text{Modulus of elasticity of steel}}{\text{Modulus of elasticity of concrete}}$

$$m = \frac{E_s}{E_c}$$

106. How many angular bleed lines are present in the 200 rupees note?

- (a) 7 (b) 4
(c) 2 (d) 6

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : There are 4 angular bleed lines present in 200 note.

107. The beam outside a wall up to the floor level above it is known as

- (a) Lintel (b) Purlin
(c) Spandrel (d) Rafter

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Spandril beam is the exterior beam that stretches horizontally from one column to another column

- They are provided on each floor and helps in distinguish floor level in high rise building.
- Also known as edge beam.

108. Air pollution from automobiles and industries can be controlled by fitting

- (a) Catalytic converter
(b) Wet collector (scrubber)
(c) All of the options
(d) Electrostatic precipitator

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Air pollution from automobile and industries can be controlled by fitting–

1. Wet collector (scrubber)
2. ESP (Electrostatic precipitator)
3. Catalytic convertor

109. Which among the following ministries gives Medni Puraskar every year?

- (a) Ministry of Environment and Forests
(b) Ministry of Finance
(c) Ministry of Law
(d) Ministry of Culture

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Ministry of Environment and forest gives Medni Puraskar every year. This puraskar is given to encourage original Hindi writing Prize gives Rs. 1 lakh first prize, Rs 75000 as second prize Rs. 50000 as third prize. The Medini Puraskar award was instituted in 1987.

110. Kanchi was the capitals of _____.

- (a) The Rashtrakutas (b) The Cholas
(c) The Pallavas (d) The Chalukyas

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Kanchi was the capital of Pallavas. Kanchi is well known for its huge productions of silk and rock cut temples. Simhavishnu was the founder of Kanchi. Kanchi ruled Tamil Nadu from the 6th to 9th centuries AD. Kanchi is known for its temples architectures.

111. Honeycombing defect in RCC members is caused by

- (a) Chemical reaction
(b) Shock waves
(c) Poor curing
(d) Inadequate compaction

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Honeycombing defect in RCC members is caused by Inadequate compaction.

112. Which of the following lines are used to show that the object is cut and then viewed?

- (a) Hatching lines (b) Centre lines
(c) Leader lines (d) Hidden lines

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : **Hatching lines** – Hatching lines are used to show that the object is cut and then viewed.

113. Reverse Osmosis is a type of

- (a) Dead end filtration system
(b) Ion exchange method
(c) Cross flow filtration system
(d) Micro filtration

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Reverse osmosis is a cross flow filtration system or through a semi permeable membrane in which the water is moved across from lower concentration to the higher concentration.

Example: Water desalination.

114. Pick up the correct statement for the following

- (a) Phytoplankton contains photosynthetically active pigment
(b) An increase of phytoplankton increases scattering in the green region
(c) An increase of phytoplankton absorbs the blue region rapidly
(d) An increase of phytoplankton decreases the back scattering in the green region

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Ans. (b) : The phytoplankton content, increase the backscattering increasing in the green region but the blue region is absorbed.

115. What is the quantities of the work items are difficult to be quantified and the rate analysis is also a complex issue, but still the contractor is willing to undertake a work, then the type of Contract best suited is:

- (a) Labour Contract
(b) Lump Sum Contract
(c) Turn Key Contract
(d) Item Rate Contract

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : **Lump sum contract**– In lump-sum contract the contractor undertakes the execution or construction of a specific work with all its contingencies to complete it in all respect with in a specified time for a fixed amount.

116. The common type of staircase in buildings with two consecutive 90° direction changes at mid-landing slab level is:

- (a) Dog-legged Staircase
(b) Straight Flight Staircase
(c) Spiral Staircase
(d) Ramp

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Dog-legged staircase:- It is also called u-shaped staircase is building with two consecutive 90° direction changes at mid landing slab level i.e., a landing separate the two parallel flights.

- **Straight stair case**– A single linear flight with no change in direction.

117. Mangalore Tiles belong to the category of

- (a) Concrete tiles (b) Slate tiles
(c) Burnt clay tiles (d) Mosaic tiles

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Mangalore tiles are the tiles prepared from hard laterite clay at extreme high temperature and pressure.

- It are used in the form of roofing and also used for roofing kitchen.
- It belongs to burnt clay tiles.

118. Which of the following is/are the functions of an operating system?

- (a) Security
(b) All of the options
(c) File Management
(d) Memory Management

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Security, Memory management, file management, all are the functions of an operating system.

119. _____ is the greatest source of halogens.

- (a) Emissions from Automobiles
(b) All of the options
(c) Lake water
(d) Sea

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Sea is the greatest source of halogens. Sea water contains chlorides, bromides and iodides of Na, K, Mg and Ca. It primarily contains NaCl, Marine life also contains iodine in their systems. Seaweeds contains upto 0.5% iodine as sodium iodine. Thus, the sea is the greatest source of halogens.

120. To ensure that compression flange of a beam is restrained from moving laterally, the cross section must be

- (a) Thin
(b) Semi-compact
(c) Slender
(d) Plastic

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : To ensure that compression flange of a beam is restrained from moving laterally, the cross-section must be plastic or compact is significant ductility is required, section must in variously be plastic.

121. To comply with current building regulations, the minimum cavity width in an external wall is

- (a) 60 mm (b) 100 mm
(c) 70 mm (d) 50 mm

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : As per new building regulation, the cavity width should neither less than 40 mm not more than 100 mm.

- Cavity walls is used to prevent moisture to enter and also regulated as insulation and heat resistant.

122. If the intercept on a vertical staff is observed as 0.75 m from a tacheometer, the horizontal distance between tacheometer and staff station is:

- (a) 50 m (b) 75 m
(c) 25 m (d) 7.5 m

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Given that,

S = Staff intercept = 0.75 m

D = Distance between the tacheometer and the staff station = ?

$$D = KS + C$$

K = Multiply constant = 100

C = additive constant = 0 (zero)

$$D = 0.75 \times 100 + 0$$

$$D = 75 \text{ m}$$

123. The test conducted by Vicat's apparatus is

- (a) Consistency
(b) Compression strength
(c) Fineness
(d) Tensile Strength

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Vicat's apparatus–

- Vicat's apparatus is used to measure the consistency of cement.
- There are three attachments, square needle, plunger and needle with annular collar.

Attachment	Use
10 mm ϕ plunger	Consistency test
1 mm ² needle	Initial setting time
5 mm ϕ annular collar	Final setting time

124. Which of the following is a kind of non-impact printer?

- (a) Dot matrix printers
(b) Line printers
(c) Ink-jet printers
(d) Daisy-wheel printers

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Ink-jet printers–It is non-impact printer. Inkjet printer is a computer peripheral that produce hand copy by spraying ink onto paper.

125. Which of the following metals are mixed with chromium to make stainless steel?

- (a) Nickel and iron
(b) Copper and Silver
(c) Copper and Chromium
(d) Copper and Nickel

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Stainless steel is made by mixing of nickel and iron and minimum 10.5% chromium.

126. **Non-colloidal liquids are:**

- (a) Ideal fluids
- (b) Newtonian fluids
- (c) Plastic fluids
- (d) Dilatant fluids

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Non-colloidal liquids are ideal fluids colloidal solutions, or colloidal suspensions, are mixture in which the substances are regularly, suspended in a fluid.

➤ A colloid is a very tiny and small material that is spread out normally all through another substance.

127. **Slipform Paver is an equipment used for constructing**

- (a) Walls
- (b) Pavements
- (c) Precast elements
- (d) Chimney

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Slipform Paver is an equipment used for constructing pavements.

128. **Which of the following is NOT a computer hardware?**

- (a) Software
- (b) Floppy disk
- (c) CPU
- (d) Motherboard

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Software is the only thing among the following which can see, but may not touch. Hence it's not a hardware.

129. **What is the conveyor system used for transporting loose materials like soil, ores, coal, concrete, etc. without the need for full total enclosure?**

- (a) Roller conveyor
- (b) Screw conveyor
- (c) Bucket conveyor
- (d) Belt conveyor

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Belt conveyor– The belt conveyor is an endless belt moving over two end pulleys at fixed position and used for transporting material horizontally or at incline up or down.

Example – Soil, ores, coal, concrete etc.

130. **Total distance covered in total time is termed as**

- (a) Uniform speed
- (b) Variable speed
- (c) Instantaneous speed
- (d) Average speed

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Average speed is defined as the total distance covered in total time. SI unit of average speed is m/s. When an object travels equal distance in equal interval of time, then it is said to be that the object is moving with uniform speed.

131. _____ addresses are reserved for multicasting.

- (a) Class E
- (b) Class B
- (c) Class D
- (d) Class C

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Multicasting is a type of one-to-many and many-to-many communication which allows a sender to send data packets simultaneously to several receivers over LANs or WANs.

Class D addresses are 32 bit network addresses which are reserved for multicasting.

132. **Colloidal particles are seen continuously in a zigzag path in**

- (a) Discrete particle
- (b) Tyndall effect
- (c) Raman effect
- (d) Brownian movement

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Brownian Motion– It is the random motion (zigzag) of microscopic particles suspended in a liquid or gas, caused by collisions with molecules of the surrounding medium.

133. **The head of water over the centre of an orifice of diameter 20 mm is 1 m. The actual discharge through the orifice is 0.85 litre/s. Find the coefficient of discharge.**

- (a) 1.4
- (b) 0.61
- (c) 1
- (d) 0.2

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Given that

Diameter of orifice (d) = 20 mm = 0.020 m

Head (h) = 1 m

Actual discharge (Q_{act}) = 0.85 l/s = $0.85 \times 10^{-3} \text{ m}^3/\text{s}$

Coefficient of discharge (C_d) = ?

$$\therefore C_d = \frac{Q_{act}}{Q_{th}} = \frac{0.85 \times 10^{-3}}{a \sqrt{2gh}}$$

$$C_d = \frac{0.85 \times 10^{-3}}{\frac{\pi}{4} (0.02)^2 \times \sqrt{2 \times 9.81 \times 1}}$$

$$\boxed{C_d = 0.61}$$

134. _____ application provides a single platform for all Indian Citizen to access pan India e-Gov services ranging from Central to Local Government bodies and other citizen centric services.

- (a) Boomi
- (b) Startup India
- (c) UMANG
- (d) E-Sahaj

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : UMANG (Unified Mobile Application for New age Governance) is developed by Ministry of Electronics and Information Technology and National e-Governance Division.

135. **Which of the following air pollution control devices has maximum efficiency?**

- (a) Spray tower
- (b) Wet cyclonic scrubber
- (c) Dynamic precipitator
- (d) Electrostatic precipitator

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : Electrostatic precipitator has the maximum efficiency among the rest with a value of 99%.

Electrostatic precipitators (ESP)

- ESP are used particle control
- ESP use electric process to move the particle flowing out of the gas stream on to the collector electrodes.
- The particles get a negative charge, when they pass through an ionized field.
- The removal efficiency is more than 99% with a low-pressure drop.

136. What is the binary representation of 32?

- (a) 100001 (b) 100100
(c) 100000 (d) 110000

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) :

2	32	0
2	16	0
2	8	0
2	4	0
2	2	0
	1	

Hence, binary representation of 32 = 100000

137. Shielding glass contains

- (a) Steel wires
(b) Chrome
(c) Fibre glass
(d) Lead oxide

RRB JE CBT-II 28-08-2019 (morning)

Ans. (d) : X-ray glass, also referred to as radiation shielding glass of lead glass, is leaded glass that provides shielding protection by absorbing the energy of radiation. The shielding effect created by a high concentration of lead and barium and the glass can be optically, clear or have a slight yellow tint.

138. In which state are the Bharatpur and Ranthambhore National Parks located?

- (a) Madhya Pradesh
(b) Rajasthan
(c) Uttar Pradesh
(d) Gujarat

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : The Bharatpur and Ranthambhore National Park located in Rajasthan. It is the one of the largest and most famous National Parks in North India.

The area of this park is 392 square kilometers. The park is mainly known for its tigers and is one of the best places in India to see majestic predators in its natural habitat Ranthambhore National Park is a vast wildlife reserve near the town of Sawai Madhopur in Rajasthan, northern India. It is a former royal hunting ground and home to tigers, leopards and marsh Crocodiles.

139. Which of these musical instruments has a keyboard?

- (a) Ghatam (b) Santoor
(c) Harmonium (d) Shehnai

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : Among the following harmonium is a musical instrument which has a keyboard.

140. Who among the following was the first woman to win Wimbledon title successfully nine times?

- (a) Martina Navratilova
(b) Monica Seles
(c) Chris Evert
(d) Steffi Graf

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Martina Navratilova was the first woman to win Wimbledon title successfully nine times. Wimbledon women's single title was won by Martina Navratilova most times. Martina Navratilova is a tennis player from Czechoslovakia Martina Navratilova holds the second for winning the Wimbledon title 9 times.

141. Which of the following days is observed to commemorate the signature of the Montreal Protocol?

- (a) International Day for Biological Diversity
(b) International Ozone Day
(c) World Health Day
(d) International Wildlife Conservation Day

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Every year International Ozone Day is observed to commemorate the signature of the Montreal Protocol.

Ozone day - 16 September.

142. In which year was India declared a Republic?

- (a) 1947 (b) 1948
(c) 1950 (d) 1955

RRB JE CBT-II 28-08-2019 (morning)

Ans. (c) : On 26 January 1950 India declared a republic, replacing the government of India Act 1935. The constitution was adopted by the Indian constituent assembly on 26 November 1949 and came into effect on 26 January 1950 with a democratic government system. 73rd Republic day was celebrated 26 January 2022.

143. With which of the following sports is the term 'double fault' associated?

- (a) Tennis (b) Bridge
(c) Baseball (d) Golf

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : The term double fault associated with tennis double fault means hitting a fault on the second serve. Tennis or lawn tennis is a racket sport that can be played individually or between two teams of two items of two - player each.

International Tennis federation–

- It was founded on 1st March 1973.
- It is a governing body of world tennis.
- Head quarter are located in London, United kingdom.

144. Medium thickness line-group of 2 mm are not used

- (a) Out lines
- (b) Dimension lines
- (c) Cutting plane lines
- (d) Dotted lines

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Outlines, dotted lines and cutting plane lines are drawn using 2-mm thickness lines. Where as centre lines, section lines dimension lines, Extension line, construction line are drawn using 1 mm thickness lines.

145. Which of the following statements is correct about remote sensing?

- (a) The surface from which emergent radiance is constant in all directions is called Lambertian surface
- (b) All of the options
- (c) The basic property used to identify objects is called signature
- (d) The ratio of the reflected flux to incident flux is called reflectance which varies from 0 to 1

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : In remote sensing energy leaving a surface is angularly distributed into the hemisphere above the surface. Is all of its perpendicular to the surface? Is the radiant intensity the same in all direction? Can be intensity distribution be characteristic is any functional form? We will often make use of idealized surface known as lambertian surface to help us deal with these question.

- A combustion radiator or reflector is characterized by a well behave variation in radiation intensity according to

$$I_{\theta} = I_0 \cos\theta$$

- I_{θ} is the intensity normal to the surface so is the angle from the normal to the surface to the direction of interest.

(ii) In remote sensing, the basic property which allows identification of an object is called signature.

(iii) The ratio of the reflected flux is called reflectance which varies from 0 to 1.

146. In an aircraft, the fuselage includes

- (a) All of the options
- (b) Pilot's cabin
- (c) Tail of aircraft
- (d) Passenger's chamber

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Fuselage length– Length of body. It is the main body part of aircraft.

- It includes, pilot's cabin, passenger's chamber and tail of aircraft.

147. Line up to which the plinth of a building adjoining a street may be lawfully extended is called

- (a) Building extend
- (b) Building line
- (c) Building carpet
- (d) Building plan

RRB JE CBT-II 28-08-2019 (morning)

Ans. (b) : Line up to which the plinth of a building adjoining a street may be lawfully extended is called building line

148. A _____ is the person responsible for verifying that the drawings in a project set are free of mistakes.

- (a) Checker
- (b) Client
- (c) CAD trainee
- (d) Receptionist

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : A checker is the person responsible for verifying that the drawings in a project set are free of mistakes.

149. The moisture content of a well seasoned wood is in the range

- (a) 10-12%
- (b) 48-210%
- (c) 27-35%
- (d) 60-65%

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Seasoning of timber is the process by which moisture content in the timber is reduced to required level.

A well-seasoned timber has 10-12% moisture content in it.

150. The value of the toughness index of most of soils lies between

- (a) 0 to 3
- (b) 1 to 3.5
- (c) 0 to 3.5
- (d) 1 to 3

RRB JE CBT-II 28-08-2019 (morning)

Ans. (a) : Toughness Index = $\frac{I_p}{I_f}$

- It is the measure of shearing strength of soil at the plastic limit.

Range = (0 to 3)

Clayey soil = (1-3)

Soil which are friable at plastic < 1



Railway Recruitment Board (RRB) Junior Engineer Civil (CBT-II) Exam-2019

Date- 28-Aug-2019

Time- 15:00-17:00

1. Find the deflection of the free end of a cantilever beam carrying a concentrated load **P** at the free end.

- (a) $\delta = PL^3/365EI$
- (b) $\delta = PL^3/5EI$
- (c) $\delta = PL^3/34EI$
- (d) $\delta = PL^3/3EI$

RRB JE CBT-II 28-08-2019 (evening)

Loading	Deflection	Slopes
	$\Delta = \frac{PL^3}{3EI}$	$\theta = \frac{PL^2}{2EI}$
	$\Delta = \frac{WL^4}{8EI}$	$\theta = \frac{wL^3}{6EI}$
	$\Delta = \frac{ML^2}{2EI}$	$\theta = \frac{ML}{EI}$

2. The digits used in a binary number system are _____ and _____.

- (a) 3, 4
- (b) 1, 2
- (c) 0, 9
- (d) 0, 1

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Ans : (d) The digits used in a binary number system are 0 and 1. The binary number system, also called the base-2 number system.

- Computers use the binary number system to manipulate and store all of their data including numbers, words, videos, graphics and music. The term bit, the smallest unit of digital technology, stands for "Binary digit".

- A byte is a group of eight bits. One kilobyte is 1,024 bytes or 8192 bits. Using binary number, 1+1 = 10 because '2' does not exist in this system.

3. The old type of Pile Driving Equipment which is banned in most countries due to heavy sound and vibration is called as:

- (a) Augur Boring Pile Driver
- (b) CFA-Continuous Flight Augur
- (c) Hammer Driven Pile Driver
- (d) Hydraulic Pile Driver

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Ans : (c) Hammer driven pile driver is the old type of pile driving equipment is banned in most countries due to heavy sound and vibration while driving and so as to prevent damage to adjacent structure and excessive noise, vibration and other related impacts.

4. What is the mass of the 0.5 moles of Nitrogen atoms?

- (a) 14 g
- (b) 70 g
- (c) 21 g
- (d) 7 g

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Ans : (d) Given that-
Number of moles = 0.5 mol
We know that, molar mass of Nitrogen atom is = 14 g/mol.
Now formula-
Mass = Number of moles × Molar mass
then,
Mass of Nitrogen atom = 0.5 mol × 14 g/mol
= 7 g

5. According to the ICAO specification for field runway length, take off run available is known as-

- (a) ASDA
- (b) TORA
- (c) TODA
- (d) LDA

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Ans : (b) According to the ICAO specification for field runway length, take off run available is known as TORA.

TORA (Take off run available) – The length of runway declared available and suitable for the ground run of an aircraft taking off.

TODA (Take off distance available) – The length of TORA plus length of the CWY (clear way), if provided.

ASDA (Accelerate stop distance available) – The length of TORA plus the length of the SWY (Stop way), if provided.

LAD (Landing distance available) – LDA is the portion of runway length delivered available and suitable for landing of an aircraft.

6. When did the partition of Bengal came into effect?

- (a) 1902 (b) 1903
(c) 1904 (d) 1905

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Ans : (d) Lord Curzon was the Viceroy of India from 1899 to 1905. The partition of the Bengal province came into effect during his viceroyalty on 16th October 1905.

• The idea of the partition had been brought up only for administrative reasons. The anti-partition movement was initiated on 7 August 1905. On that day, a massive demonstration against the partition was organized in the Town Hall in Calcutta.

7. The precautionary principle was first introduced in-

- (a) The First International Conference on Protection of the North Sea
(b) Kyoto protocol
(c) The Earth Summit
(d) Vienna convention

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The precautionary principle was first introduced in the 'International Conference on Protection of the North Sea' in 1987. Precautionary principle, approach in policy making that legitimizes the adoption of preventative measures to address potential risks to the public or environment associated with certain activities or policies.

8. Who introduced the concept of biodiversity hotspot?

- (a) Christopher Columbus
(b) Norman Myers
(c) Christoph Schwitzer
(d) Charles Darwin

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Ans : (b) The term 'Biodiversity Hotspot' was given by Norman Myers in 1988. He first identified 10 hotspots based on the high degree of endemism of rich biodiversity and most endangered. India is home to nearly 8% of global biodiversity on just 2.3% of global land area and contains sections of four of the 36 global biodiversity hotspot.

• There are major four biodiversity hotspots in India.
(i) The Himalayas
(ii) Indo-Burma region
(iii) The Western Ghats
(iv) Sundaland

9. Which of the following is the appropriate triaxial test to assess the immediate stability of an unloading problem, such as an excavation of a clay slope?

- (a) CU test
(b) CD test
(c) Unconsolidated drained test
(d) UU test

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Ans : (d) UU test– UU test is quick test and may complete in 5 to 10 minutes.

• In this test water is not allowed to leave the soil neither during the consolidation stage nor shear stage.
• Such test is suitable for low permeable soil such as clays with fast loading.
• UU test carried out for evaluation short term stability of the structure.

10. A line joining the vertices of the trusses is called-

- (a) Ridge line (b) Peak line
(c) Sky line (d) Top line

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) A line joining the vertices of the trusses is called ridge line.

• A truss is a structure composed of slender members joined together at end points by welding or bolting or riveting. Ends of the members are joined to a common plate called gusset plate.

11. According to the ICAO recommendations, what is the rate of elevation correction for the runway above MSL?

- (a) 2% for every 500 m of elevation above MSL
(b) 1% for every 100 m of elevation above MSL
(c) 2% for every 300 m elevation above MSL
(d) 7% for every 300 m elevation above MSL

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) According to the ICAO recommendations, the rate of elevation correction for the runway above MSL 7% for every 300 m elevation above MSL.

12. The effective length of fillet should not be less than-

- (a) One time the size of the weld
(b) Three times the size of weld
(c) Two times the size of weld
(d) Four times the size of weld

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) According to ISO 800:2007 a minimum effective length of weld is four times the size of weld.

➤ The length of weld which is actually effective to resist loads, called effective length.

Effective length = Total length – 2 × Size of weld

13. Which of the following is/are an example of utility program?

- (a) All of the options
(b) Antivirus software
(c) Network Managers
(d) File Compression

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Ans : (a) Utility program or system utilities are software used for maintenance and configuration of the computer system.

• Some system utilities are shipped with operating system and some are not shipped with operating system but are required to improve the performance of the system.

• Network managers, file compression, antivirus software, disk cleaner tool, etc are an example of utility program.

14. Which of the following humanoid robots was developed by the HDFC bank?

- (a) KEMPA (b) MITRA
(c) IRA 2.0 (d) AJIT

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Ans : (c) HDFC bank has developed IRA (Interactive Robotic Assistant) 2.0 in collaboration with its technology partners Ivento Maker spaces and Sen Seforth Technologies. It became first bank in India to introduce a humanoid IRA 1.0 for customer service at the Kamala Mills branch in Mumbai.

15. The stresses caused by the bending moment is called-

- (a) Tensile stress
(b) Compressive stress
(c) Shear stress
(d) Flexural stress

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The flexural stress or bending stress arise when the beam section subjected to transverse loading... i.e, Bending at the section of beam.

$$\frac{\sigma_b}{y} = \frac{M}{I} = \frac{E}{R}$$

Where,

σ_b = Bending stress due to moment at any section of beam.

M = Moment of neutral axis Nm

y = Perpendicular distance to neutral axis in m

I = Second moment area of neutral axis in m⁴

E = Modulus of elasticity

R = Radius

16. Which of the following is the ratio of absolute viscosity to mass density?

- (a) Coefficient of viscosity
(b) Viscosity index
(c) Specific viscosity
(d) Kinematic viscosity

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Kinematic viscosity- It is defined as the ratio between the dynamic viscosity (μ) and density of fluid (ρ).

$$v = \frac{\mu}{\rho}$$

CGS Unit = $\frac{\text{cm}^2}{\text{sec}}$ or stoke

S.I. unit = $\frac{\text{m}^2}{\text{sec}}$

1 m²/s (SI) = 10⁴ stoke

17. The interaction of the electromagnetic radiation produced with a specific wave length to illuminate a target on the terrain for studying its scattered radiance, is called:

- (a) Active remote sensing
(b) Remote sensing
(c) Neutral remote sensing
(d) Passive remote sensing

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Active remoted sensing work on their source of energy for illumination, the sensors emits radiation which is directed towards the target of investigated.

• Passive remoted sensing use sun as a source of energy for illumination, this work on the available of natural energy to the target of investigation.

18. Which of the following is the type of roof which slopes in two directions with a break in the slope on each side?

- (a) Gable roof
(b) Gambrel roof
(c) Hip roof
(d) Mansard roof

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) The type of roof which slopes in two directions with a break in the slope on each side is called gambrel roof.

Hip roof- This roof is formed by four sloping surface in four directions at the end faces, sloped triangles are formed.

Gable roof- This is the common type of sloping roof which slopes in two directions the two slopes meet at the ridge.

19. For a vertical stiffened web of a plate girder, the lesser clear dimension of the panel should not exceed:

- (a) 180 t (b) 200 t
(c) 85 t (d) 250 t

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) As per 800-2007, in the case of plate girder with vertical stiffness and horizontal stiffeners the lesser can greater unsupported clear dimension of web panel should not exceed 180t and 270t respectively.

20. Which of the following areas is/are NOT included in the Carpet area?

- (a) The walls along with doors and other openings
(b) All of the options
(c) Entrance gate
(d) Verandah, corridor and passage

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) For a building not included in the Carpet area-

- The walls along with doors and other openings
- Entrance gate
- Verandah, corridor and passage
- Porch, stair case, stair cover, lift shaft, bath room machine room, kitchen, pantry, store room, A.C. duct shaft for sanitary work.

21. The large steel cylindrical metal containers used in RMC plants used for storing cement and/or fly ash and such cementitious materials are named as-

- (a) Scraper (b) Screw Conveyor
(c) Mixer (d) Silo

RRB JE CBT-II 28-08-2019 (evening)

Ans: (d) Silo is a large storage structure to be used for storing anything which is to be kept for larger time i.e., grain and cement or fly ash or other, there are three type of silo used today–

1. Tower
2. Bunker silo
3. Bag silo

22. The loss of head in pipe due to friction is calculated by–

- (a) Darcy-Weisbach equation
- (b) Darcy's law
- (c) Chezy's law
- (d) Energy loss

RRB JE CBT-II 28–08–2019 (evening)

Ans : (a) Darcy-weisbach formula for head loss due to friction,

$$h_f = \frac{4f\ell v^2}{2gd}$$

Where,

f = Darcy's coefficient of friction.

ℓ = Length of pipe,

V = Velocity of the fluid in the pipe,

d = diameter of the pipe.

23. When is 'World Wildlife Day' observed?

- (a) 3 March
- (b) 5 March
- (c) 17 March
- (d) 10 March

RRB JE CBT-II 28–08–2019 (evening)

Ans : (a) On 20 December 2013, at its 68th session the United Nations General Assembly (UNGA) proclaimed 3rd March - the day of signature of the convention on International Trade in Endangered Species of wild Fauna and Flora (CITES) in 1973 - as UN World Wildlife day to celebrate and raise awareness regarding the world's wild animals and plants.

24. The structure which is used to divide the stages in different levels is termed as–

- (a) Roof
- (b) Lintels
- (c) Damp proof course
- (d) Floor

RRB JE CBT-II 28–08–2019 (evening)

Ans : (d) The structures which divide building into stages or storey's to give the space to live at different levels are termed as floors.

• Different types of floors are timber floors, cement tile, concrete flooring, mosaic floor, brick floor etc.

25. The space between two adjacent trusses is called–

- (a) Span
- (b) Pitch
- (c) Bay
- (d) Panel

RRB JE CBT-II 28–08–2019 (evening)

Ans : (c) The space between two adjacent trusses is called **Bay**.

• A line joining the vertices of the trusses is called ridge line.

26. Cobalt is an example of a _____ material.

- (a) Diamagnetic
- (b) Ferromagnetic
- (c) Paramagnetic
- (d) Non-magnetic

RRB JE CBT-II 28–08–2019 (evening)

Ans : (b) Ferromagnetic– It is one of the strongest forms of magnetism. It is responsible for most of the magnetic behaviour encountered in every day life.

• Most permanent magnets are ferromagnetic, as are the metals that are attracted to them, examples : iron, cobalt, nickel etc.

27. In fibre reinforced concrete, if the fibres are not dispersed properly, then the resulting problem is called as–

- (a) Spalling
- (b) Congestion
- (c) Balling
- (d) Segregation

RRB JE CBT-II 28–08–2019 (evening)

Ans : (c) If the fibres are not dispersed properly, then the resulting problem is called as balling.

• Fiber reinforcement concrete (FRC) is portland cement concrete reinforced with more or less randomly distributed fibers.

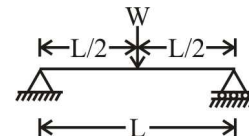
• In FRC, thousands of small fibers are dispersed and distributed randomly in the concrete during mixing.

28. In a simply supported beam of span L subjected to central concentrated load, the central deflection is 24 mm. Then the slope at support is:

- (a) (48/L) radians
- (b) (36/L) radians
- (c) (24/L) radians
- (d) (72/L) radians

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Ans : (d)



$$\text{Deflection } (y_c) = \frac{WL^3}{48EI}, \quad \text{Slope } (\theta_c) = \frac{WL^2}{16EI}$$

Given,

$$y_c = 24 \text{ mm}$$

$$24 = \frac{WL^3}{48EI} = \frac{WL^2 \times L}{16EI \times 3}$$

$$24 = \frac{\theta \times L}{3}$$

$$\theta = \frac{72}{L} \text{ radian}$$

29. Pick up the correct statement from the following:

- (a) Amplitude of a wave is the height of its crest from the mid-point
- (b) Frequency is the number of wave crests passing a fixed point in one second
- (c) Frequency of a wave is measured in Hertz (Hz)
- (d) All of the options

RRB JE CBT-II 28–08–2019 (evening)

Ans : (d) • Amplitude of a wave is the height of its crest from the mid-point.
 • Frequency is the number of wave crests passing a fixed point in one second.
 • Frequency of a wave is measured in Hertz (Hz).

30. Which of the following commands does not affect the text font?

- (a) Underline
- (b) Italics
- (c) Borders
- (d) Bold

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) When 'BORDER' is applied to the selected text, the font will not change but the text box will have a border. But when 'BOLD' is applied to the selected text, the text will be thicker and when 'ITALICS' is applied to the selected text. The text will be slanted.

31. The 1's complement of binary number 10010 is-

- (a) 11101
- (b) 10101
- (c) 01101
- (d) 01111

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The one's complement of a binary number is defined as the value obtained by inverting all the bits in the binary representation of the number (Swapping 0s for 1s and vice versa). Hence 01101 would be the 1's complement of binary 10010. It can be implemented using only NOT gate for each bit of binary number input.

32. The number of independent elastic constants for a linear elastic isotropic and homogenous material is-

- (a) 3
- (b) 4
- (c) 1
- (d) 2

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Ans : (d)			
S.N	Condition	No. of independent elastic constant	Total elastic constant
1.	Homogeneous and isotropic	2	4
2.	Orthotropic (wood)	9	12
3.	Anisotropic	21	∞

33. RE wall means-

- (a) Resistant Earth Wall
- (b) Reinforced Earth Wall
- (c) Retaining Earth Wall
- (d) Revertment Earth Wall

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) RE wall means Reinforced Earth Wall.
 • A reinforced earth wall is designed and constructed to resist the lateral pressure of the soil and supports the soil laterally. So that it can be maintained at different levels on both sides.

34. The special formwork without support from ground, used for constructing tall structures and which moves up continuously is called as-

- (a) Tunnel form
- (b) Lost forms
- (c) Myvan form
- (d) Slipform

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Slip forming is used to form continuous surface such as tunnel and high rise building cores. The entire form is constructed with working platforms and support for jacking assembly.

35. When an object undergoes acceleration-

- (a) It always moves down
- (b) It always moves up
- (c) It always falls towards the earth
- (d) A force always acts on it

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) When a body undergoes acceleration there is always a force acting on it. According to Newton's second law of motion, "the rate of change of momentum of a body is directly proportional to the applied force and takes place in the direction in which the force acts". According to Newton's second law

$$F = ma$$

36. The property of the soil due to which a decreases in volume occurs under compressive force is known as-

- (a) Compression strength of soil
- (b) Compressibility of soil
- (c) Initial consolidation of soil
- (d) Consolidation of soil

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Property of the soil due to which a decreasing the volume is known as compressibility.

• Since after applying the load, the compaction of soil occurs due to the air present in the void gets compressed first, then consolidation of soil occurs i.e., squeezing out of water takes place.

37. The girders having two or more than two webs are called-

- (a) Plate girder
- (b) Box girder
- (c) Gantry girder
- (d) Balanced girder

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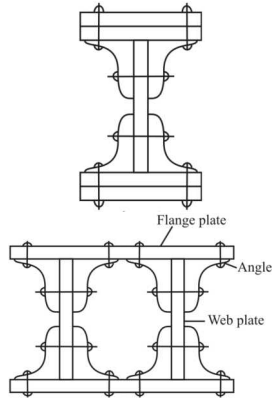
Ans : (b) Box girder is a pre-cast structure in which two concrete slab at top and bottom, the slabs are connected by the two or more web by an angle with the common flange.

• The box girder are commonly used for highway flyover and other.

• Plate girder is I-section made up of separate structure steel plate which are welded, bolted or riveted flange.

It is used to support the beam/slab above it.

- Gantry girder are girder which support the load that are transmitted through the travelling wheel of the crane used in construction of crane for use in manufacturing unit.



38. Electron was discovered by _____.

- Goldstein
- Neils Bohr
- Chadwick
- J.J. Thomson

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Ans : (d) Electron, Proton and Neutron were discovered by J.J. Thomson, Ernest Rutherford and Chadwick respectively.

- In 1911, Ernest Rutherford discovered that at the core of every atom is a nucleus. Atomic nuclei consist of electrically positive protons and electrically neutral neutrons.

39. The rain waterholes in the parapet or in edging is called as-

- Weep hole
- Hole
- Water proofing
- Edge hole

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The rain waterholes in the parapet or in edging is called as Weep hole.

- Weep holes are also provided in retaining walls and abutments of bridges.

40. The electric charges attract and repel each other due to-

- Electrostatic force
- Aerodynamic force
- Nuclear force
- Gravitational force

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The electric charges attract and repel each other due to electrostatic force.

41. Foundation plan will show-

- Size and depth of foundation
- Carpet area
- Length of plinth level
- Height of foundation

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Foundation plan will show size and depth of foundation.

42. The distance between centres of rivet holes should not be less than-

- 2.5 times the diameter of the holes
- 3 times the diameter of the holes
- 3.5 times the diameter of the holes
- 2 times the diameter of the holes

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The distance between centres of rivet holes should not be less than 2.5 times the diameter of the holes.

Maximum pitch-

- Tension = min [16t, 200 mm]
- Compression = min [12t, 200 mm]
- In case tacking rivets

(i) If the plates are not exposed to weather then pitch = min [32 t, 300 mm]

(ii) If the plates are exposed to weather then the pitch = min [16t, 200 mm]

43. Kerb and median are two elements in a highway cross-section. Choose the correct match.

- Kerb and median classification names are not based on position in pavement cross-section but based on their shape
- Kerb for both the side edges of the pavement and 1 median at the centre line of the pavement
- Median is a longitudinal element and kerb is a lateral element
- 1 Kerb at the middle and 2 medians at the side edges

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Median- A divided highway or dividing strip in the middle to separate traffic movement.

IRC recommend minimum desirable width of 5.0 m for Rural highway
Restricted upto 3 m where land is not available

Kerb- A vertical sloping member along the edge of a pavement provided for supporting raised footpaths or

- It is function to strengthen and protect the pavement edge.
- Control drainage and present a more finished surface.

44. With which of the following fields is Zakir Hussain associated?

- Literature
- Painting
- Music
- Sculpture

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Popularly known as the Tabla Maestro, Ustad Zakir Hussain is arguably the most famous Tabla player of our country in the post-independence era. He was awarded the Padma Shree by the government of India in the year 1988, In 2002, Zakir Hussain once again honoured with India's third highest civilian award Padam Bhushan.

45. Which of the following is an input device which can sense light, and is used to point at spots on a video screen?

- (a) Joystick (b) Mouse
(c) Plotter (d) Light pen

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) A light pen, basically a stylus, is a light-sensitive directly computer input device. It is generally used to highlight text, object or alter data on a computer screen or monitor. Similar to touch screen, it allows users to interact with user interface objects available on the screen but with the greater positional accuracy. It is used with any CRT-based display.

46. For night landing, the runway threshold lights are lighted-

- (a) Red (b) White
(c) Green (d) Yellow

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) For night landing, the runway threshold lights are lighted green.

47. Where was the Special Olympics World Games 2019 inaugurated?

- (a) Tokyo (b) New Delhi
(c) Shanghai (d) Abu Dhabi

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The Special Olympics World Games 2019 were inaugurated at Abu Dhabi in the United Arab Emirates. For the first time, the Special Olympics was held in the Middle East and North Africa region.

• The host UAE had introduced the term "people of determination" as part of a new National Strategy for empowering people with disabilities.

48. Which of the following is used to write web pages?

- (a) HTML (b) FTP
(c) HTTP (d) URL

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) HTML is used to write web pages. HTML stands for Hyper Text Markup Language, which is the most widely used language on web develop web pages. Hypertext Transfer Protocol (HTTP) is an application layer protocol for transmitting hypermedia documents, such as HTML.

• A URL (uniform resources locator) is a unique identifier used to locate a resource on the Internet. It is also referred to as a web address. FTP (File Transfer Protocol) is a Standard Internet Protocol provided by TCP/IP used for transmitting the files from one host to another.

49. A _____ is formed when each colour of the white light is refracted in the prism at a different angle.

- (a) Colour spread
(b) Rainbow
(c) Colour image
(d) Spectrum

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) A spectrum is formed when each colour of the white light is refracted in the prism at a different angle.

• As per Snell's law, light travelling from a rarer medium to a denser medium bends towards the normal and vice versa.

• Glass is denser than air, and thus, when a ray of light falls on the surface of prism, it bends towards the normal.

50. When one body rolls over the surface of another body, the resistance to its motion is called-

- (a) Sliding friction
(b) Static friction
(c) Rolling friction
(d) Electrostatic friction

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Rolling friction- On a surface, the force resisting the motion of a rolling body is known as rolling resistance or rolling friction.

Sliding friction- In sliding friction, there is a restriction on the movement of the body as only side of the body is in contact with the surface.

51. With which of the following sports is Mithali Raj associated?

- (a) Golf
(b) Cricket
(c) Football
(d) Basketball

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Mithali Raj is associated with cricket. India women's Test and ODI captain Mithali Raj became the first female cricketer to be awarded the Major Dhyan Chand Khel Ratna award by President Ram Nath Kovind, which is the highest sports honour in India.

52. Compressibility is the reciprocal of-

- (a) Bulk modulus of elasticity
(b) Rigidity modulus of elasticity
(c) Shear modulus of elasticity
(d) Young's modulus of elasticity

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Compressibility is the reciprocal of bulk modulus of elasticity

$$\beta = \frac{1}{K} = \frac{-dV}{Vdp}$$

Where,

dp = change in pressure

V = original volume

dV = change in volume

53. Who was the first Deputy Prime Minister of India?

- (a) Maulana Abul Kalam Azad/
(b) Sardar Vallabh bhai Patel/
(c) B.R. Ambedkar
(d) Sardar Baldev Singh

RRB JE CBT-II 28-08-2019 (evening)

Ans: (b) Sardar Vallabh Bhai Patel was the first Deputy Prime Minister of India, on the first anniversary of Independence, Patel was appointed as the Home Minister of India.

He was also in charge of the states department and the Information and Broadcasting Ministry. As the first Home Minister and Deputy Prime Minister of India, Patel organized relief efforts for refugees fleeing from Punjab and Delhi and worked to restore peace.

- 54. Terzaghi's bearing capacity factors depend on-**
- Angle of internal friction of soil and depth of foundation
 - Uniformity coefficient of soil and dry density of soil
 - Coefficient of curvature of soil and bulk density of soil
 - Angle of internal friction of soil only

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Bearing capacity of soil.

$$q_u = CN_c + \gamma D_f N_q + \frac{1}{2} B \gamma N_\gamma$$

- It is clear from the above expression that q_u depends on N_c , N_q , N_γ & D_f .
- Since N_c , N_q , N_γ bearing capacity factors depending on ϕ .

$$N_c = \cot \phi (N_q - 1)$$

$$N_q = N_\phi e^{\pi \tan \phi}$$

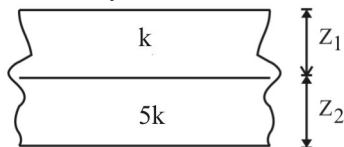
$$N_\gamma = 1.8 \tan \phi (N_q - 1)$$

- 55. Soil at a site consists of two layers. The top layer has permeability k units and bottom layer has permeability $5k$ units. If the thickness of both the layers is equal, then what is the average permeability in the vertical direction?**

- $(6/5)k$ units
- $(5/3)k$ units
- $(5/6)k$ units
- $3k$ units

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Permeability in the vertical direction-



$$k_v = \frac{Z_1 + Z_2}{\frac{Z_1}{k_1} + \frac{Z_2}{k_2}}$$

According to question thickness of both the layer is equal.

$$Z_1 = Z_2 = Z$$

$$k_1 = k$$

$$k_2 = 5k$$

$$= \frac{2Z}{\frac{Z}{k} + \frac{Z}{5k}} = \frac{2Z}{\frac{Z}{k} \left(1 + \frac{1}{5}\right)} = \frac{2}{\frac{6}{5}} = \frac{10}{6}k = \frac{5}{3}k$$

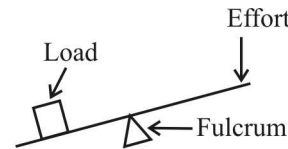
- 56. In which of the classes of lever is fulcrum placed between effort and load?**

- Class 2
- Class 4
- Class 3
- Class 1

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Class-1 lever is fulcrum placed between effort and load.

- In a first class lever the effort moves over a large distance to move the load a smaller distance, and the fulcrum is between the effort and the load.



Class-I lever

- In class -2 levers, the fulcrum lies at one end, the effort is applied at the other end, and the load is placed at the middle.

- 57. Consider the following statements:**

Sinking of an intermediate support of a continuous beam

- reduces the negative moment at support.
- increases the negative moment at support.
- reduces the positive moment at support.
- increases the positive moment at the centre of span.

Of these statements

- (i) and (iv) are correct
- (ii) and (iii) are correct
- (ii) and (iv) are correct
- (i) and (iii) are correct

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Sinking of an intermediate support of a continuous beam-

- Reduces the negative moment at support.
- Increases the positive moment at the centre of span.

- 58. In pre-stressed concrete, high grade concrete is used for-**

- Having Low creep
- Having concrete of low ductility
- Having concrete of high brittleness
- Controlling the pre-stress loss

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) In a prestressed concrete, the high strength concrete, is necessary for prestressed concrete as the material offers high resistance in tension, shear bond and bearing and all other stresses which results different losses

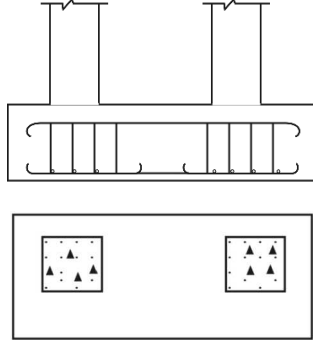
- Achorage, shrinkage, elastic relaxation and other may get reduce to some amount by prestressing. eg: shrinkage in concrete get reduced.

59. If two individual footings are too close as per design, then they should be converted as-
- Combined footing
 - Strap footing
 - Mat raft
 - Strip raft

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Combined footing-

- A combined footing is a long footing supporting two or more columns in one row.
- It can be rectangular or trapezoidal in shape.
- Combined footing can be designed as simple slabs or as a slab with a longitudinal spine beam.



60. Which of the following is NOT anti-virus software?

- McAfee
- Kaspersky
- Oracle
- Norton

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Antivirus software is a program or set of programs that are designed to prevent, search for, detect, and remove software viruses, and other malicious software like worms, trojans, adware and more. McAfee, Kaspersky and Norton are some examples of antivirus software. They perform some essential functions-

- Scan specific file or directories for any malware or known malicious patterns
- Allow you to schedule scan to automatically run for you.
- Show you the 'health' of your computer, etc.

61. A passive sensor uses-

- Its own source of energy
- Sun as the source of energy
- Flash light as a source of energy
- Signals emitted from transmission towers

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Active system- A system which utilized man-made sources of energy for data collection is called on active system.

Passive remote sensing- Passive remote sensing makes use of sensors that detect the reflected or emitted electromagnetic radiation from natural sources.

- Passive detection can only work when the naturally occurring energy is available.

- Passive sensor technologies gather target data through the detection of vibrations, light, radiation, heat or other phenomena occurring in the environment.

62. The maximum height of a projectile is given by-

- $(u^2 \cos^2 \alpha) / 2g$
- $(u^2 \cos 2\alpha) / 2g$
- $(u^2 \sin 2\alpha) / 2g$
- $(u^2 \sin^2 \alpha) / 2g$

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The maximum height of a projectile is given by $(u^2 \sin^2 \alpha) / 2g$.

- Maximum height of projectile is when the projectile reaches zero vertically velocity, from this velocity vector will point downwards. The horizontal displacement of the projectile is called the range of the projectile and depends on the initial velocity of the object.

$$\text{Time of flight} = \frac{2u \sin \theta}{g}$$

$$\text{Horizontal range (R)} = \frac{u^2 \sin 2\theta}{g}$$

63. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$

The above reaction is an example of a

- Double displacement reaction/
- Combination reaction
- Displacement reaction
- Decomposition reaction

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Cu}$

This reaction is an example of a displacement reaction. A displacement reaction is the one wherein the atom or a set of atoms is displaced by another atom in a molecule.

- In the above reaction, iron is added to a copper sulphate solution, it displaces the copper metal.

64. IAQ means-

- Indoor Air Quality
- Interior Airconditioning Quality
- Indoor Air Quantity
- Interior Architectural Quality

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) IAQ (Indoor Air Quality) is air quality within and around the building structure.

- It affects the health

Parameter of (IAQ) it depends- PM_{10} , $\text{PM}_{2.5}$, SO_2 , NO_2 , CO , CO_2 humidity and temperature.

65. In which country's spacecraft did Rakesh Sharma travel into space?

- Germany
- Soviet Union
- UK
- Japan

RRB JE CBT-II 28-08-2019 (evening)

Ans: (b) In 1970 Rakesh Sharma joined the Indian Air force as a pilot. He flew 21 combat mission in a MIG-21 in the Bangladesh war of 1971. In 1982 he was selected as a cosmonaut for a joint Soviet-Indian spaceflight. On April 3, 1984, he flew on board Soyuz T-11 with two soviet cosmonauts, commander Yuri Malyshev and flight engineer Gennady Strekalov, to the space station Salyut 7.

66. Which of the following is the correct statement?

The strength of timber

- (a) Is maximum in the direction 45° to the grain
- (b) Remains same in all directions
- (c) Is maximum in the direction perpendicular to the grain
- (d) Is maximum in the direction parallel to the grain

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Timber (wood) is much stronger parallel to the grain rather than the perpendicular direction because.

- When the stress is applied parallel the grain, the fibres of the wood are oriented in such a way that the whole length resist the stresses.
- The strength of timber is highest in the direction of angle of 0° to the grains.

67. Which of the following is NOT a flood proofing measure for houses?

- (a) Detention basins
- (b) Elevation
- (c) Flood walls
- (d) Dry flood proofing

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Flood proofing measures for houses by flood walls, elevation and dry flood proofing.

- Detention basins is for detention of water in water tank in treatment.

68. The strength of winds is measured with the help of

- (a) Tintometer
- (b) Wind indicator
- (c) Barometers
- (d) Beaufort scale

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The strength of winds is measured with the help of beaufort scale.

- Tintometer is used to measure colour.
- Barometer is used to measure atmospheric pressure.
- Wind indicator is use to assess the direction of winds.

69. To which of the following cities was Swachh Survekshan Award 2019 for India's cleanest city given?

- (a) Mysore
- (b) Ambikapur
- (c) Ahmedabad
- (d) Indore

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Indore has been awarded the cleanest city in the country in the Swachh Survekshan 2019 awards while Bhopal has been declared as the cleanest capital.

• Swachh Survekshan Awards are given by the Union Ministry of Housing and Urban Affairs based on the survey which covered all urban local bodies in the country. The survey is the largest such cleanliness survey in the world.

Note– As per Swachh Survekshan 2021 'Indore' became India cleanest city for 5th year in a row were announced by President Ram Nath Kovind at a function held in 20 November, 2021.

70. In 2019, RBI lauched SRPHi, which stands for:

- (a) Survey on Retail Payment Habits of Individuals
- (b) Survey on Retail Payment History of India
- (c) Survey on Rural Poor Habitation of India
- (d) Survey on Retail Payment Habits of Indians

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) In 2019, RBI launched SRPHI, which stands for : Survey on Retail Payment Habits of Individuals, we know that, the National Payments Corporation of India (NPCI) is an initiative taken by the reserve Bank of India (RBI) and Indian Bank's Association (IBA) to operate the retail payments and settlement systems in India.

71. The Nobel Peace prize for contribution towards environmental conservation in 2004 was awarded to

- (a) Ratan Tata
- (b) Dr. Manmohan Singh
- (c) S.D. Bush
- (d) Wangari Maathai

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The Nobel Peace Prize for contribution towards environmental conservation in 2004 was awarded to Wangari Maathai. For her work as leader of a movement that planted more than 30 million tree across Africa.

Through which state do the rivers Chenab, Ravi, Beas, Sutlej and Yamuna flow?

- (a) Jammu & Kashmir
- (b) Punjab
- (c) Haryana
- (d) Himachal Pradesh

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The perennial rivers found in the state of Himanchal Pradesh are Beas, Ravi, Chenab, Satulaj and Yamuna, Beas river arises from Pir Panjal range near the rohtang pass.

• Chenab is the largest river formed by the two streams named Chandra and Bhagu. Ravi river rises from Bara Bangal of Kangra district, Himachal Pradesh. Satulaj river originate from Tibet crosses the Indo-Tibeten border and joined by the Spit river, Yamuna river originates from Yamunotry in the Uttarkashi district of Uttarakhand.

73. In case public drainage system is not available in a locality, then the structure used to store waste water from toilets is:

- (a) Overhead tank
- (b) Storage tank
- (c) Septic tank
- (d) Sump

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The septic tank is a buried, watertight container usually made up of concrete, fibre glass or polythene.

• It is to hold water (waste) long enough to allow solid to settle down to form sludge.

74. World Water Day is observed on-

- (a) March 22 (b) March 20
- (c) March 24 (d) March 26

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) World Water Day, held on 22 March every year since 1993.

World Habitat Day – First Monday of October

World Tourism Day – 27 September

International Day of Peace – 21 September

Earth Day – 22 April

75. If the initial setting time of cement is 5 minutes, it can be classified as

- (a) Quick setting cement
- (b) Rapid hardening cement
- (c) Sulphate resisting cement
- (d) Low heat cement

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Quick setting cement – It is special type of cement, where the setting time of the cement is to be less and hardening of cement to be fast and where aluminium sulphate is used as an accelerating agent to accelerate the setting time of cement.

• Initial setting time for this type cement are 5 minutes and final setting time is about 30 minutes.

• It used in under - water construction in running water conditions.

• Rainy and cold weather condition.

• Anchoring and tunneling and also under where quick strength is needed in short span of time.

76. The heading up of water above its normal level while passing under the bridge is known as-

- (a) Free board (b) Afflux
- (c) Scour (d) Clearance

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Afflux–It is the heading up of water over the flood level caused by construction or waterway at the bridge site, which can be computed from the relation–

$$x = \frac{V^2}{2g} \left\{ \frac{L^2}{C^2 W^2} - 1 \right\}$$

where,

x = Afflux in m

V = Velocity of normal flow in the river, m/s

L = Width of stream at HFL

C = Coefficient of discharge through the structure

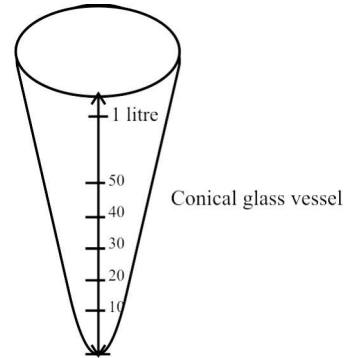
= 0.7 for sharp entry
= 0.9 for bell mouth entry

77. Imhoff cone is used to measure

- (a) Settleable solids
- (b) Suspended solids
- (c) Dissolved solids
- (d) Colloidal solids

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Imhoff cone– The cone is used to measure the volume settleable solids in a specific volume (usually one litre) of water or wastewater.



78. Name the drawing instruments and aids.

- (a) Templates
- (b) Set squares
- (c) All of the options
- (d) Drawing sheet

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The drawing instruments and aids are–

- Templates
- Set squares
- Drawing sheet

79. Tintometer is used to measure

- (a) Hardness
- (b) Odour
- (c) Temperature
- (d) Colour

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Tintometer– It is a device to determine colour in water.

• Unit of colour measurement is TCU.

• 1 TCU is colour produced by 1 mg of platinum cobalt in the form of chloroplatinate ions dissolved in 1 litre of distilled water.

• As per IS 10500 : 2012 acceptable limit is 5 TCU and cause for rejection is 15 TCU.

80. The bracing provided in the plane of end posts is called

- (a) Top lateral bracing
- (b) Bottom lateral bracing
- (c) Portal bracing
- (d) Sway bracing

RRB JE CBT-II 28-08-2019 (evening)

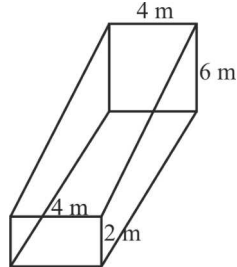
Ans : (c) The bracing provided in the plane of end posts is called portal bracing.

81. What is the volume of a 6 m deep tank having rectangular shaped top 6 m × 4 m and bottom 4 m × 2 m (computed through the use of prismoidal formula)?

- (a) 92 m³ (b) 94 m³
(c) 90 m³ (d) 96 m³

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a)



Given,

$$2L = 6 \text{ m}$$

$$L = 3 \text{ m}$$

$$\text{Top area } (A_1) = 6 \times 4 = 24 \text{ m}^2$$

$$A_1 = 24 \text{ m}^2$$

$$\text{Bottom area } (A_2) = 4 \times 2 = 8 \text{ m}^2$$

Volume (V) of the earth work between a number of sections having area A_1, A_2, \dots, A_n . Spaced at constant distance d apart is –

$$V = \frac{d}{3} \left[(A_1 + A_n) + 4(A_2 + A_4 + \dots + A_{n-1}) + 2(A_3 + A_5 + \dots) \right]$$

$$\text{Volume } (V) = \frac{L}{3} (A_1 + 4A_m + A_2)$$

$$A_m = \frac{6+4}{2} \times \frac{4+2}{2}$$

$$= 5 \times 3 = 15$$

$$V = \frac{3}{3} (24 + 4 \times 15 + 8)$$

$$\text{Volume } (V) = 92 \text{ m}^3$$

82. Which of the following cricketers was/were induced as the Honorary Life Members of the Marylebone Cricket Club (MCC) in April, 2019?

- (a) Virat Kohli
(b) Inzamam-ul-Haq
(c) Mark Boucher
(d) Both Inzamam-ul-Haq and Mark Boucher

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Inzamam-ul-Haq and Mark Boucher were induced as the Honorary Life Members of the Marylebone Cricket Club (MCC) in April 2019.

83. The minimum grades for PCC and RCC structure as per IS code is:

- (a) M 20 and M 30 respectively
(b) M 10 and M 15 respectively
(c) M 15 and M 20 respectively
(d) M 10 and M 20 respectively

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) As per IS 456 : 2000

Exposure condition	Min grade (PCC)	Min grade (RCC)	Min cover (mm)	Min Cement content kg/m ³ (PCC)	Min cement content kg/m ³ (RCC)	Max water cement ratio (PCC)	Max water cement ratio (RCC)
Mild	–	M 20	20	220	300	0.60	0.55
Moderate	M 15	M 25	30	240	300	0.60	0.50
Severe	M 20	M 30	45	250	320	0.50	0.45
Very severe	M 20	M 35	50	260	340	0.45	0.45
Extreme	M 25	M 40	75	280	360	0.40	0.40

84. Which of the following protocols is responsible for converting higher level protocol addresses to physical network addresses?

- (a) Address Resolution Protocol (ARP)
(b) Internet Control Message Protocol (ICMP)
(c) Bootstrap Protocol (BOOTP)
(d) Reverse Address Resolution Protocol (RARP)

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Address Resolution Protocol (ARP) is responsible for converting higher level protocol addresses to physical network addresses. ARP is a procedure for mapping a dynamic IP addresses to a permanent physical machine address in a local area network.

• The physical machine address is also known as a media access control (MAC) address. The job of ARP is essentially to translate 32-bit address to 48 bit addresses and vice-versa. This is necessary because IP addresses in IP version 4 (IPv 4) are 32 bits, but MAC addresses are 48 - bits.

85. For limit state of collapse, the partial safety factors recommended by IS 456:2000 for estimating the design strength of concrete and reinforcing steel are respectively-

- (a) 1.5 and 1.0
(b) 1.15 and 1.5
(c) 1.0 and 1.0
(d) 1.5 and 1.15

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) For limit state of collapse, the partial safety factors recommended by IS 456:2000 for estimating the design strength of concrete and reinforcing steel are respectively 1.5 and 1.15

86. The financial analysis helps to judge:

- (a) Both the operational efficiency of the firm and the financial position of the firm
(b) Neither operational efficiency of the firm nor financial position of the firm
(c) The operational efficiency of the firm
(d) The financial position of the firm

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The financial analysis helps to judge the operational efficiency and financial position of the firm. The goal of financial analysis is to analyze whether an entity is stable, solvent, liquid or profitable enough to warrant a monetary investment.

• It is used to evaluate economic trends, set financial policy, build long-term plans for business activity and identify projects or companies for investment.

87. If there is any obstruction to the uniform settlement of hardened concrete, it forms a crack known as

- (a) Random crack
- (b) Shear crack
- (c) Settlement crack
- (d) Longitudinal crack

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) If there is any obstruction to the uniform settlement of hardened concrete, it forms a crack known as **Settlement crack**.

88. The highest point on a carriage way is known as

- (a) Camber
- (b) Super elevation
- (c) Crown
- (d) Gradient

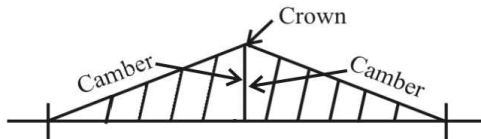
RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The highest point on a carriage way is known as summit/crown or peak point.

Camber– It is transverse slope provided in roadway for drainage purpose only.

Superelevation– When a vehicle is travelling on horizontal curve, centrifugal force is act so counter the effect of centrifugal force outer edge of pavement is raised w.r.t. inner edge which is termed as superelevation.

Gradient– It is defined as the rate of rising or falls along the length of the road w.r.t. the horizontal.



89. Superplasticizer increases slump of concrete due to which phenomenon?

- (a) Dispersion and deflocculation of cement particles
- (b) Deterioration of cement particles
- (c) Densification of cement particles
- (d) Drying of cement particles

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Super plasticizer increase slump of concrete by increasing the fluidity of concrete without adding excess water.

Note–(i) Superplasticizer reduce the water content upto 30% without changing the flow of concrete.

(ii) Superplasticizers proportion can be varied from 0.5 to 3% of weight of cement depending on the purpose to be served.

90. Which of the following is the most reliable estimate?

- (a) Cube rate estimate
- (b) Plinth area estimate
- (c) Preliminary estimate
- (d) Detailed estimate

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Detailed estimate is most reliable estimate. A detailed estimate is prepared after its complete set of drawings a ready. The quantities of various items of work are worked out from such drawings and are multiplied by the present rates of items of works to arrive at the estimate cost of the work.

- It is prepared by after its complete set of drawing are ready.

- The quantity of item workout from drawing and each rates are described in details.

Purpose of detailed estimate–

- Technical sanction
- Administrative approval
- Framing and inviting tender
- To know material required and project duration
- Accurate ideal of cost of construction.

Preliminary estimate– It is prepared by various way for different structure.

Plinth area estimate– Plinth should be calculated for covered area by taking external dimensions of the building the floor level.

Cube rate estimate– It is more accurate as compared to the plinth area estimate.

Cube rate estimate is type of approximate estimate.

91. The point of contraflexure is the point at which _____ changes its sign.

- (a) Torsional moment
- (b) Shear force
- (c) Bending moment
- (d) All of the options

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The point of contraflexure is the point at which bending moment changes its sign.

- Shear force is the rate of change of bending moment.
- For bending moment to be the maximum or minimum, shear force should change its sign.

92. What is the unit of refractive index?

- (a) m^{-1}
- (b) Dioptre
- (c) No unit
- (d) m/s

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Refractive index, also called index of refraction, is a measure of the bending of a ray of light when passing from are medium into another.

93. _____ and water in the air react together to form carbonic acid.

- (a) All of the options
- (b) Carbon
- (c) Carbon monoxide
- (d) Carbon dioxide

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Carbon dioxide and water in the air react together to form carbonic acid. It has the chemical formula H_2CO_3 . Carbonic acid is often described as a respiratory acid since it is the only acid that is exhaled in the gaseous state by the human lungs.

It is a weak acid and it forms carbonate and bicarbonate salts. Ringworm and other dermatitides are treated via the application of carbonic acid over the affected area.

94. Compounds of which of the following metals is used in black and white photography?

- (a) Cu (b) Ag
(c) Au (d) Al

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) The compounds of Silver (Ag), Silver Bromide and Silver Chloride are used in black and white photography. These two are photosensitive compounds. But Silver Iodide is used in cloud seeding.

95. The member which is subjected to bending is called

- (a) Beam (b) Column
(c) Footing (d) Slab

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The member which is subjected to bending is called beam.

96. Soundness of cement is tested by

- (a) Vicat apparatus
(b) Hopper apparatus
(c) Le-chatelier apparatus
(d) Izod apparatus

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Le-Chatelier apparatus is used to measure soundness of cement.

- Unsoundness of the cement is increase in volume of cement after setting due to presence of free lime and magnesia.
- Le-Chatelier method is used in case of unsoundness due to free lime only.

97. Which of the following is a waterborne disease?

- (a) Tuberculosis
(b) Anthrax
(c) Cholera
(d) Small pox

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Waterborne diseases are those that are transmitted by ingestion of contaminated water. Important waterborne diseases include Diarrhoeal Diseases, Cholera, Shigella, Typhoid, Hepatitis A and E, and Poliomyelitis.

98. Which of the following output devices is used for translating information from a computer into pictorial form on paper?

- (a) Plotter
(b) Touch panel
(c) Keyboard
(d) Card punch

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Plotters are used to print graphical output on paper. It interprets computer commands and makes line drawings on paper using multicoloured automated pens.

It is capable of producing graphs. Drawing, charts, maps etc. Computer Aided Engineering (CAE) application like CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) are typical usages areas for plotters.

99. For which of the following games is the "Indira Gandhi Gold Cup" awarded?

- (a) Women's football
(b) Women's cricket
(c) Women's hockey
(d) Women's badminton

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Indira Gandhi Gold Cup is associated with Women's hockey.

Trophy	Sports
American Cup	– Yacht Racing
Davis Cup	– Tennis (Men)
Ryder Cup	– Golf (Men)
Uber Cup	– Badminton (Women)
Walker Cup	– Golf

100. In which of the following districts of Jharkhand is bauxite obtained?

- (a) Lohardaga
(b) Gumla
(c) All of the options
(d) Lather

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Ans : (c) Lohardaga district is rich in mineral resources, Lohardaga district is known for Bauxite mineral. This Bauxite extends to Pakhar, Hisari, Rudhali Pat, Khamar Pat, Gumla and Latehar district also, which goes to the north-west, Lohardaga is known for producing world classes bauxite and hence known as 'Bauxite town'.

101. The critical load for a long column with both ends fixed is 160 kN. If the same section is to be used for another column of double the length, the critical load is:

- (a) 160 kN (b) 40 kN
(c) 80 kN (d) 320 kN

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Ans : (b) $P = \frac{\pi^2 EI}{l_e^2}$
 $160 = \frac{\pi^2 EI}{(l/2)^2}$ (Fixed at both end)
 $l_e = l/2$

When $l_e = 2l$

$$P' = \frac{\pi^2 EI}{l_e^2} = \frac{\pi^2 EI}{(2l)^2} = \frac{\pi^2 EI}{4 \left(\frac{l}{2}\right)^2} = \frac{160}{4}$$

$$P' = 40 \text{ kN}$$

102. Ozone layer absorbs _____ which are very harmful for the living organisms.

- (a) Gamma rays (b) Infrared rays
(c) X-rays (d) Ultraviolet rays

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Ans : (d) Ozone layer absorbs ultraviolet rays which are very harmful for the living organisms. It absorbs 97-99% of the UV radiation from the Sun. It is a layer in the earth's stratosphere that contains high level of Ozone. Some ozone depleting substances are CFCs, HCFCs, Halons, Methyl, Bromide, Carbon, Tetrachloride and Methyl Chloroform, Montreal protocol is treaty adopted in 1987 to phase out the production and use of Ozone depleting substances.

103. Which of the following forms of land degradation is more prevalent in India?

- (a) Soil subsidence
- (b) Landslide
- (c) Desertification
- (d) Soil erosion

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Ans : (d) Soil erosion is the natural process in which the topsoil of a field is carried away by physical sources such as wind and water. Some causes of soil erosion are rainfall and flooding, agriculture, grazing, logging and mining, construction, rivers and streams and heavy winds. It is a form of land degradation which is more prevalent in India.

104. The vibrating of the concrete before grouting makes the quality of concrete

- (a) Fair
- (b) Slow
- (c) Low
- (d) Better

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Ans : (d) Grouting– Grouting is basically a process of injecting a pump able material into a structure to change its physical properties.

- The vibrating of the concrete before grouting makes the quality of concrete better.

105. In a compaction factor test of concrete, if the compaction value is less than 0.95 and greater than 0.85, then the standard of the workability is:

- (a) Medium
- (b) Good
- (c) Fair
- (d) Very good

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Ans : (a)

Compaction factor test	Index
Very low	0.78-0.80
Low	0.80-0.85
Medium	0.85-0.92
High	Greater than 0.92

106. What is the correct formula of washing soda?

- (a) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$
- (b) $\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$
- (c) $\text{Na}_2\text{CO}_3 \cdot 6\text{H}_2\text{O}$
- (d) Na_2CO_3

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Ans : (a) The chemical formula of washing soda is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. It is also known as soda ash. The process by which sodium carbonate (washing soda) is obtained is called solvay process. It is used in the process of softening of water and paper industry.

107. Gypsum used in cement manufacturing acts as a/an

- (a) Retarder
- (b) Air entraining agent
- (c) Accelerator
- (d) Plasticizer

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Ans : (a) Retarder – These are admixture that down the process of hydration or to control setting of cement. Generally Gypsum mixture in cement 2-3%.

Exp. – Sugar, Gypsum, Carboxylic acid.

108. Local attraction in compass surveying may exist due to

- (a) Loss of magnetism of the needle
- (b) Incorrect levelling of the magnetic needle
- (c) Presence of magnetic substances near the instrument
- (d) Friction of the needle at the pivot

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Ans : (c) Local attraction in compass surveying is occurs when the magnetic needle is sometime disturbed from its normal position under the external attractive force or presence of magnetic substance.

109. The best type of crusher for manufacturing M Sand is

- (a) VSI Crusher
- (b) Cone Crusher
- (c) Jaw Cursher
- (d) Roll Crusher

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Ans : (a) VSI Crusher form is a vertical shaft impact crushed this is one of the most commonly used crusher in M sand making and it is gaining popularity due to the good quality of the produced sand.

110. What is the rate of back-washing of filtration in a typical rapid sand filter?

- (a) 6
- (b) 10
- (c) 2
- (d) 4

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Ans : (*) In a typical rapid sand filter six is the ratio of back-washing of filtration.

In STP, back washing is 6 times effective to the sand filter. Rate of backwashing = 6–16 times the actual rate of rapid sand filtration.

Note : The commission has dismissed the question.

111. While designing the pile as a column, the end conditions adopted is

- (a) One end fixed and other end free
- (b) Both ends fixed
- (c) One end fixed and other end hinged
- (d) Both ends hinged

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Ans. (c) : While designed pile as a column one end considered as fixed and other end considered as hinged.



112. In Highway Construction engineering, the equipment HMA means-

- (a) Hot Mix Aggregate Plant
- (b) Hot Mix Admixture
- (c) Hard Mix Asphalt Plant
- (d) Hot Mix Asphalt Plant

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Ans : (d) Hot mix asphalt Plant is a plant used for manufacture of asphalt, macadam and other form of coated roadstone sometimes.

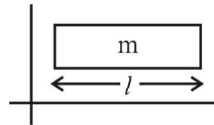
• In include high quality aggregate, RAP and liquid asphalt cement.

113. Mass moment of inertia of a uniform thin rod of mass (m) and length (l) about its mid-point and perpendicular to its length is-

- (a) $3/4 m l^2$
- (b) $m l^2 / 12$
- (c) $2/3 m l^2$
- (d) $m l^2 / 3$

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Ans : (b)



$$\frac{I}{l} = \frac{\frac{m \times l^3}{12}}{l} = \frac{m \times l^2}{12}$$

114. The penetration value of residue from distillation upto 360°C of rapid curing cutback bitumen is-

- (a) 80 to 120
- (b) 30 to 120
- (c) 100 to 160
- (d) 40 to 80

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Ans : (a) A penetration value of residue from distillation up to 360°C of rapid curing cut back bitumen is (80 to 120)°.

Rapid curing– Rapid curing cut back are bitumen with a petroleum distillate such as Naphtha or gasoline, which rapid by evaporate after used in construction of pavement.

Medium curing– With boiling point solvent such as kerosene and light diesel.

Slow curing– High boiling point gas

115. The moment distribution method in structural analysis is also called as

- (a) Flexibility method
- (b) Displacement method
- (c) Force method
- (d) Unit method

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Ans : (b) Example of force methods :

- (a) Castigliano's theorem
- (b) Strain energy method
- (c) Virtual energy method
- (d) Clapeyron's three moment equations
- (e) Column analogy method

(f) Flexibility matrix method

Example of displacement method :

- (a) Slope deflection method
- (b) Moment distribution method
- (c) Stiffness matrix method
- (d) Kani's method

116. If Reynolds number is _____ then the flow of fluid through a pipe is laminar.

- (a) < 2000
- (b) > 4000
- (c) > 2000
- (d) < 4000

RRB JE CBT-II 28-08-2019 (evening)

Ans. (a) The limiting values of Reynolds Number corresponding to which flow is laminar is given by

Flow condition	Pipe flow	Open channel flow
Laminar flow	$R_e \leq 2000$	$R_e \leq 500$
Transitional flow	$2000 < R_e < 4000$	$500 < R_e < 2000$
Turbulent flow	$R_e > 4000$	$R_e > 2000$

117. The ratio of current assets to current liabilities is known as:

- (a) Debts ratio
- (b) Liquidity ratio
- (c) Acid-test (or quick) ratio
- (d) Current ratio

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Ans : (d) The current ratio compass all of a company's current assets to its current liabilities. The current ratio helps investors understand more about a company's ability to cover its short-term debt with its current assets and make apples to apples comparisons with competitors and peers.

118. The Law of Triad was given by

- (a) Henry Moseley
- (b) John Newlands
- (c) D.I. Mendeleev
- (d) J.W. Dobereiner

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The law of Triad was given by J.W. Dobereiner. It stated that the arithmetic mean of the atomic masses of the first and third element in a triad would be approximately equal to the atomic mass of the second element in the triad.

119. Cleaning of hard to reach places inside a spiral tube, odd shaped parts, electronic components etc. is done using which waves?

- (a) Supersonic waves
- (b) Infrasonic waves
- (c) Ultrasonic waves
- (d) Subsonic waves

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Ans : (c) Cleaning of hard to reach places inside a spiral tube, odd shaped parts, electronic components etc. is done using ultrasonic waves.

• Ultrasonic waves are sound waves whose frequencies are higher than those of waves normally audible to the human ear.

120. A method in which mortar conveyed through a hose and pneumatically projected at a high velocity onto a surface is called.

- (a) Varnishing
- (b) Concreting
- (c) Ferrocement
- (d) Gunite

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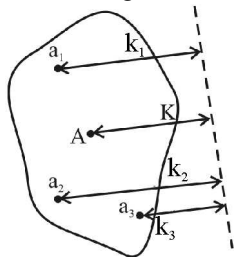
Ans : (d) A method in which mortar conveyed through a hose and pneumatically projected at a high velocity onto a surface is called gunite.

121. The distance of a point where the whole area of a body is assumed to be concentrated from a given axis is called

- (a) Second moment of area
- (b) Mass moment of inertia
- (c) Moment of inertia
- (d) Radius of gyration

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Ans : (d) Radius of gyration of a body is defined as the whole mass/area of the body is assumed to be concentrated from a given axis so as not to alter the moment of inertia about the given axis.



$$I = a_1 k_1^2 + a_2 k_2^2 + a_3 k_3^2 \dots\dots$$

$$I = \sum k^2 A \quad A = a_1 + a_2 + a_3$$

$$I = K^2 A, \quad \Sigma k^2 = k_1^2 + k_2^2 + k_3^2$$

$$K = \sqrt{\frac{I}{A}}$$

122. Formation of snow occurs if the cloud temperature is:

- (a) Equal to the freezing point
- (b) At the freezing point
- (c) Just above the freezing point
- (d) Below the freezing point

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Formation of snow occurs if the cloud temperature is below the freezing point. Snow is defined as solid precipitation which occurs in variety of minute ice crystals at temperatures well below 0°C but as larger snowflakes at temperatures near 0°C.

123. A project construction cost estimate includes the

- (a) Equipment and over head cost
- (b) All of the options
- (c) Labour and material cost
- (d) Profit of the contractor

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Ans : (b) A project construction cost estimate includes

- Labour and material cost
- Profit of the contractor
- Equipment and over head cost
- Transportation and including all supervision
- Liquidity damage

124. A change in state directly from solid to gas without changing into liquid state is called ___.

- (a) Vapourisation
- (b) Sublimation
- (c) Condensation
- (d) Fusion

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) A change in state directly from solid to gas without changing into liquid state is called sublimation. This process is an endothermic phase transition that occurs at a temperature and pressure below the triple point of the substance, Camphor, Iodine, Ammonium Chloride, Naphthalene and dry ice are some example of sublime.

125. Who among the following assumed charge as the 23rd Chief Election Commissioner of India?

- (a) Achal Kumar Jyoti
- (b) Sunil Arora
- (c) Om Prakash Rawat
- (d) Nasim Zaidi

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Ans : (b) Sunil Arora is the 23rd Chief Election Commissioner of India, succeeding Om Prakash Rawat. Article 324 of the constitution provides that the election commission shall be vested with the power of superintendence, direction and control of election to parliament, state legislatures, the office of president of India, the office of vice-president of India. Sushil Chandra is the 24th Chief Election Commissioner of India and at present Rajiv Kumar is the 25th Chief Election Commissioner of India from May 15, 2022.

126. A cantilever beam of size 230 × 400 mm has a clear span of 2.5 m and is supported on a 400 × 400 mm column. The effective span of the cantilever is-

- (a) 2.7 m
- (b) 2.9 m
- (c) 2.615 m
- (d) 3.3 m

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a)

$$l_0 = \text{clear span} = 2.5 \text{ m} = 2500 \text{ mm}$$

$$D = \text{depth of beam} = 400 \text{ mm,}$$

$$W = \text{width of support} = 400 \text{ mm}$$

$$l_{\text{eff}} = l_0 + \frac{W}{2}$$

$$l_{\text{eff}} = 2500 + \frac{400}{2}$$

$$= 2700 \text{ mm}$$

$$= 2.7 \text{ m}$$

127. The objectives of the Integrated Child Development Services (ICDS) are

- (a) Pre-school non-formal education
- (b) Immunization
- (c) All of the options
- (d) Health check up and referral services/

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Ans : (c) Launched on 2nd October, 1975 the Integrated Child Development Service (ICDS) scheme is one of the flagship programmes of the Government of India and represent one of the world's largest and unique programmes for early childhood care and development. The ICDS scheme offers a package of six services, viz- supplementary Nutrition, Pre-school non-formal education, Nutrition and health education, Immunization, Health check-up and referred service.

128. Fibres used in FRC are also called as

- (a) Secondary reinforcements
- (b) Super reinforcements
- (c) Slim reinforcement
- (d) Slender reinforcement

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Fibres used in Fibre reinforced concrete (FRC), which increases structural integrity.

- They are usually used to control cracking due to plastic shrinkage and dry shrinkage that's why it is called as secondary reinforcement.

129. What is the main principle of Prestressed Concrete Structure?

- (a) To introduce tensile stresses
- (b) To introduce shear stress
- (c) To introduce compressive stresses in the zone where tensile stresses are expected
- (d) To introduce deflection

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The principles of pre-stressed concrete structure is to introduce compressive stresses in the concrete section.

- Both pre-stressing we can reduce the tensile stress in the section to the point till the tensile stress is below the cracking stress, thus the concrete doesn't crack.
- Concrete can have two compressive stresses
 - Internally pre stressing force due to (tendons/ anchorage)
 - Externally force due (dead load and live load) etc.

130. A phreatic line is defined as the line within a dam section below which there is/are

- (a) Negative hydrostatic pressure
- (b) Negative equipotential lines
- (c) Positive hydrostatic pressure
- (d) Positive equipotential lines

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) A phreatic line is defined as the line within dam section below which there are positive hydrostatic pressure. The pressure on the phreatic line is atmospheric.

➤ The top most flow line below which seepage takes place is termed as "phreatic line".

➤ It is used to separates saturated soil mass from unsaturated soil.

➤ Presence below phreatic line is hydrostatic whereas pressure above or on phreatic line is atmospheric.

131. The surface of painting is measured in-

- (a) Cu. ft
- (b) Tonnes
- (c) Sq.m
- (d) Cu.m

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Ans. (c) :	
Description	Unit
Painting work/ Distemper/ Colour washing	m ²
Earthwork, stone/brick work	m ³
Shutter, Panel, batten	m ²
Pointing, DPC, Plastering, door	m ²
Steel/Iron work	Kg/quintal
Partition wall/Half brick wall	m ²

132. Pick up the correct statement from the following.

- (a) All of the options
- (b) Engineering economy is a decision assistance tool by which one method will be chosen as the most economical one
- (c) For understanding the engineering economy, one should be able to classify the basic terminology and fundamental concepts of economy
- (d) Engineering economy is a collection of mathematical techniques which simplify economic comparisons

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Ans : (a) The correct statements are –

- Engineering economy is a decision assistance tool by which one method will be chosen as the most economical one.
- For understanding the engineering economy, one should be able to classify the basic terminology and fundamental concepts of economy.
- Engineering economy is a collection of mathematical techniques which simplify economic comparisons.

133. In a trussed bridge, the maximum limit of span is-

- (a) 18 to 30 m
- (b) 50 to 150 m
- (c) 3 to 7.5 m
- (d) 30 to 80 m

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Ans : (b) In a trussed bridge, the maximum limit of span is 50 to 150 m.

In a truss bridge–

- Simply truss bridge is in the range of 55m to 85m
- Continuous truss bridge is in the range of 60m to 300m
- Cantilever truss bridge is in the range of 300m to 510m.

134. Which of the following is the process of removal of permanent hardness of water?

- (a) Boiling of water
- (b) Zeolite process
- (c) Filtration process
- (d) Lime treatment

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Ans : (b) • Permanent hardness of water can be removed by zeolite process.

- Hardness due to SO_4^{2-} , Cl^- and NO_2^{3-} of multivalent cation is referred as non carbonate hardness.
- It may be referred as permanent hardness it cannot be removed by simple boiling or by addition of a lime.
- Zeolite process is the best process of remove permanent hardness from the water.

135. When does a quick sand condition is developed in soil?

- (a) Head causing downward flow is decreased/
- (b) Head causing upward flow is decreased/
- (c) Head causing downward flow is increased/
- (d) Head causing upward flow is increased/

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Ans : (d) • Quick sand condition is a condition occurs in a sand when the effective stress is reduced due to upward flow of water.

- When the upward flow is increased a stage is reached at which effective stress is reduced to zero.
- The condition so developed is known as quick sand condition.

136. EOT crane means

- (a) Earth moving Overhead Truck type/
- (b) End Open Type
- (c) Electric Overhead Travelling
- (d) Easy Operation Type/

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) EOT crane stands for Electric Overhead Travelling Crane.

- This is used for handling and moving a maximum heavy load of the components to a specific area.

137. Why are moorings provided?

- (a) For towing the ships to the sea/
- (b) For repair of ships
- (c) For washing of ships and ship boards/
- (d) For anchoring of ships

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The purpose of mooring is to safely hold a ship in a certain position to accomplish a specific mission. A key need is to safely hold the vessel to protect the ship, life the public interest and to preserve the capabilities of the vessel and surrounding facilities.

138. Special types of glazed tiles or bricks are used as facing material for the rubble or concrete or brick backing in

- (a) Stone facing with Brick, Rubble or Concrete baking masonry/
- (b) Random Rubble masonry
- (c) Brick facing with Rubble or Concrete backing masonry
- (d) Brick backed Ashlar masonry

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) Brick facing with Rubble or concrete backing masonry. In this type of composite rough tooled and chamfered stones are provided in facing while cost of construction as the rubbles are available at a cheap rate.

139. The international protocol to protect the ozone layer in 1987 was

- (a) Montreal Protocol
- (b) Cartagena protocol
- (c) Vienna Convention
- (d) Kyoto protocol

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The international protocol to protect the Ozone layer in 1987 was Montreal protocol. Ozone depletion is caused by human related emission of ozone-depleting substances (ODSs) and subsequent release of reactive halogen gases, especially Chlorine and Bromine, in the stratosphere. Cartagena protocol and Kyoto protocol are associated with biodiversity and global warming respectively.

140. The water in the soil which is in excess of the hygroscopic and capillary water and which can move freely downwards when the soil is porous and drainage available is called-

- (a) Free water
- (b) Hygroscopic water
- (c) Firing water
- (d) Capillary water

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) The water in the soil which is in excess of the hygroscopic and capillary water and which can move freely downwards when the soil is porous and drainage available is called free water.

141. Mini drafter combines the functions of

- (a) T-square and Set squares
- (b) FrenchCurve and Procircle
- (c) All of the options
- (d) Divider and Compass

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Drafting machine- The uses and advantage of T-square, set square and the protractor are combined in the drafting machine.

142. Which type of radiation is emitted from Carbon 14?

- (a) Gamma
- (b) Alpha
- (c) All of the options
- (d) Beta

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) The nucleus of Carbon 14 contains 6 protons and 8 neutrons, as opposed to the 6 and 6 found in ordinary carbon 12. The imbalance makes carbon 14 a radioisotope with a half-life of 5700 years and emitter of beta particles.

143. The quantity of heat required to raise the temperature of unit mass of material by one degree centigrade is called

- (a) Temperature stress
- (b) Thermal expansion
- (c) Heat of hydration
- (d) Specific Heat

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Specific heat, the quantity of heat required to raise the temperature of one gram of substance by one degree celsius. The unit of specific heat are usually calories or joules per-celsius degree.

144. The main factor to be considered first in town planning is –

- (a) Society needs
- (b) Governing body and cultural
- (c) Topography
- (d) Ecology of land

RRB JE CBT-II 28-08-2019 (evening)

Ans : (c) The main factor to be considered first in town planning is topography. Topography is the study of the land surface. In particular, it lays the underlying foundation of a landscape. Planning process is : Identification and Definition of problem → Defining the objectives → Data collection → Data analysis → Forecasting → Design → Fixing the priorities → Implementation → Review, Evaluation → Feedback.

145. A flexible curve consists of a lead bar inside rubber which bends conveniently to draw a smooth curve through any set of points. Which of the following drawing aid is this?

- (a) Scale
- (b) French curves
- (c) Set square
- (d) Divider

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) French curves– A flexible curve consists of lead bar inside rubber which could bends conveniently to draw a smooth curve through any set of points.

146. Analysis of continuous beam can be done by–

- (a) All of the options
- (b) Slope deflection method
- (c) Three moment theorem
- (d) Moment distribution method

RRB JE CBT-II 28-08-2019 (evening)

Ans : (a) Analysis of continuous beam can be done by–
• SDM (Slope deflection method)
• MDM (Moment distribution method)
• Three moment method

147. is the process of inviting bids or proposal in response to an invitation.

- (a) Starting
- (b) Scheduling
- (c) Planning
- (d) Tendering

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) It is an invitation form the owner to the contractor to execute some work at specified cost in specified time.

➤ Tending is the process of inviting bids or proposal in response to an invitation.

148. The _____ statement is used to transfer the control to the end of statement block in a loop.

- (a) Continue
- (b) Break
- (c) Goto
- (d) Switch

RRB JE CBT-II 28-08-2019 (evening)

Ans : (b) Break statement– A break statement is used to terminate the execution of a statement block. The next statement which follows this statement block will be executed. The keyword is break.

149. For a constant aggregate cement ratio, if the coarse aggregate is increased at the expense of sand, maintaining total aggregate cement ratio constant, then the total surface area of the aggregate is

- (a) Depends on Other factor
- (b) Remains Unchanged
- (c) Increased
- (d) Reduced

RRB JE CBT-II 28-08-2019 (evening)

Ans : (d) Aggregate cement ratio– It is the ratio of weight of aggregate to the weight of cement.

➤ At constant aggregate cement ratio, if coarse aggregate is increased then total surface area of the aggregate is decreased.

150. The equation of continuity of flow is applicable when the

- (a) All of the options
- (b) Flow is one dimensional
- (c) Velocity is uniform over the cross section
- (d) Flow is steady

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Ans : (a) Continuity equation is the flow rate has the same value at very position along a tube that has a single entry and single exit for fluid flow.

This principal is known as the conservation of mass.

Assumption–

- (i) Flow should be incompressible
- (ii) Non viscous
- (iii) Steady flow



Railway Recruitment Board (RRB) Junior Engineer Civil (CBT-II) Exam-2019

Date- 29-Aug-2019

Time- 15:00-17:00

1. **Bending moment at any section in a conjugate beam gives the actual beam's –**

- (a) Slope (b) Deflection
(c) Bending moment (d) Curvature

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Bending moment at any section in a conjugate beam gives deflection in the actual beam.

Real beam	Conjugate beam
(i) Free end	Fixed end
(ii) Internal hinge	Internal pin or roller support
(iii) Slope at any point in real beam	Shear force at that point or section in conjugate beam
(iv) End pin or roller connection	Remains same
(v) Deflection at any point in real beam	B.M. at that point or section in conjugate beam
(vi) M/EI diagram of real beam due to top applied load	Loading on conjugate beam

2. **The processes that are residing in main memory and are ready and waiting to be executed, are kept on a list called–**

- (a) Ready queue (b) Process queue
(c) Job queue (d) Execution queue

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) The processes that are residing in main memory and are ready and waiting to be executed, are kept on a list called ready queue. The ready queue is a simplified version of kernel data structure consisting of a queue with one entry per priority.

3. **When is Halloween celebrated?**

- (a) 1 December (b) 29 September
(c) 3 November (d) 31 October

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Ans. (d) Halloween celebrated on 31 October. This tradition originated with the ancient Celtic festival of Samhain, when people would light bonfires and wear costumes to ward off ghosts. It is celebrated as contraction of All Hallow's Eve (The evening before all Saints) (or All Hallow's day).

4. _____ addressing mode is most suitable to change the normal sequence of execution of instructions.

- (a) Immediate (b) Indirect
(c) Relative (d) Index

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Ans. (c) Relative addressing mode is most suitable to change the normal sequence of execution of instructions. The relative addressing mode is used for this since it directly updates the PC. In this mode, the effective address (EA) of the operand is calculated by adding displacement and the register value.

5. **Which of the following is NOT a type of page margin?**

- (a) Center (b) Right
(c) Left (d) Top

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Ans. (a) Center part of a page is not a type of page margin. The type of page margins are top, bottom, right & left.

6. **Mullers Breslau's principle can be applied to–**

- (a) To draw the influence line diagram to statically determinate and indeterminate structures
(b) To draw the influence line diagram to statically indeterminate structures only
(c) To draw the phreatic line diagram to statically determinate and indeterminate structures
(d) To draw the influence line diagram to statically determinate structures only

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Ans. (a) Mullers Breslau's principle– "If an internal stress component (Shear force and Bending Moment etc) or reaction component is allowed to at through a small distance thereby causing deformation of the structure, the curve of the deformed shape represents to some scale, the influence line for that stress or the reaction component."

Application– Muller Breslau's principle is application to all structure, determinate or indeterminate.

Influence lines can be drawn for all structures determinate or indeterminate.

7. **Grade of Cement and Concrete is expressed in which SI units?**

- (a) MPa (or) N/mm² (b) Kg/cm²
 (c) Psi (d) Pa (or) N/m²

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Ans. (a) Grade of concrete shows compressive strength of concrete in MPa.

For example-

M represents Mix

20 represents Compressive strength of concrete (20 MPa)

$$1 \text{ MPa} = 10^6 \frac{\text{N}}{\text{m}^2}$$

$$= 10^6 \frac{\text{N}}{(10^3 \text{ mm}^2)} = 10^6 \times \frac{\text{N}}{10^6 \text{ mm}^2}$$

$$1 \text{ MPa} = 1 \text{ N/mm}^2$$

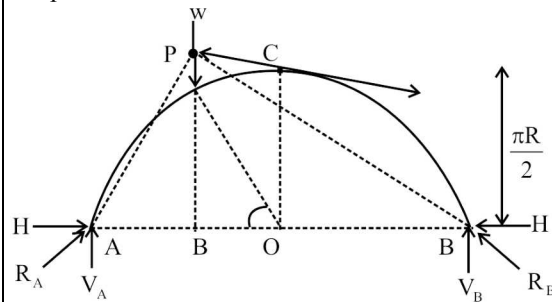
8. **The locus of the reaction of a two hinged semi-circular arch is-**

- (a) Straight line
 (b) Parabola
 (c) Hyperbola
 (d) Circle

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Ans. (a) The locus of the reaction of a two hinged semi-circular arch is a straight line.

• The locus of the reaction of two hinged parabolic arch is a parabolic curve.



• Reaction locus is straight line parallel to the line joining abutment and height at $\pi R/2$.

9. **Which of the following cannot be done with help of theodolite in surveying?**

- (a) Setting Out curves
 (b) Establishing grades
 (c) Determining the difference in elevation
 (d) Determining the area of ground

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Ans. (d) The theodolite is a most accurate surveying instrument mainly used for:-

1. Measuring horizontal and vertical angles.
2. Locating points on a line
3. Prolonging survey lines
4. Finding difference of level

5. Setting out grades/curves.

6. Ranging curves

7. Tacheometric survey.

10. **A computer _____ is a type of malware that propagates by inserting a copy of itself into and becoming part of another program.**

- (a) Virus
 (b) Spyware
 (c) Program
 (d) Application

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Virus- The term stands for vital information resources under siege. A computer virus is self-replicating program containing code that explicitly copies itself into other executable codes or programs. It spreads from one computer to another leaving infection as it travels.

Malware is short for malicious software –

• Malware is general term used to refer to a variety of intrusive software.

Malware includes various : spy-wares, adware, Trojan horses, worms etc.

11. **The average velocity of flow that will take place through the total cross-sectional area of soil under unit hydraulic gradient is known as-**

- (a) Stoke's coefficient
 (b) Uniformity coefficient
 (c) Coefficient of permeability
 (d) Darcy's coefficient

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) The average velocity of flow that will take place through the total cross section area of soil under unit hydraulic gradient is called coefficient of permeability.

$v = ki$ (Darcy's equation)

$$k = \frac{v}{i}$$

Considering its units,

$$k = \frac{\text{cm/s}}{\text{cm/cm}}$$

$$k = \frac{\text{cm}}{\text{sec}}$$

Hence coefficient of permeability has same unit as velocity.

12. **The length of sedimentation tank should be at least _____ the breadth of the tank.**

- (a) One time
 (b) Four times
 (c) Two times
 (d) Three times

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) The length of sedimentation tank is should be at least 4 times the breadth of tank Generally, $\left(\frac{\ell}{B} = \frac{5}{1}\right)$

Design condition of sedimentation tank–

Velocity of flow measured in cm/min for horizontal flow tank

Detention period (D_t) = 3 to 4 hours (plain sedimentation)

$D_t \rightarrow 2-2.5$ hr (coagulated sedimentation)

Depth = 2.5 to 5 (generally 3m)

13. The combined name for the two tests– elongation index and flakiness index is

- (a) Stability test
- (b) Shape test
- (c) Surface test
- (d) Strength test

RRB JE CBT-II 29–08–2019 (evening)

Ans. (b) Shape test include–

- Elongation Index \rightarrow Road construction (<15%).
- Flakiness Index \rightarrow Road construction <15% to 25%).

Flakiness index = $\frac{3}{5}$ of mean dimension

Elongation index = $\frac{9}{5}$ of mean dimension

14. Which of the following devices performs signal conversion?

- (a) Plotter
- (b) Mouse
- (c) Modulator
- (d) Keyboard

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) A modulator is a device that performs modulation. Modulation allows to send a signal over a band pass frequency ranges. If every signal gets its own frequency range, then we can transmit multiple signals simultaneously over a signal channel, all using different frequency ranges. Any device that performs signal conversion is modulator.

15. Coefficient of earth pressure at rest is given by: (μ - Poisson's Ratio)

- (a) $\mu/(1-\mu)$
- (b) $(1-\mu)/\mu$
- (c) $\mu/(1+\mu)$
- (d) $(1 + \mu)/\mu$

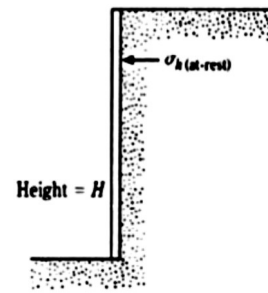
RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Earth pressure at rest–

$$\sigma_x = \sigma_y \text{ and } \epsilon_x = 0$$

So,
$$\sigma_x = \frac{\mu}{1-\mu} \sigma_z$$

$$\sigma_x = K_0 \cdot \sigma_z$$



at-rest condition

So,
$$K_0 = \frac{\mu}{1-\mu}$$
 (for cohesionless soil),

$K_0 = 1 - \sin \phi$ (for ϕ - soil).

16. Which of the following is used to measure the difference in pressures between two points in a pipe or in two different pipes?

- (a) Differential manometer
- (b) Orifice meter
- (c) Piezometer
- (d) Single column manometer

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Differential manometers are devices used for measuring the difference of pressures between two points in a pipe or in two different pipes. A differential manometer consists of a U-tube, containing a heavy liquid, whose two ends are connected to the points, whose difference of pressure is to be measured.

17. The command which is used to make a regional geometry in the AutoCAD is–

- (a) REG
- (b) Trim
- (c) Array
- (d) CO

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) REG : The command can be used to make a region geometry in AutoCAD.

CO : This command is used to copy object(s) in AutoCAD. .

ARRAY– Using this command you can make rectangular polar or path ARRAY.

18. Which one of the following is not the assumption in deriving Euler's theory for long columns?

- (a) The column fails by buckling alone
- (b) The column is initially straight and is loaded axially
- (c) The columns are having hinged ends only
- (d) The section of the column is uniform throughout

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) The assumption of Euler's theory for long column

- The column is straight and uniform lateral dimension
- The material of the column is homogenous, isotropic and obey Hooke's law
- The stresses are within elastic limit
- The self weight of the column itself is neglected
- The column fails by buckling alone.
- The compressive load is axial and passes through centroid of this section.

19. What is equal to the measurement of $1\mu\text{A}$?

- (a) 10^6A (b) 10^3A
 (c) 10^{-6}A (d) 10^{-3}A

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c)

$$\therefore 1\mu = 10^{-6}$$

$$\therefore 1\mu\text{A} = 10^{-6}\text{A}$$

20. Which of the following states is the least producer of wheat?

- (a) Punjab (b) Haryana
 (c) Uttar Pradesh (d) Andhra Pradesh

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Andhra Pradesh is the least producer of wheat among the following options. The largest wheat producing states are UP, Punjab, Haryana, M.P.

21. A magnetic field can exert force on-

- (a) Moving charge
 (b) Stationary magnet
 (c) Moving magnet
 (d) All of the above

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The magnetic field is a vector quantity that describe the magnetic influence on moving charge, electric current and magnetic materials.

• Magnetic field exerts a force on a magnet irrespective of its motion, which is given by-

$$F = M.B$$

where, (M = magnetic dipole moment of a magnet, B = magnetic field)

• Magnetic field exerts a force on moving charge given by-

$$\vec{F} = q(\vec{V} \times \vec{B})$$

where, (q = charge, \vec{V} = velocity of charge, \vec{B} = magnetic field)

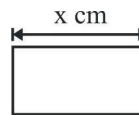
Thus, magnetic field exerts a force on stationary magnets, moving charges & moving magnets.

22. Dimension text is generally placed above the _____ line

- (a) Leader (b) Center
 (c) Dimension (d) Extension

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Dimension text is generally placed above the dimension line.



23. For interpolation of satellite data used for monitoring dynamic changes that occur on the earth surface, the most suitable orbit for the satellite is:

- (a) Circular orbit
 (b) Sun-synchronous orbit
 (c) Near polar orbit
 (d) All of the options

RRB JE CBT-II 29-08-2019 (evening)

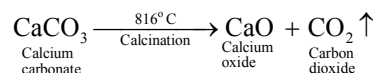
Ans. (b) For interpolation of satellite data used for monitoring dynamic changes that occur on the earth surface, the most suitable orbit for the satellite is sun-synchronous orbit.

24. When calcium carbonate is heated, it decomposes to give _____ and _____.

- (a) Ca_2O , CO (b) CaO, CO
 (c) CaO, CO_2 (d) Ca_2O_2 , CO_2

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c)



25. The density of ash produced in the municipal solid waste is-

- (a) 450 kg/m^3 (b) 100 kg/m^3
 (c) 1000 kg/m^3 (d) 700 kg/m^3

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Ans. (d)

Domestic solid waste	Density (kg/m^3)
Garbage	450 - 900
Rubbish	50 - 400
Ashes	700 - 850

26. The Aquatic animals can breathe under water due to the presence of dissolved _____ in water.

- (a) Hydrogen
 (b) Nitrogen
 (c) Carbon dioxide
 (d) Oxygen

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Air dissolved in water is important for aquatic animals to survive. They can breathe in water only through the dissolved O_2 present in water. Aquatic animals extract O_2 from the water and expels water.

27. Which of the following concepts is the basic principle of structural design?

- (a) Equally Strong column-beam
- (b) Partial Weak column-beam
- (c) Strong-column Weak-beam
- (d) Weak-column Strong-beam

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) In tall building, it is important to control lateral displacements within the serviceability limit state. A structural system may be classified as follows :

- (i) Building frame system
- (ii) Moment resisting frame system
- (iii) Dual frame system
- (iv) Tube system

- In a moment resistant frame, the relative stiffeners of beam and column is very important.
- A frame may be designed using weak column-strong column - weak beam proportions.
- A frame with weak beam-strong column is more stable and therefore highly desirable.

28. What is the percentage content of asphalt in the cut-back asphalt?

- (a) 10%
- (b) 50%
- (c) 85%
- (d) 30%

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Cut back asphalt generally consist of about 85% asphalt cement and 15% cutter by weight as well asphalt is very close.

29. Tendons are steel reinforcements mandatorily required for-

- (a) Precast concrete elements
- (b) Prestressed concrete elements
- (c) Prefabricated concrete elements
- (d) Pressed steel elements

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Tendons are steel reinforcements are mandatorily required for pre-stressed concrete element because tendons are used only to provide internal stress to the member to counter act the stress due to the load applied and reinforced.

→ Reinforcement are used to provide flexure strength to the member like resistance to twisting and bending of the member due to the given load.

30. GPS receivers are usually equipped with

- (a) Mechanical clocks
- (b) Digital LCD Alarm clocks
- (c) Quartz clocks
- (d) Electronic clocks

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) GPS receivers are usually equipped with quartz clock they have low power requirements and long-life span. The Global Positioning system (GPS) is a satellite based navigation system consisting of 24 satellites.

31. Assertion(A): Trusses comprise triangular figures.

Reason (R): A pin-jointed stable figure is a triangle.

- (a) A is true but R is false
- (b) Both A and R are true but R is not the correct explanation of A
- (c) Both A and R are true and R is the correct explanation of A
- (d) A is false but R is true

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) A truss is a triangular structure composed of slender member joined together at ends by bolting/riveting.

- The ends joined are consider as pin joint for calculation purpose.

- It is an stable structure used in bridge roof and for many purpose like cranes and for lifting heavy loads.

- There are many type of truss used-

- (i) Scissors (ii) Howe
- (iii) Pratt (iv) Fan

- (v) Fink (vi) Combined fink

- For bridge Pratt truss is mainly comes in use and as per the loading it can be divided in three forms-

- (i) Deck truss
- (ii) Through truss
- (iii) Semi through truss

32. After fixing the plane table to the tripod, the main operations which are needed at each plane table station are:

- (i) Leveling (ii) Orientation
- (iii) centering

The correct sequence of these operations is-

- (a) (ii), (iii), (i) (b) (iii), (i), (ii)
- (c) (i), (ii), (iii) (d) (i), (iii), (ii)

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Temporary adjustment of plane table :

(i) Leveling-

- Process of bringing plane table in horizontal plane.
- It is done with the help of level tube.

(ii) Centering-

- Is the process of bringing plotted point on plane table exactly over the ground station or vice versa.

- Done with plumbing fork.

(iii) Orientation -

- It is operation of keeping plane table parallel to position it occupied at first station.

33. A combined footing may be rectangular in shape if-

- (a) Both the columns carry unequal loads
- (b) Rectangular shape of combined footing depends not on column loads but on soil type

- (c) Both the columns carry equal loads
- (d) One column is loaded and the other column is a tension column

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) The combined footing can be rectangular in shape, if both the columns carry equal loads, or can be trapezoidal if there are space limitation and they carry unequal loads.

34. The most common type of scaffolding which is widely used in the construction of brickwork is–

- (a) Steel scaffolding
- (b) Trestle scaffolding
- (c) Single scaffolding
- (d) Suspended scaffolding

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Single Brick-layer scaffolding–This is the most common type of scaffolding and is widely used in the construction of brick work. This type of scaffolding is, sometimes known as putlog scaffolding.

35. Identify the repair type related to preventive maintenance.

- (a) Filling up cracks in masonry
- (b) Painting of doors and windows
- (c) Renewal of flooring
- (d) Repairing pot holes in roads

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) The repair type related to preventive maintenance is painting of doors and windows. (a), (c) & (d) are not repair type related to preventive maintenance.

36. What is the full form of FDDI?

- (a) Fiber Distributed Dual Interface
- (b) Fiber Distributed Data Interface
- (c) Fiber Data Distributed Interface
- (d) Fiber Dual Distributed Interface

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) FDDI stands for Fiber Distributed Data Interface. It is a standard for data transmission in a local area network.

37. The specific gravity of commonly available ordinary Portland Cement is–

- (a) 4.92
- (b) 3.15
- (c) 1.83
- (d) 2.05

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Following are parameters are properties of cement–

- (i) Bulk density of cement = 1440 kg/m³
- (ii) Specific gravity of cement = 3.15
- (iii) Weight of one bag of cement = 50 kg
- (iv) Volume of cement bag = 50 /1440 = 0.035 m³

(v) Number of cement bag in 1 m³ = 30 approx.

(vi) Volume of dry mortar is 30% more than volume of wet mortar.

$$\therefore \text{Volume of dry mortar} = 1.3 \times \text{Volume of wet mortar.}$$

38. Which of the following missiles is a canister launched hypersonic surface-to surface tactical missile developed by DRDO?

- (a) Trishul
- (b) Akash
- (c) Astra
- (d) Shaurya

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Shaurya is a delivery system stored in a composite canister for a rapid deployment and minimum interaction with the elements for a long period.

The Shaurya is a canister launched hypersonic surface to surface tactical missile developed by the Indian Defence Research and Development Organization (DRDO) for use by the Indian Armed Forces.

39. When the soil layer surrounding a portion of the pile shaft settles more than the pile, a downward drag occurs in pile, then the drag is known as–

- (a) Negative skin friction
- (b) Negative vibration
- (c) Single acting hammer
- (d) Friction piles

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Negative skin friction occur when the soil layer surrounding a portion of pile shafts settle more than the pile a downwards drag occur in pile. It is also known as 'downdrag'.

→ It occurs due to increase in surcharge over the surrounding.

→ Lowering of ground water table.

→ Disturbance due to seismic activities..

40. When the time taken to complete a given amount of work increases, then -

- (a) Energy decreases
- (b) Power decreases
- (c) Energy increases
- (d) Power increases

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) The equation for power shows the importance of time–

$$\text{Power (P)} = \frac{\text{work}}{\text{time}} = \frac{w}{t}$$

That is, the time taken to complete the job inversely proportional to power required to perform the task. Hence, as time taken increase, power decrease.

41. In which year was the first general election held in India?
- (a) 1947–48 (b) 1950–51
(c) 1951–52 (d) 1948–49

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) General elections were held in India between 25 Oct 1951 to 21 Feb 1952. They were the first elections to the Lok Sabha after independence in August 1947. It was conducted as per the provisions of the Indian constitution, which was adopted on 26 Nov, 1949.

42. What was the rank of India in WEF's global Energy Transition Index, 2019?
- (a) 78 (b) 80
(c) 76 (d) 79

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) India moved up two places to rank 76th on a WEF's Global Energy Transition index, 2019.

This annual list, compiled by Geneva-based World Economic Forum (WEF) has ranked 115 economy on how well they are able to balance energy security and access with environmental sustainability and affordability.

43. Evaporation losses depend upon–
- (a) Nature of precipitation and type of vegetation
(b) All of the options
(c) Humidity and wind velocity
(d) Area of the water surface and depth of the water

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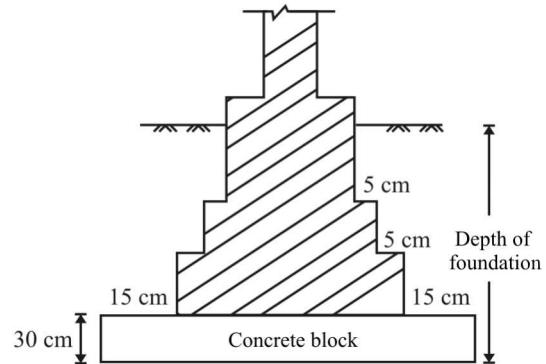
Ans. (b) Evaporation depends upon–

- (i) Vapour pressure
(ii) Atmospheric pressure
(iii) Temperature
(iv) Wind velocity
(v) Depth of water body
(vi) Surface area
- Evaporation losses depend on many factors like vegetation type, nature of precipitation, humidity wind velocity, area of the water surface, depth of the water, salinity & temperature. But most suitable factors are salinity and temperature.

44. The old type of wall foundation consisting of multiple steps of bricks or stone layers of gradually increasing width is called as–
- (a) Linear Footing
(b) Running Footing
(c) Stepped Footing
(d) Line Footing or Wall Footing

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) The old type of wall foundation consisting of multiple steps of bricks or stone layers of gradually increasing width is called as Line Footing or Wall Footing.



45. Liquidity ratios are used

- (a) All of the options
(b) To compare short term obligations to short term resources available to meet these obligations
(c) To obtain much insight into the present cash solvency of the firm and the firm's ability to remain solvent in the event of adversity
(d) to measure a firm's ability to meet shortcut obligations

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Liquidity ratios are used–

- To compare short term obligations to short term resources available to meet these obligations.
- To obtain much insight into the present cash solvency of the firm and the firm's ability to remain solvent in the event of adversity.
- To measure a firm's ability to meet shortcut obligations.

46. Who among the following was the first Indian woman to be nominated to the international Olympic Committee?

- (a) Chanda Kocchar
(b) Anjum Chopra
(c) Nita Ambani
(d) Mithali Raj

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) Nita Ambani was the First India women to join International Olympic committee in 2016. As a member of the IOC, Nita Ambani will continue her position till she attains the age of 70. She also winning the IOC election with high percentage during 129th session of the IOC session in Rio.

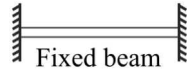
47. Fixed beam is also known as _____.

- (a) Constricted beam
(b) Constricted beam

- (c) Encaster beam
(d) Spandrel beam

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Fixed beam is also known as Encaster or constraint beam or built in beam. In the fixed beam, end moment developed at ends and slope is zero at ends, the supports should be kept at same level.



48. In a overhanging beam ABC, AB = L and BC = a, C being the free end. If it is subjected to a vertical load W at free end, maximum moment occurs at–

- (a) C (b) A
(c) B (d) Between A and B

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Given that,

$$AB = L, BC = a$$

$$(BM)_{BC} = W \times x$$

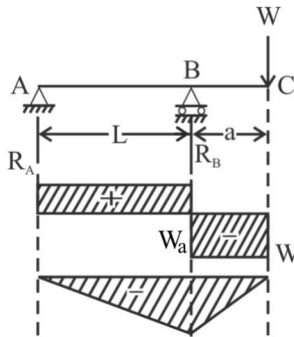
$$BM \text{ at B} = Wa$$

BM for AB portion

$$(BM)_{AB} = Wx - \frac{W(\ell + a)}{\ell}(x - a)$$

$$\text{Since } (BM)_{AB} < (BM)_C$$

Hence maximum moment will occur at point B.



49. A solution turns red litmus blue, the pH is likely to be–

- (a) 4 (b) 10
(c) 5 (d) 1

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Basic solution has a pH value of more than 7. Since the solution turns red litmus blue, therefore its pH is likely to be > 7 i.e., 10.

50. The double lacing shall be designed to resist transverse shear V_t equal to–

(Where P is total load acting on the column)

- (a) 2.5% of P (b) 3.75% of P
(c) 5.0% of P (d) 1.25% of P

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) The double lacing member shall be designed to resist transverse shear V_t equal to

$$V_t = 2.5\% \text{ of } P$$

P = load acting transversely.

➤ Lacing bars whether in double or single systems shall be inclined at an angle not less than 40° nor more than 70° to the axis of the built up member.

51. In AAC blocks, the lightweight property is achieved by–

- (a) Aeration
(b) By using light weight coarse aggregates
(c) Autoclaving
(d) Accelerated curing

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Autoclaved aerated concrete (AAC) is made with fine aggregate, cement, and expansion agent. In this type of cement, 80% air, which make concrete light weight results good for earthquake resistant and reliable for building construction.

52. To find which of the following is consistency test performed?

- (a) Compressive strength
(b) Correct water cement ratio
(c) Fineness of cement
(d) Tensile strength

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) To find the correct water cement ratio, the consistency test performed.

Consistency test – This test is to estimate the quantity of mixing water to form a paste of normal consistency.

➤ Normal consistency is defined as that percentage water requirement of the cement pastes.

➤ Normal consistency generally 25-30% weight of cement.

53. The process of water being lost from the leaves of the plants from the pores is known as–

- (a) Evaporation
(b) Transpiration
(c) Precipitation
(d) Run off

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Ans. (b) Evaporation– It is the conversion of liquid into the vapour phase.

Precipitation– It is the deposition of water on the earth's surface in the form of rain, snow, hail, frost and so on.

Transpiration– It is the soil moisture taken up through the root of a plant and discharged into the atmosphere through evaporation. It occurs during photosynthesis.

Runoff– It is the volume of water drained by a river at the outlet of a catchment.

54. What is the octal equivalent of $(F3B1)_{16}$?

- (a) 178543 (b) 171661
(c) 172101 (d) 178213

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b)

$$\begin{aligned} (F3B1)_{16} &= (15 \times 16^3 + 3 \times 16^2 + 11 \times 16^1 + 1 \times 16^0)_{10} \\ &= (61440 + 768 + 176 + 1)_{10} \\ &= (62385)_{10} \end{aligned}$$

8	62385	1	↑
8	7798	6	
8	974	6	
8	121	1	
8	15	7	
	1		

Hence, $(62385)_{10} = (171661)_8$

55. In soil compaction, if the MDD (Maximum Dry Density) has to be increased and that too at all lower OMC (Optimum Moisture Content), then the method required is—

- (a) Increase the surface area of rammer contact plate
(b) Increase the weight of rammer
(c) Increase the height of fall of rammer
(d) Mix more cohesionless soil

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Modified proctor imparts higher compactive effort than standard proctor which results in increase in MDD and a decrease in OMC.

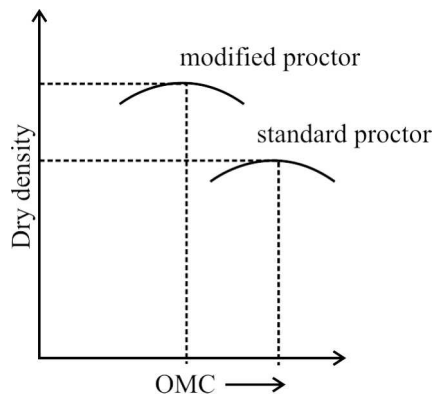
Indian Standard proctor test— Weight of hammer = 2.6 kg

Height of fall – 304.8 mm

Indian Modified proctor test—

Weight of hammer = 4.9 kg.

Height of fall = 450 mm



56. Sheep-foot-roller is most suitable for compacting

- (a) Cohesion-less soil
(b) Coarse grained soil
(c) Cohesive soil
(d) Gravel

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Sheep-foot-roller is most suitable for compacting cohesive soil.

- **Rammers or tempers**— All soils (suitable)
- **Smooth wheeled rollers**— Crushed rocks, gravels, sand.
- **Vibratory rollers** – Sands

57. "World Religion Day" is observed on the _____ of January.

- (a) 2nd Sunday
(b) 1st Monday
(c) 2nd Saturday
(d) 3rd Sunday

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) World Religion Day is observed on the 3rd Sunday of January, every year. The National Spiritual Assembly of the Bahias is of the United States initiated World Religion Day in 1950. The Bahias faith teaches the value of all religion and emphasizes the importance of universal equality and unity.

58. Which is NOT a green house gas in earth's atmosphere?

- (a) Ozone
(b) Methane
(c) Sulphur dioxide
(d) Carbon dioxide

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Sulphur Dioxide is not a greenhouse gas in Earth's atmosphere because, SO₂ does not absorb and trap infrared radiation as it attempt to return.

The major greenhouse gases are— Water vapour, Carbon dioxide, Methane, Nitrous oxide Chlorofluorocarbons (CFCs).

59. Taj Mahal is said to be suffering from "Marble Cancer". what is Marble Cancer?

- (a) Brown Carbon
(b) Large number of Fungi in Taj Mahal marbles
(c) Acidic rain which corrodes marble
(d) All of the options

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Marble cancer refers to the corrosion of structure made up of marble by the action of sulphuric or nitric acid. In the last decade, there was huge industrial growth nearby Taj Mahal and huge amount of sulphur and nitric gases are released in the atmosphere by industries. These gases mixed with rain cause acid rain.

60. Consider the following statement:

In solid waste management

1. Density separation of solid wastes can be accomplished by air classifiers.
2. Iron recovery from solid wastes can be done by magnetic separators.

3. Aluminium separation from solid wastes can be accomplished by eddy current separators.

Which of the statements given above are correct?

- (a) 2 and 3 (b) 1, 2 and 3
(c) 1 and 2 (d) 1 and 3

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) In solid waste management–

- Iron can be removed from solid wastes by magnetic separator
- Aluminum can be removed from solid waste by eddy current separator
- Density separation can be done by air classifier
- Grease and oil can be removed by skimming action

61. Coning of train wheels is done for the purpose of–

- (a) For reducing the self weight of wheels
(b) For decorative purposes
(c) For reducing the frictional contact surface area with the rails
(d) Enabling the train wheels to cover different distances along the inner and outer curves simultaneously

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Coning of wheel is done at slope of (1/20) is done for –

- To keep the train in central position in a level track.
- To provide the possibility of lateral movement of axle with its wheel.
- It reduces wear and tear of the wheel flanges
- To prevent wheels from slipping to some extent
- On curve track outer wheel has to travel greater length than inner wheel, the coning of wheel help the outer wheel tread to move up and down relatively to curve without any jerk and disturbance to inner wheel movement.

62. VOC represents–

- (a) Volatile Oxides of Calcium
(b) Volatile Oxides and Compounds
(c) Volatile Organic Carbon
(d) Volatile Organic Compounds

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) VOC (volatile organic compound) are emitted as gases from certain solid or liquid like acetone, aliphatic, Aromatic etc.

- Acetone = paint thinner, coating
- Aliphatic = gasoline paint
- Aromatic = combustion source paint, gasoline sources

63. The common name for all doors, windows and such units are called as:

- (a) Ventilators (b) Furniture
(c) Shuttering (d) Joinery

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Joinery is the process of working with the joints of the home including the joint areas of windows, trusses and the doorways and including all work unit making window frame, furniture of home, staircase.

64. In load bearing structures, if a wall is not bearing the load from slab, that wall is also called as–

- (a) Retaining wall
(b) Intermediate wall
(c) Tension wall
(d) Partition wall

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) A non load bearing partition wall divides a space doesn't carry any vertical load from above.

- They carry only self weight and occupy less floor area and cost effective on constriction of partition wall

65. Which folder retains copies of messages that you have started but are NOT yet ready to send?

- (a) Sent Items
(b) Inbox
(c) Draft
(d) Address book

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Draft message are saved in our draft folder until we send them or delete them from the folder.

Inbox– Inbox is an area where we can see all the received mails.

Sent or sent items is a folder or area that stores any e-mails that were successfully delivered.

66. 'A time varying electric field produces a magnetic field.' This phenomenon is called

- (a) Hertz's law
(b) Ampere Maxwell's law
(c) Kirchhoff's law
(d) Faraday's law

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) 'A time varying electric field produces a magnetic field.' This phenomenon is called Ampere Maxwell's law.

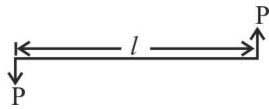
67. The product of either force of couple with the arm of the couple is called–

- (a) Resultant couple
(b) Resulting couple
(c) Moment of the forces
(d) Moment of the couple

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Moment of a couple– The moment of a couple is the product of the force (that is one of the forces of the two equal and opposite parallel force and the arm of the couple.

$$M = P \times l$$



68. Drawing pencils are graded according to increase in relative–

- (a) Diameter (b) Hardness
(c) Sharpness (d) Length

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b)

- (i) Softer – B, 2B, 3B, 4B
(ii) Medium grade – HB
(iii) Harder – H, 2H, 3H, 4H

69. What is the curve resistance for a 50 tonnes train on a BG track on a 4° curve?

- (a) 0.06 tonne (b) 0.05 tonne
(c) 0.01 tonne (d) 0.08 tonne

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Curve Resistance for a BG track–

$$R_c = 0.0004 \times W \times D$$

W = weight of train in tonne

D = Degree of curve

$$R_c = 0.0004 \times W \times D$$

$$= 0.0004 \times 50 \times 4^\circ = 0.08 \text{ tonne}$$

Note– (i) $R_c = 0.0003 \times W \times D$ (for M G track)

(ii) $R_c = 0.0002 \times W \times D$ (for NG track)

70. Which of the following four Bogue's Compounds has the maximum percentage by volume in the hydration of cement?

- (a) Alite C_3S
(b) Celite C_3A
(c) Felite C_4AF
(d) Belite C_2S

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Following four Bogue's compound–

Principle mineral	Compound	Formula	Avg.	Symbol function
Tricalcium silicate (Alite)	$3CaO.SiO_2$	C_3S	40%	7 days strength and best cementing
Di-calcium silicate (Belite)	$2CaO.SiO_2$	C_2S	32%	Ultimate strength (1 year strength)
Tricalcium aluminate (Celite)	$3CaO.Al_2O_3$	C_3A	10%	Flash set initial setting time

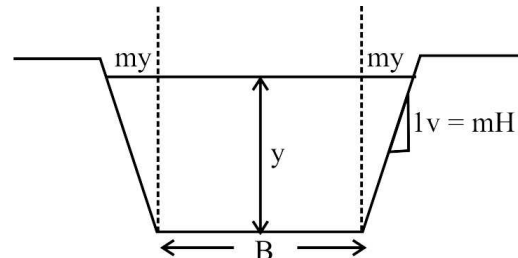
Tetra calcium alumina ferrite (Felite)	$4CaO.Al_2O_3.Fe_2O_3$	C_4AF	8%	Poorest cementing value
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71. The discharge through a trapezoidal channel is maximum when–

- (a) Top width = $1.5 \times$ sloping side
(b) Half of top width = one of the sloping sides
(c) Top width = Half of sloping side
(d) Half of top width = half of the sloping side

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b)



$$\text{Area, } A = (B + my) \times y$$

$$\text{Perimeter, } P = 2 \sqrt{3}y$$

$$\text{Hydraulic radius, } R = \frac{A}{P} \Rightarrow \frac{y}{2}$$

$$\text{Top width (T) = } T = \frac{4y}{\sqrt{3}}$$

Half of top width = One of the sloping side

$$\text{hydraulic depth, } D = \frac{3}{4}y$$

72. What is the superelevation for a horizontal highway curve of radius 500m and speed 100 kmph in mixed traffic condition?

- (a) 6.2% (b) 8.9%
(c) 0% (d) 7%

RRB JE CBT-II 29-08-2019 (evening)

$$\text{Ans. (d) } e = \frac{(0.75v)^2}{127 \times R}$$

$$e = \frac{(0.75 \times 100)^2}{127 \times 500}$$

$$e = 0.0885 > (0.07) \text{ so, we taken } 7\%$$

• IRC recommends 0.07 or 7% of superelevation.

73. If the hard rock strata is very great depth, then the feasible economical pile type is–

- (a) Under-reamed pile
(b) Batter pile
(c) Friction pile
(d) End bearing pile

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Friction Pile is recommended when the depth is greater for hard structure beneath the strata of soil
 → In Friction Pile load is transferred through friction along the surface.

74. At critical flow conditions in a rectangular channel, the value of Froude number is–

- (a) Two (b) Zero
 (c) Infinity (d) Unity

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) Froude's number (F_r) ⇒ The Froude's number is defined as the square root of the ratio of inertia forces of a flowing fluid to the gravity force.

$$F_r = \frac{V}{\sqrt{Lg}} = \frac{V}{\sqrt{F_g}}$$

$F_r < 1$ = Sub-critical flow

$F_r = 1$ = Critical flow

$F_r > 1$ = Super critical flow

75. In any good staircase, the maximum and minimum pitch should be–

- (a) 90° and 0° (b) 75° and 30°
 (c) 40° and 25° (d) 60° and 10°

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) Maximum and minimum pitch is 40° & 25° for any good stair case

- Greater than 40° degree make to steep step not good for aged people to climb.
- Smaller than 25° occupy large area of space and more time taken to reach above floor and cost will be increased

76. Pick up the correct statement from the following.

- (a) The assumptions that all cash flow occur at the end of the interest period, is known as the end of period convention
 (b) The receipts and disbursements in a given time interval are referred to as cash flow
 (c) A cash flow diagram is a graphical representation of cash flows drawn on a time scale
 (d) All of the above

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) Cash flow diagram– The graphic presentation of each value plotted at appropriate time is called a cash flow diagram.

- The assumptions that all cash flow occur at the end of the interest period, is known as the end of period convention
- The receipts and disbursements in a given time interval are referred to as cash flow

77. The particle size of an aggregate bigger than 4.75 mm but smaller than 75 mm is known as–

- (a) Silt
 (b) Clay
 (c) Fine aggregate
 (d) Coarse aggregate

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) Aggregate ranging from 75mm - 4.75 mm are called coarse aggregate while those passing from 4.75 mm sieve are fine aggregate.

78. The suggestion of organising Asian Games was first made at the _____

- (a) Conference of Asian Countries, New Delhi in 1947
 (b) Conference of Asian Countries, New Delhi in 1956
 (c) Conference of Asian Countries, New Delhi in 1952.
 (d) Conference of Asian Countries, New Delhi in 1943

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) The suggestion of organizing Asian Games was first made at the conference of Asian countries New Delhi, in 1947.

- The first edition of the Asian Games was held in New Delhi in March 1951.

79. The following are the statements about lug angle used to connect heavily loaded tension member to gusset plates.

- (i) The length of end connection is reduced
 (ii) By using lug angles there will be saving in the gusset plate
 (iii) Cost of connection increases due to additional fasteners and angle required.
 (a) All the (i), (ii) and (iii) statements are correct
 (b) Only (ii) and (iii) statements are correct
 (c) Only (i) and (ii) statements are correct
 (d) Only (i) and (iii) statements are correct

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Lug member using in tension member to gusset plate in the structure results

- The length of end connection is get reduced
- Saving of the gusset plate
- Cost of fastener increase as new connection make to the angle with the gusset plate.

80. Anthrax is caused by a type of –

- (a) Bacteria (b) Fungi
 (c) Protozoa (d) Virus

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Anthrax is a serious infectious disease caused by rod shaped bacteria known as bacillus anthracis. Common protozoan disease include malaria, giardia disease caused by Fungi are ringworm, skin disease virus diseases one – AIDs, Measles, Chickenpox.

- 81. Which device is used to measure the force acting on an object?**
- (a) Manometer
 - (b) Barmometer
 - (c) Spring balance
 - (d) Thermometer

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Spring balance measure force acting on an object mass is measured by the deflection of springs and combining with gravity (g) will give weight i.e. Force.

- 82. The key to profitable operation for project cost control is–**
- (a) To keep the project cost within the cost budget and knowing when and where job costs are deviating
 - (b) To keep the project cost equal to subsequent construction budget
 - (c) To keep the project cost equal to original cost estimate
 - (d) To keep the project cost higher than the cost estimate

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Project cost control– Keeping within the cost budget and knowing when and where job costs are deviating are two factors that constitute the key to a profitable operation. As the work proceeds in the field, cost accounting method are applied to determine the actual costs of production.

- 83. The maximum number of electrons present in a shell is given by the formula**
- (a) $2n^2$
 - (b) n^2
 - (c) $2n$
 - (d) $3n^2$

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Maximum number of electrons = $2n^2$
Where, n = Energy shell number.

- 84. The process of separation of coarse aggregates from concrete during transportation is called**
- (a) Creeping
 - (b) Workability
 - (c) Bleeding
 - (d) Segregation

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The process of separation of coarse aggregates from concrete during transportation is called segregation.

Bleeding – In this, water from concrete comes out to the surface of concrete because of low specific gravity.

- 85. Which year was the Central Rural Sanitation program started?**

- (a) 1986
- (b) 2006
- (c) 1996
- (d) 2016

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) The Central Rural Sanitation Program was launched in 1986 primarily with the objective of improving the quality of life of the rural people and also to provide privacy and dignity to women. This was launched by the Rajiv Gandhi led congress government.

- 86. Which of the following is a type of bolt?**

- (a) High strength friction grip bolt
- (b) Black bolt
- (c) Turned bolt
- (d) All of the options

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Type of bolts–

- 1) Black bolt or c- grade or unfinished bolt (IS: 1363-1992)
- 2) Turned bolt - expensive & used in special jobs
- 3) High strength bolts (IS 3757-1985) & (IS 4000-1992)- For friction type connection
- 4) Precision (A- grade) & Semiprecision (B-Grade) → IS (1364-1992) for no slippage is permitted.

- 87. The lorry or truck bringing RMC from factory to construction site is called as–**

- (a) Transit Mixer
- (b) Concrete Truck
- (c) Concrete Mixer
- (d) RMC Truck

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Transit mixture truck or lorry is a machinery used to move concrete/mortar or ready mix concrete directly from a concrete manufacturing plant to the location to be used.

- 88. On cubic meter of mild steel weighs about–**

- (a) 3625kg
- (b) 1000kg
- (c) 12560kg
- (d) 7850kg

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) On cubic meter of mild steel weighs about 7850 kg.

IS 432 : 1982, Mild steel and medium tensile steel.

➤ Modulus of elasticity, $E = 2 \times 10^5 \text{ N/mm}^2$

➤ Coefficient of thermal expansion,

$$a = 12 \times 10^{-6}/^\circ\text{C}$$

- 89. Gas leaked during Bhopal tragedy was–**

- (a) Ethyl isothiocyanate
- (b) Sodium isothiocyanate
- (c) Methyl isocyanate
- (d) Potassium isothiocyanate

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Bhopal gas tragedy was happened on December 3, 1984. It was happened due to leakage of Methyl Isocyanate (C_2H_3NO) from the pesticide plant of Union Carbide on MNC, in Madhya Pradesh's Bhopal.

- After the tragedy, the government of India enacted a Public Liability Insurance Act (1991) that meant to provide immediate relief to victims of accidents involving hazardous industries.

90. What is the minimum number of longitudinal bars provided in a reinforced concrete column of circular cross section?

- (a) 8 (b) 10
(c) 4 (d) 6

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Minimum number of bar-

- (a) For rectangular columns = 4
(b) For circular columns = 6
- Maximum centre to centre species of reinforcement = 300 mm
 - Cover to reinforcement-
(a) Minimum = 40 mm
(b) It can be reduced to 25 mm for small sized column.
(c) In aggressive environment maximum cover is limited to 75 mm

91. The forces which meet at one point and have their line of action in different planes are called

- (a) Coplanar non-concurrent forces
(b) Non-coplanar non-concurrent forces
(c) Non-coplanar concurrent forces
(d) Intersecting force

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) The forces which meet at one point and have their line of action in different planes are called non-coplanar concurrent forces.

Force meeting at one point is said to concurrent forces

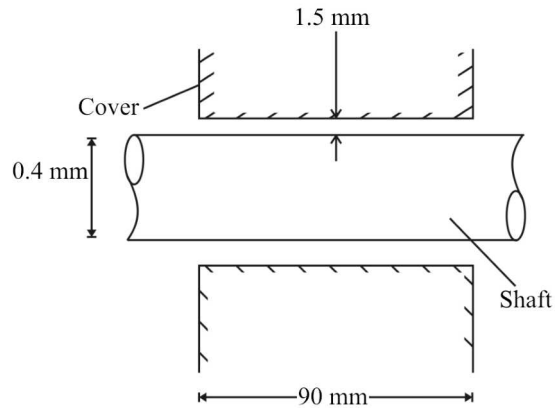
→ Force meeting at one common plane or common line of action is said to be co-planar forces.

92. The dynamic viscosity of an oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5 mm

- (a) 886.5 KW
(b) 800 KW
(c) 809.5KW
(d) 716.48 KW

RRB JE CBT-II 29-08-2019 (evening)

Ans. (*)



$\mu = 6$ poise

$$= \frac{6}{10} \frac{Ns}{m^2} = 0.6 \frac{Ns}{m^2}$$

Dia of shaft (D) = 0.4 m

Speed of shaft (N) = 190 r.p.m

Length of cover = L = 90 mm

$$= 90 \times 10^{-3} \text{ m}$$

Length of oil layer = r = 1.5 mm = 1.5×10^{-3} m

Tangential velocity of shaft, $u = \frac{\pi DN}{60}$

$$= \frac{\pi \times 0.4 \times 190}{60} = 3.98 \text{ m/sec}$$

Formula, $\tau = \mu \frac{du}{dy}$

$$\tau = 0.6 \times \frac{3.98}{1.5 \times 10^{-3}}$$

$$\tau = 1592 \text{ N/m}^2$$

Shear stress of shaft (F) = Shear stress \times Area

$$= 1592 \times \pi D \times L$$

$$= 1592 \times \pi \times 0.4 \times 90 \times 10^{-3}$$

$$= 180.05 \text{ N}$$

Torque of shaft (T) = Force \times Distance

$$= \text{Force} \times D/2$$

$$= 180.05 \times \frac{0.4}{2} = 36.01 \text{ Nm}$$

Power lost in the bearing

$$= \frac{2\pi NT}{60} = \frac{2 \times \pi \times 190 \times 36.01}{60} = 716.48 \text{ W}$$

Note : The Commission has dismissed the question.

93. The failure of a material under varying load after a number of cycles of such load is known as-

- (a) Ductile failure
(b) Fatigue failure
(c) impact failure
(d) Hysteresis failure

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Fatigue failure occur if total strain energy > toughness.

Fatigue– Deterioration of material under repeated cycles of stress or strain resulting in progressive cracking that eventually produces fracture.

94. Which of the following statements about environmental education is false?

- (a) Environmental Education will prepare the next generation to plan appropriate strategies for addressing developmental environmental issues
- (b) Environmental education does not advocate a particular viewpoint or course of actions
- (c) Environmental education is essential for the younger generation only
- (d) Environmental Education is evolving to be education for sustainable and ethical development both at a local and global level

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) • Environmental Education will prepare the next generation to plan appropriate strategies for addressing developmental environmental issues.

- Environmental education does not advocate a particular viewpoint or course of actions.
- Environmental Education is evolving to be education for sustainable and ethical development both at a local and global level.

95. On which of the following factors, does strength of concrete depend primarily?

- (a) quality of fine aggregate
- (b) Fineness of cement
- (c) Quality of coarse aggregate
- (d) Water-cement ratio

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Abram's Law – Abram's water cement ratio law states that the strength of concrete is primarily dependent upon the water cement ratio provided mixture is workable.

• It say that the strength of a concrete mixture is inversely related to the mass ratio of water to cements. As the water content increase, the strength of concrete decrease.

$$S = \frac{A}{B^{w/c}}$$

Where,

S = Strength of concrete

A & B = Constant

w/c= 0.32–1.20 range

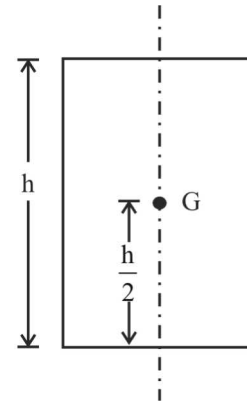
96. The centre of gravity of a uniform lamina lies at–

- (a) The bottom surface
- (b) The midpoint of its axis

- (c) The centre of the heavy portion
- (d) All of the options

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Ans. (b) A uniform body is a body whose density same through out the body. The center of mass of uniform body is at the centre of uniform lamina and it lie on the axis of symmetry , and they meet at the center.



97. The process of marking the positions of various foundation and other elements on to the ground as per the drawings is called as–

- (a) Settling of foundation
- (b) Settlement of foundations
- (c) Setting out of foundation
- (d) Sitting of foundations

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Ans. (c) Setting out of foundation– Setting out or ground tracing is the process of laying down the excavation lines and centre line etc on the ground before excavation is started. After the foundation design is done a setting out plan, sometimes also known as foundation layout plan is prepared to some suitable scale (usually 1 : 50). The plan is fully dimension.

98. The five year term of the President is calculated from the–

- (a) Date of his election result
- (b) First day of the month following the month he assumes charge
- (c) Day he assumes charge
- (d) First day of the month he assumes charge

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Ans. (c) The five year term of the President of India is calculated from the date on which he enters upon his office and assumes charge.

• **Article 61**– The president may, for violation of the constitution, be removed from his post via impeachment.

99. The portions of the structure below the ground level are called as–

- (a) Sub-structures
- (b) Sustainable Structures

- (c) Super-structures
- (d) Submerged structures

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) The portion of structure below the ground level are called as sub structure in which all load of super structure lie and from sub structure to the soil subgrade.

100. Mud pumping is a problem occurring in which type of pavement

- (a) Moorum roads
- (b) Earthen roads
- (c) Flexible bitumen roads
- (d) Rigid concrete roads

RRB JE CBT-II 29-08-2019 (evening)

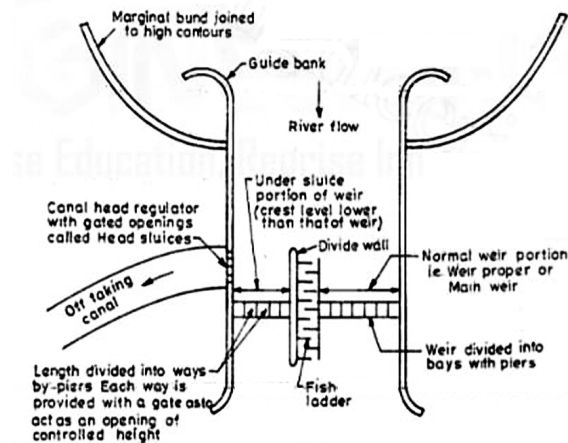
Ans. (d) Mud pumping occurs in rigid pavement as when the soil slurry comes out through the joint and crack of cement concrete pavement due to heavy wheel load.

101. A divide wall is provided–

- (a) At an inclination to the axis of weir
- (b) Parallel to the axis of weir and upstream of it
- (c) Parallel to the axis of weir and downstream of it
- (d) At right angle to the axis of weir

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Ans. (d) A divide wall is a long masonry or concrete wall which is constructed at right angles to the axis of the weir to separate the under sluice from the rest of the weir or weir proper.



- The divide wall extends a little under section side upto the a distance little beyond the beginning of the canal head regulator and on the d/s upto the ends of the loose protection of the under sluices.
- The top width of divide wall is about 1.5 to 2.5 m.

102. When did the Santhal rebellion break-out?

- (a) 1985
- (b) 1912
- (c) 1855
- (d) 1821

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) On 30 June 1855, two Santhal rebel leaders, Sidhu and Kanhu Murmu, mobilized roughly 60,000 Santhals and declared a rebellion against the East India Company.

- The Santhal are the largest tribal group, native to the Indian states of predominantly Jharkhand, West Bengal and Odisha.

103. Rocket works on the principle of conservation of–

- (a) Momentum
- (b) Energy
- (c) Mass
- (d) Velocity

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) Rocket works on the principle of conservation of momentum. Rocket ejaculates gases in backward direction which creates momentum of the gases backwards and thus by conservation of momentum, the rockets gets a momentum in the forward direction making it to move forward.

104. In AutoCAD, the 3-D commands on the Modeling toolbar include–

- (a) Extrude
- (b) All of the options
- (c) Sphere
- (d) Box

RRB JE CBT-II 29-08-2019 (evening)

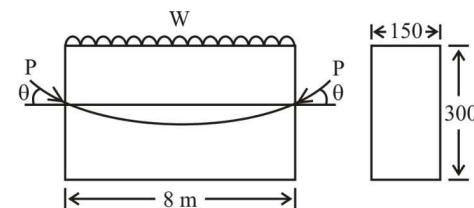
Ans. (b) In AutoCAD, the 3-D commands on the Modeling toolbar include extrude, sphere, box, revolve, union, sweep etc.

105. A prestressed concrete beam 150 mm × 300 mm supports a live load 5 KN/m over a simply supported span of 8m. It has a parabolic cable having an eccentricity of 75 mm at mid span and zero at the ends. The prestressing force required to maintain the net resultant stress at the bottom fibre at mid span as zero under the action of D.L. (Dead Load) + L.L. (Live load) + prestress is–

- (a) 293KN
- (b) 239 KN
- (c) 392 KN
- (d) 302 KN

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) :



Load calculation

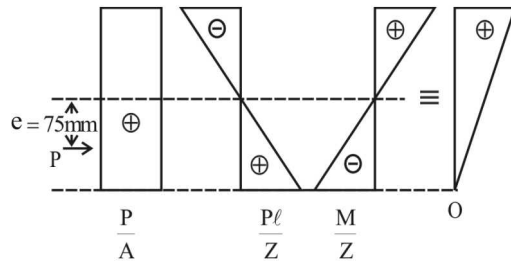
$$W_d = 0.15 \times 0.3 \times 25 \times 1 = 1.125 \text{ kN/m.}$$

$$W_l = 5 \text{ kN/m.}$$

$$W = (W_d + W_L) = 6.125 \text{ kN/m.}$$

$$M = \frac{W\ell^2}{8} = \frac{6.125 \times 8^2}{8} = 49 \text{ kN-m.}$$

At mid-span



$$A = 150 \times 300 \text{ mm}^2$$

$$Z = \frac{150 \times (300)^2}{6} \text{ mm}^3$$

By the problem, at bottom fiber at mid span;

$$\frac{P}{A} + \frac{Pe}{Z} - \frac{M}{Z} = 0$$

$$\Rightarrow \frac{P}{150 \times 300} + \frac{P \times 75}{150 \times (300)^2} - \frac{49 \times 10^6}{150 \times 300^2} = 0$$

$$\Rightarrow P + \frac{3}{2}p = 49 \times 20000$$

$$\Rightarrow p = 49 \times 20 \times \frac{2}{5} \times 10^3 \text{ N.}$$

$$\Rightarrow P = 392 \text{ kN.}$$

106. In which year was Wildlife Protection Act implemented in India?

- (a) 1971 (b) 1970
(c) 1972 (d) 1973

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) Wildlife Protection Act, 1972 provides for the protection of wild animals, birds and plants and issues concerned with them. It consists of total VI schedules.

Schedule I and II – Provides absolute protection and offences under these provision are prescribed with the highest penalties.

107. If the time period of a sound wave is 0.04s, then what is its frequency?

- (a) 50 Hz (b) 22 Hz
(c) 25 Hz (d) 500 Hz

RRB JE CBT-II 29-08-2019 (evening)

$$\text{Ans. (c) Frequency } (\eta) = \frac{1}{\text{Time period}(T)}$$

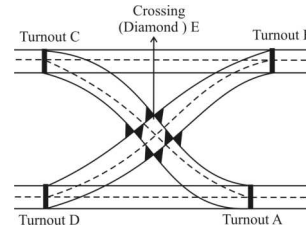
$$= \frac{1}{0.04} = 25 \text{ Hz}$$

108. A scissors cross over consists of one diamonds and

- (a) four turn outs
(b) Two turn outs
(c) Three turn outs
(d) One turn out

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) A scissors cross over consists of one diamond and four turn outs.



Turnout- A, B, C, D (4)

Diamond crossing - E (1)

109. To design the deep beam, the factors that are taken into account are-

- (a) All of the options
(b) Non-linear distribution of stress
(c) Temperature stresses
(d) Lateral buckling

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) To design the deep beam, the factor taken into account -

- 1) Non-linear distribution of stress
2) Temperature stresses
3) Lateral Buckling
4) Deep beam is designed for bending moment only.

110. In AutoCAD, the free orbit tool is found on the _____ toolbar.

- (a) Rotate (b) Move
(c) 3-D move/3-D (d) Modify

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Free orbit tool is found on the modify toolbar.

111. Which of the following is liquid at ordinary temperature?

- (a) Gold
(b) Silver
(c) Gallium
(d) Germanium

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) In the following options Gallium (Ga) having low melting point (30°C). So Gallium is metal which is liquid at ordinary temperature.

112. To prevent corrosion of steel reinforcement in RCC structures, the pH value of concrete should be -

- (a) Acidic (b) Neutral
(c) Just alkaline (d) Highly alkaline

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The pH should not be less than 6 i.e the concrete should be highly alkaline.
 • The alkalinity is maintained by Ca(OH)_2 produced during the hydration of cement along with C-S-H gel.

113. For dust free flooring, the floor finish material should have which property mainly?

- (a) Impact resistance
- (b) Compressive strength
- (c) Abrasion resistance
- (d) Flexural strength

RRB JE CBT-II 29-08-2019 (evening)

Ans. (c) For dust free flooring, the floor finish material should have property mainly abrasion resistance.

➤ Abrasion resistance can be defined as the ability of a surface to resist being worn away by rubbing or friction.

114. The winter Olympic Games came into being in

- (a) 1916
- (b) 1912
- (c) 1920
- (d) 1924

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The Winter Olympic Games is a sporting event which occurs every four years. The first celebration of the Winter Olympics was held in Chamonix, France, in 1924. The original sports were alpine and cross-country skiing, figure skating, ice-hockey etc.

115. The superelevation 'e' is expressed as–

(Where V =Speed of vehicle, g =Acceleration due to gravity, R = radius of the horizontal curve, W =weight of the vehicle, G = Universal gravitational constant)

- (a) $e = v^3/gR$
- (b) $e = h/GR$
- (c) $e = W/GR$
- (d) $e = v^2/gR$

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Centrifugal ratio/Impact factor/stability factor

• It is defined as the ratio of the centrifugal force to the weight of the vehicle.

$$\text{C.R.} = \frac{P}{W} = \frac{Wv^2}{gRW} = \frac{v^2}{gR}$$

$$e = \frac{V^2}{gR}$$

v = Speed of vehicle,

R = Radius of the horizontal curve

g = Acceleration due to gravity

116. A square column section of size 350 mm is reinforced with four bars of 25mm diameter and four bars of 16mm diameter. Then the transverse steel should be:

- (a) 8 mm diameter @ 250 mm c/c
- (b) 5 mm diameter @ 240 mm c/c
- (c) 8 mm diameter @ 350 mm c/c
- (d) 6 mm diameter @ 250 mm c/c

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) $\phi_{\max} = 25$ mm, $\phi_{\min} = 16$ mm
transverse steel

$$\text{tie diameter } \phi_t \geq \begin{cases} \frac{\phi_{\max}}{4} \\ 6 \text{ mm} \end{cases}$$

$$\frac{25}{4} = 6.25 \Rightarrow \text{take } 8 \text{ mm}$$

$$\text{tie spacing } s_t \leq \begin{cases} D - \text{least lateral dimension} \\ 16\phi_{\min} \\ 300 \text{ mm} \end{cases}$$

- $D = 350$ mm
- $16\phi_{\min} = 16 \times 16 = 256$
take = 250 mm
- 300 mm

Provide 8 mm diameter @ 250 mm c/c

117. In which city is the famous Howrah Bridge located

- (a) Mumbai
- (b) Chennai
- (c) New Delhi
- (d) Kolkata

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The Howrah Bridge is a balanced cantilever bridge over the Hoogly river in West Bengal (Kolkata). Commissioned in 1943, the bridge was originally named the New Howrah Bridge on 14th June 1965, it was renamed Rabindra Setu but it is still popularly known as Howrah Bridge.

118. Bar A has diameter 'd' and length 'L'. Bar B has diameter '2d' and length '2L'. If both the bars are made up of same material and subjected to same load. The ratio of change in length of A to change in Length of B is:

- (a) 0.50
- (b) 2.00
- (c) 0.25
- (d) 4.00

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Given, $d_A = d$, $L_A = L$

$d_B = 2d$, $L_B = 2L$

$$\Delta_A = \frac{PL_A}{AE} = \frac{P \times L}{\frac{\pi}{4} \times (d_A)^2 \times E} = \frac{P \times L}{\frac{\pi}{4} \times d^2 \times E}$$

$$\Delta_B = \frac{P \times L_B}{\frac{\pi}{4} \times (d_B)^2 \times E} = \frac{P \times 2L}{\frac{\pi}{4} \times (2d)^2 \times E}$$

$$= \frac{PL}{\frac{\pi}{4} \times 2 \times d^2 E}$$

$$\frac{\Delta_A}{\Delta_B} = \frac{PL / \frac{\pi}{4} d^2 E}{PL / \frac{\pi}{4} 2d^2 E} = 2$$

119. The working stress method is also known as–

- (a) All of the options
- (b) Critical method
- (c) Elastic method
- (d) Load factor method

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c) Working stress method is also known as elastic method where concrete is assumed as elastic steel and concrete together act as Elastically where the load and stress is linear

→ Also know as modular ratio method.

120. Pick up the correct statement from the following.

- (a) Localizer indicates to the pilot his position with respect to the proposed alignment
- (b) All of the options
- (c) The glide slope indicates the correct angle of descent
- (d) Runway edge from the landing side is called threshold

RRB JE CBT-II 29–08–2019 (evening)

Ans. (b) LOM and LMM help the pilot to judge has position for the runway.

- Runway edge from the landing side is called threshold.
- Localizer indicates to the pilot his position with respect to the proposed alignment.
- The guide slope indicates the correct angle of descent.

121. A layer provided to prevent entry of unwanted moisture inside the building either by seepage or by leakage is known as–

- (a) Damp proof course
- (b) Sunshade
- (c) Lintel
- (d) Roof

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) DPC is a layer provided to prevent energy of unwanted moisture inside the building

→ It is measure in m^2

122. Name the structural member connecting all the trusses and also supporting the roofing sheets.

- (a) Purlins
- (b) Tie Rods
- (c) Gutters
- (d) Bracings

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Purlins is the structure member connecting all the truss and also supporting the roof sheet

- They run parallel to the building eave and are supported by rafter or wall
- It added rigidity to the roof and reduce the length of rafter

123. Mendeleev's periodic law states that the properties of elements are the periodic function of their _____.

- (a) Metal
- (b) Non-metal
- (c) Atomic number
- (d) Atomic masses

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) Mendeleev claimed the famous periodic law that 'Element properties are a periodic function of their atomic weight'. Mendeleev placed elements in the order of their atomic weights in the form of stable known as the periodic table of Mendeleev.

124. Who among the following has been appointed the brand ambassador of RedBus?

- (a) Hardik Pandya
- (b) Virat Kohli
- (c) Sachin Tendulkar
- (d) Mahendra Singh Dhoni

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) In 2019 Red Bus has announced Indian cricketer Mahendra Singh Dhoni as its Brand ambassador.

At present actor Allu Arjun is the new Brand Ambassador of Red Bus from April 2022.

125. HDF board means–

- (a) Hardened dry fibre board
- (b) Hardened dense fibre board
- (c) High density flat board
- (d) High density fibre board

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) HDF board means, high density fiber board is a type of fiber board. It is an engineered wood product. It is used in furniture and in the construction industry.

126. Calculate the molecular mass of HNO_3

- (a) 70U
- (b) 65U
- (c) 63U
- (d) 64U

RRB JE CBT-II 29–08–2019 (evening)

Ans. (c)

Molecular Mass of HNO_3

Atomic mass of H = 1

Atomic mass of N = 14

Atomic mass of O = 16

$$= (1 \times 1) + (1 \times 14) + (3 \times 16)$$

$$= 1 + 14 + 48$$

$$= 63U$$

127. Which of the following codes is also known as reflected binary code?

- (a) Error code
- (b) Straight binary code
- (c) Excess-3 code
- (d) Gray code

RRB JE CBT-II 29–08–2019 (evening)

Ans. (d) The reflected binary code is also known as gray code because one digit reflected to the next bit. In gray code, every sequence of successive bits differs by 1 bit only.

128. In Contractual payments, RA BILL means

- (a) Receipts and Accounts Bill
- (b) Recurring Amount Bill
- (c) Received Amount Bill
- (d) Running Account Bill

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) RA Bill (Running account bill) – It is used by the contractor upon completion of part of work project.

129. What is the very first crack that occurs in any RCC member, especially if constructed during summer

- (a) Flexural crack
- (b) Settlement crack
- (c) Corrosion spelling crack
- (d) Shrinkage crack

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) Shrinkage crack in concrete occurs due to change in moisture, during summer they absorb moisture and shrink during dry season.

DPC is a layer provided to prevent entry of unwanted moisture inside the building.

→ To avoid shrinkage crack the concrete surface covers polythene sheeting or plastic.

130. High level radioactive waste can be managed in which of the following ways?

- (a) Composting
- (b) Store indefinitely
- (c) Neutralization
- (d) Incineration

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) High level radioactive waste can be managed by dumping in sealed containers that called store indefinitely.

• Open dumping composting are not a suitable process since, there is chance of spread of the radioactive in the vicinity.

131. The distance of vena contracta from the orifice is approximately–

- (a) 2/3 diameter of the orifice
- (b) 3/4 diameter of the orifice
- (c) 1/4 diameter of the orifice
- (d) 1/2 diameter of the orifice

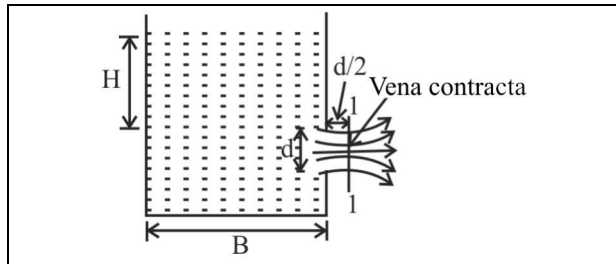
RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The distance of the vena contracta from the orifice varies with the ratio of orifice diameter to pipe diameter known as $(b = d/D)$

Where, d = orifice diameter

D = Inside diameter of the pipe

• In ideal b ratio would be approximately 0.65 to 0.7.



132. In 2019, where was the National Cancer Institute (NIC) inaugurated by Narendra Modi

- (a) Jamshedpur
- (b) Indore
- (c) Jaipur
- (d) Haryana

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) In 2019, the National Cancer Institute was inaugurated by Narendra Modi in Haryana (Jhajjar).

• The head of the institute is Dr. Goura Kishor Rathi

133. What type of devices are computer speakers or headphones?

- (a) Software
- (b) Storage
- (c) Input
- (d) Output

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) An output device is any device used to send data from a computer to another device or user. Most computer data output that is meant for humans is in the form of audio or video.

Thus, most output devices used by humans are in these categories.

Example– Monitors, projectors, specters, headphones and printers.

134. Smog is a combination of–

- (a) Air and water vapour
- (b) Smoke and fog
- (c) Fire and water
- (d) Water and Smoke

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Smog is a combination of smoke and fog.

• The smog usually appears irritating to the human respiratory system and most people soon developed red eyes, burning thought and nagging coughs, soon reports of smog-related deaths began to come in.

135. NASA has announced a plan to open up the International Space Station (ISS), a \$150 billion orbiting laboratory, to private tourists. What is the charge per day.

- (a) \$35,000
- (b) \$50,000
- (c) \$45,000
- (d) \$40,000

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) NASA has announced a plan to open up the International Space Station (ISS) a \$ 150 billion orbiting laboratory, to private tourists. The charge per day is \$ 35,000.

Note– The International Space Station is a unique laboratory that is returning enormous scientific educational and technological developments to benefit people on earth.

136. Field vane shear is the appropriate field test for obtaining the shear strength of which of the following?

- (a) Weathered rock (b) Clay
(c) Gravel (d) Sand

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Vane shear test is ideally suited for the determination of the in-situ undrained shear strength of non-fissured, fully saturated clay.

- The test can be conventionally sensitivity of the soil.

137. Which of the following quantities has the SI unit as Candela?

- (a) Impulse
(b) Velocity
(c) Force
(d) Luminous intensity

RRB JE CBT-II 29-08-2019 (evening)

Ans. (d) The basic seven quantities with their units and symbols are given as follows-

Physical quantity	SI	Unit symbol
Mass	kilogram	kg
Length	meters	m
Time	second	s
Temperature	Kelvin	k
Luminous intensity	candela	cd
Electric current	ampere	A
Amount of substance	mole	mole

138. Normal average thickness of stratospheric ozone layer across the globe is around-

- (a) 300 DU (b) 500 DU
(c) 200 DU (d) 400 DU

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a) The ozone layer is approximately 20 to 30 km above Earth, which is about 3 mm thickness or about 300 Dobson Unit (DU).

139. The minimum area required for the isolated footing to carry a factored load of 1000kN constructed over the soil of safe bearing capacity 150kN/m² is-

- (a) 6.7 m² (b) 4.9 m²
(c) 7.3 m² (d) 4.4 m²

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Given,

Safe bearing capacity of soil = 150 kN/m²

Factored load = 1000 kN

$$\text{Minimum area} = \frac{\text{Load}}{\text{Stress (Bearing capacity of soil)}}$$

F.O.S. = 1.5

Self weight of foundation = 10%

$$\text{Minimum area} = \frac{1.1 \times 1000}{1.5 \times 150}$$

$$A = 4.9 \text{ m}^2$$

140. Renubala deposits ₹ 1200 now, ₹ 800 two years from now and ₹ 1000 Five years from now. If the savings bank's rate of interest is 5%, she will receive an amount of ₹ X, 10 years from now, Where X is:

- (a) ₹ 4413 (b) ₹ 4225
(c) ₹ 3415 (d) ₹ 4826

RRB JE CBT-II 29-08-2019 (evening)

Ans. (a)

$$SI = \frac{P \times R \times T}{100}$$

$$P_1 = ₹1200$$

$$P_2 = ₹800$$

$$P_3 = ₹1000$$

$$R_1 = 50\%$$

$$R_2 = 50\%$$

$$R_3 = 50\%$$

$$T_1 = 10 \text{ years}$$

$$T_2 = (10 - 2) = 8 \text{ years}$$

$$T_3 = (10 - 5) = 5 \text{ years}$$

$$C = P \left(1 + \frac{r}{100} \right)^n$$

$$C = 1200 \left(1 + \frac{5}{100} \right)^{10} + 800 \left(1 + \frac{5}{100} \right)^{(10-2)} + 1000 \left(1 + \frac{5}{100} \right)^{(10-5)}$$

$$C = 1954.67 + 1181.96 + 12746.28$$

$$C = 4412.91 = 4413.$$

141. The 'centre line method' is specially adopted for estimating-

- (a) Polygonal Buildings only
(b) Circular, hexagonal and other geometric shapes
(c) Circular buildings only
(d) Hexagonal buildings only

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Centre line method -

By this method estimate may be prepared more quickly and this method is as accurate as the other method. Only in case of an unsymmetrical wall which is generally rare, no advantage claimed by this method over other as the center line length varies at every layer.

- But to estimate circular, hexagonal, octagonal etc. shaped building this method is adopted.

142. _____ are lines drawn on a map to locate, in the plan view, points of equal ground elevation.

- (a) Profiles (b) Contours
(c) Elevations (d) Hatches

RRB JE CBT-II 29-08-2019 (evening)

Ans. (b) Contour– A contour is an imaginary line on the ground joining the points of equal elevation.
Contour Interval– The vertical distance between any two consecutive contour is called contour interval.

143. While representing the diameter in dimensioning it is represented as–

- (a) D (b) Ø
 (c) d (d) Dia

RRB JE CBT-II 29–08–2019 (evening)

Ans. (b) Symbols represented as –

A = Area
 E = Young's Modulus
 F = Force
 τ = Shear stress
 θ = Temperature
 ϕ = Diameter

144. The ability of the eye to focus on distant objects as well as nearby objects is called–

- (a) Myopia
 (b) Power of accommodation
 (c) Hypermetropia
 (d) Presbyopia

RRB JE CBT-II 29–08–2019 (evening)

Ans. (b) When the ciliary muscle are relaxed, the eye lens becomes thin, the focal length increases and the distant objects are clearly visible to the eyes. To see the nearby object clearly, the ciliary muscle contract making the eye lens thicker. Thus the focal length of the eye lens decreases and the near by objects become visible to the eyes. Hence, the human eye lens is able to adjust its focal length to view both distant and near by objects on the retina. This ability is called the power of accommodation of the eyes.

145. Which of the following grades of leads is the hardest?

- (a) 6H (b) 5H
 (c) 6B (d) 4B

RRB JE CBT-II 29–08–2019 (evening)

Ans. (a) Hard	–	4H to 9 H
Medium Hard	–	H, F, 2H, 3H
Soft	–	B to 7B

146. The trap efficiency of a reservoir after commissioning will–

- (a) Increase with time
 (b) Decrease with time
 (c) Increase initially for some time and decrease later
 (d) Decrease initially for some time and increase later

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Ans. (b) The trap efficiency is defined as the ratio of deposited sediment to the total of sediment inflow for a given period within the reservoir.

• As the time goes the efficiency decreases because the trap capacity of sediment decreases after some time.

147. Partial safety factor for shop welding and field welding are–

- (a) 1.10 and 1.25 (b) 1.25 and 1.5
 (c) 1.5 and 1.5 (d) 1.25 and 1.25

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Ans. (b) According to IS 800-2007 the partial safety factor for shop welding and field welding are–

	Shop	Field
Weld	1.25	1.50
Rivets	1.25	1.25

148. How many times has 'Financial Emergency' been declared in India so far?

- (a) 4 times (b) Never
 (c) Once (d) 5 times

RRB JE CBT-II 29–08–2019 (evening)

Ans. (b) Financial Emergency (Article 360) has never been declared in India so far, but National emergency (Article 352) has been declared thrice.

Resident rule – Article 356, was used for the first time in Punjab on 20 June 1951.

149. Which of the following is the correct statement–

In beam to column connections in steel construction, if torsion is permitted at the ends of simply supported beams by not providing the cleats, the

- (a) Joint has to be designed for torsion
 (b) Effective length of the beam increases by 20%
 (c) Permissible bending stresses are increased by around 10%
 (d) Effective length remains same as the actual length

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Ans. (b) As per IS 800-1984 if torsion is permitted at the ends at ends of a simply supported beam by not providing cleats, the effective length of the compression flanges shall be increased by 20%.

150. When two roofing sheets meet at a lower level from opposite directions forming an acute angled junction, it is called as–

- (a) Valley (b) Gutters
 (c) Ridge (d) Summit

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Ans. (a) Valley– It is reverse of hip, it is formed by the intersection of two roofs, surfaces, making an external angle less than 180° .