Q: 1) The expansion of Portland cement is caused by

A: Voids

B: Iron oxide

C: Free silica

D: Free lime

Q: 2) In a reservoir with uncontrolled spillways, the peak of the plotted outflow hydrograph
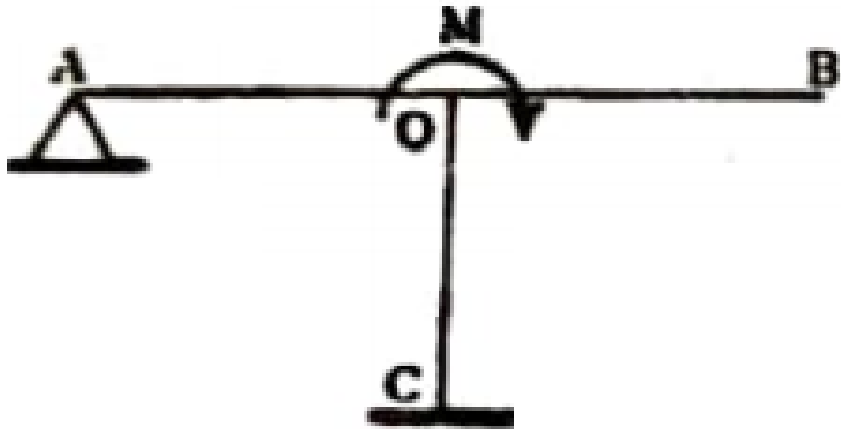
A: Lies outside of the plotted inflow hydrograph

B: Lies on the recession part of the plotted inflow hydrograph

C: Lies on the peak of the plotted inflow hydrograph

D: Is higher than the peak of the plotted inflow hydrograph

Q: 3)

The frame consists of member AO, OB and OC of equal length and equal EI. The magnitude of bending moment at C will be

A: 8M/7

B: 4M/7

C: M/6

D: M/8

Q: 4)A vehicle negotiates a transition curve with an uniform speed V. If the radius of the horizontal curve and the allowable jerk is R J respectively, the minimum length of transition curve is

A: $R^3/(VJ)$

B: $J^3/(RV)$

C: V^2R/J

D: V^3R/J

Q: 5) For a reinforced concrete section the shear stress diagram is

A: Parabolic

B: Circular

C: Parabolic above the neutral axis and triangular below the neutral axis

D: Parabolic above neutral axis and rectangular below neutral axis

Q: 6) An imaginary line along which bolts in an angle section are placed is known as

A: Rivet line

B: Back line

C: Gauge line

D: All of the above

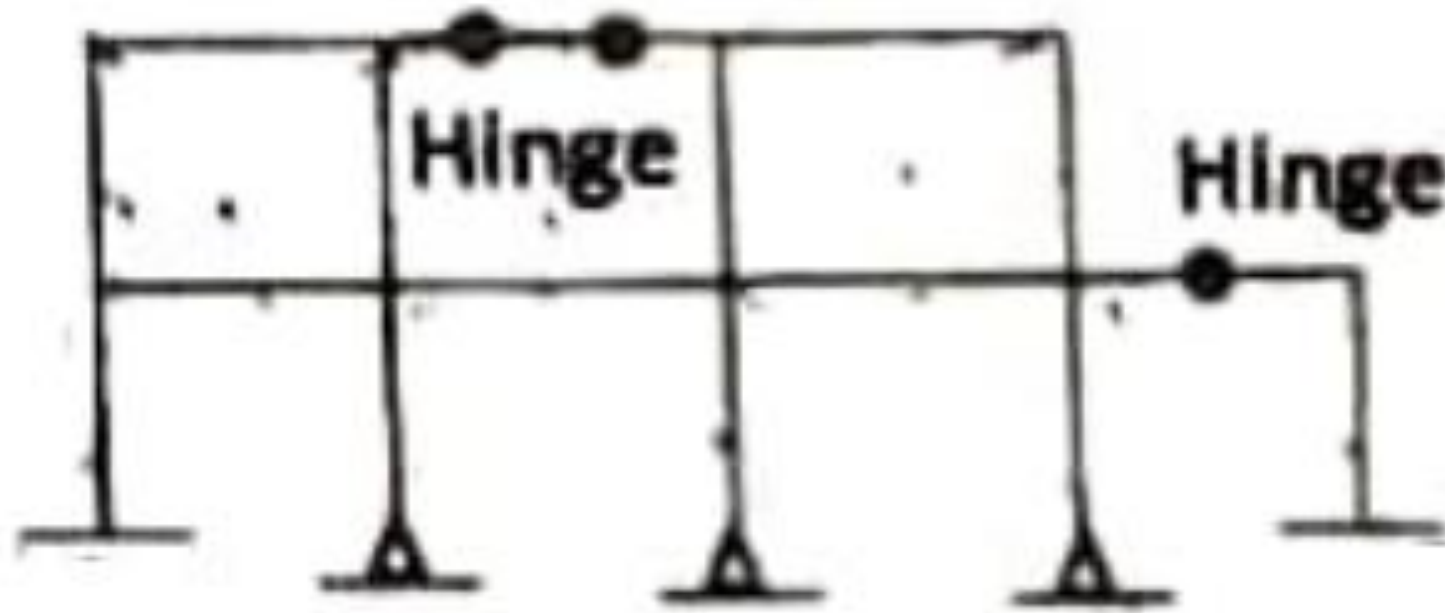**Q: 7) Static indeterminacy of this frame with 3 internal hinges and 3 hinged supports apart from 2 fixed supports, is**

A: 12

B: 13

C: 14

D: 15

Hinge

Hinge

Q: 8) The minimum cement content in a concrete mix design for durable concrete depends on

A: Exposure condition

B: Grade of concrete

C: Exposure condition + water cement ratio

D: Exposure condition + grade of concrete

Q: 9) At the location of plastic hinge in a plastic analysis of a structure the

A: Radius of curvature is infinite

B: Curvature is infinite

C: Moment is infinite

D: Flexible stress is infinite

Q: 10) A plot between rainfall intensity versus time at a site is called as

A: Hydrograph

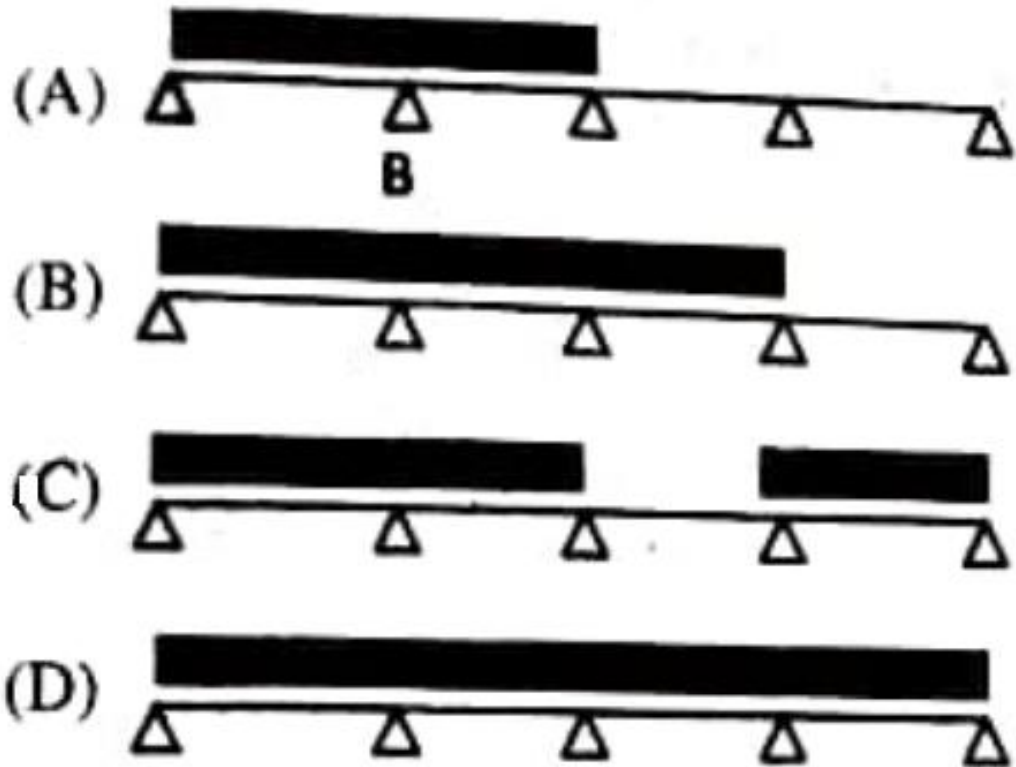**B: Mass curve**

C: Hyetograph

D: Isohyet

Q: 11) In a four span continuous beam of equal span, to determine the maximum hogging bending moment at support B (next to end support from left) the position of live load should be

Q: 12) Reynold's number is the ratio of the inertia force to the

A: Surface tension force

B: Viscous force

C: Gravity force

D: Elastic force

Q: 13) Which test is not used for workability of concrete?

A: Flow test

B: Vee bee test

C: Compacting factor test

D: Air permeability test

Q: 14) A 1 hr. rainfall of 10 cm has return period of 50 years. Find the probability of 1 hr. rainfall of 10 cm or more in each of the two successive years is

A: 0.02

B: 0.04

C: 0.0002

D: 0.0004

Q: 15) When a chain of designated length L and actual length L' is used for measuring a line. The true length of the line will be

A: $\dfrac{L}{L'}$ × measured length

B: $\dfrac{L'}{L}$ × measured length

C: (L' − L) × measured length

D: (L − L') × measured length

Q: 16) For lack of fit problems in a truss, the truss is at least statically,

A: Determinate both externally as well as internally.

B: Indeterminate internally.

C: Indeterminate externally

D: None of the above

Q: 17) Two dimensional stress at a point is given by (notations have their usual meaning)

The maximum shear stress is given by

A: 50 MPa

B: 75 MPa

C: 100 MPa

D: 110 MPa

Q: 18) Lacey's silt factor is written as

A: $f = 1.75 (d_m)^{1/2}$

B: $f = 1.01 (d_{mm})^{2/3}$

C: $f = 4.75 (d_{mm})^{1/6}$

D: $f = 1.76 (d_{mm})^{1/2}$

Q: 19) Soil to be used for earthen road should have liquid limit less than

A: 5%

B: 15%

C: 25%

D: 35%

Q: 20) When bitumen is added to soil, it mainly

A: Increases cohesion

B: Accelerate cohesion

C: Acts as a water proofing agent.

D: Fills voids

Q: 21)

w kN/m

L
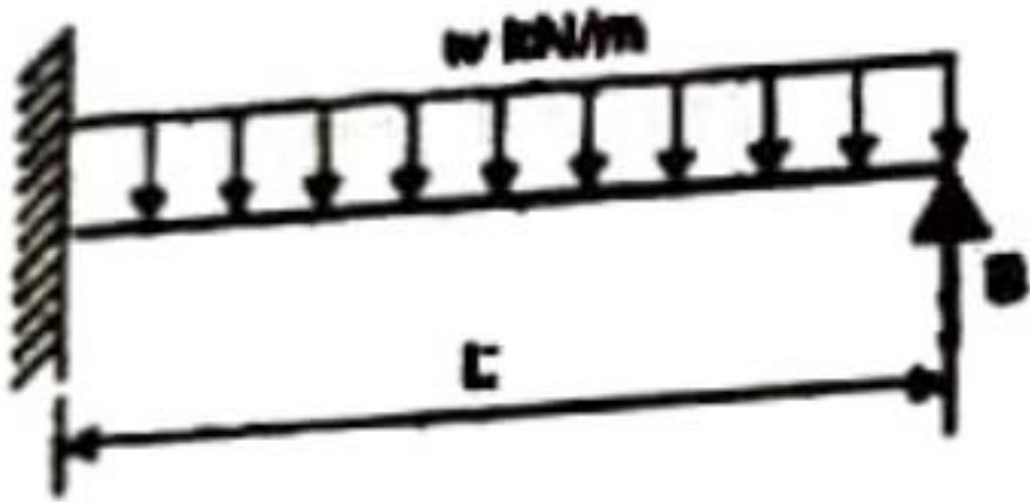
Find the reaction at B

A: 3wL/8

B: 5wL/8

C: 3wL/4

D: wL/4

Q: 22) Some of the nontoxic metal normally found in the natural water are

A: Arsenic, lead, mercury

B: Calcium, sodium, silver

C: Cadmium, chromium, copper

D: Iron, manganese, magnesium

Q: 23) Generally purlins are placed at the nodal points of the rafter in a roof truss so as to avoid

A: Axial force in rafter

B: Shear force in rafter

C: Deflection rafter

D: Bending moment rafter

Q: 24) A symmetrical footing resting on linear isotropic elastic soil is provided to transfer the concentric load from column, Assume that the footing is perfectly rigid. The distribution of pressure at the footing will be

A: Maximum at the edge and minimum at the centre

B: Maximum at the centre and minimum at the edge

C: Uniform distribution

D: Depending on the depth of foundation

Q: 25) What will be coefficient of passive earth pressure, at a depth of 8 m in cohesion less soil with an angle of internal friction of 30^0 when the water rises to the ground level?

A: 4

B: 5

C: 3

 D: 1

Q: 26) Find the equivalent permeability for flow in perpendicular to three layers of soils placed one by one having depth Z1, Z2, and Z3 and the corresponding permeability of K1, K2 and K3

A: (Z1 + Z2 + Z3)/[Z1/K1 + Z2/K2 + Z3/K3]

B: (K1.Z1 + K2.Z2 + K3.Z3)/(Z1 + Z2 + Z3)

C: [Z1/K1 + Z2/K2 + Z3/K3]/(Z1 + Z2 + Z3)

D: (Z1 + Z2 + Z3)/(K1.Z1 + K2.Z2 + K3.Z3)

Q: 27) The minimum centre to centre distance between the pile of diameter 500 mm in clay soil is

A: 2.0 m

B: 1.5 m

C: 1.0 m

D: 0.5 m

Q: 28) A reflux valve is also known as

A: Safety valve

B: Scour valve

C: Air valve

D: Check valve

Q: 29) A cantilever column is subjected to an axial load. If a linear spring of stiffness 'K' is attached to the column laterally connected at the free end, the critical buckling load will

A: Increase

B: Decrease

C: Remain unchanged

D: Depending on the value of 'K' may increase or decrease

Q: 30) Find the bending moment at the middle of AB (length of AB = L, BC = L/2, CD = L/2) of the frame in horizontal plane subjected to vertical concreted load P at D.

A: PL/2 (sagging)

B: PL/2 (hogging)

C: PL (hogging)

D: Zero

Q: 31) For a sample of dry cohesion-less soil with friction angle Ø, the failure plane will be inclined to the major principal plane by an angle equal to

A: Ø

B: 45^0

C: $45^0 + $ Ø/2

D: $45^0 - $ Ø/2

Q: 32) Find the development length of reinforcing steel of diameter d in compression for M30 grade concrete and Fe 500 grade TMT bars (Bond strength for plain bars under tension in limit state = 1.5 MPa)
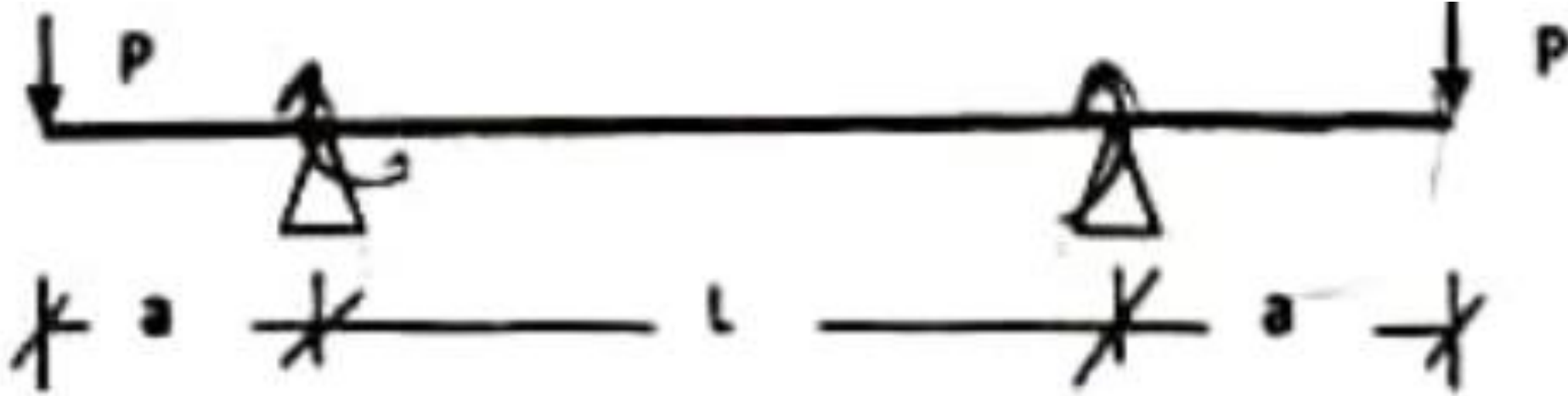
A: 30 d

B: 36 d

C: 45 d

D: 50 d

Q: 33) The shape of the deflected curve of the prismatic beam between the support as shown will

A: Be parabolic

B: Be circular

C: Be cubic parabola

D: Depend on a/L ratio

Q: 34) Two simply supported beams (A and B) are under same udl loading. The span of A is double of span B. The correct statement is

A: Deflection of A = 2 × deflection of B

B: Deflection of A = 4 × deflection of B

C: Deflection of A = 8 × deflection of B

D: Deflection of A = 16 × deflection of B

Q: 35) The latitude and departure of a line AB is – 75m and + 45 1m. The whole circle bearing of the line AB

A: 30 degree

B: 150 degree

C: 210 degree

D: 330 degree

Q: 36) For three-dimensional movement of a weight in a construction site, which one of the following machinery is most suitable?

A: Chain hoist

B: Winch

C: Crane

D: Jack

Q: 37) Minimum edge distance in bolt connection specified by the code IS 800-2007 should be maintained to avoid

A: Rupture of plate

B: Shearing of plate

C: Bearing of plate

D: Tearing of plate

Q: 38) During the clear, cool night followed by a hot sunny day, the edges and corners of slab in rigid pavement will

A: Wrap downward

B: Warp upward

C: Wrap upwards and downwards

D: Wrap laterally

Q: 39) Camber in highways is provided to take care of

A: Centrifugal force

B: Drainage

C: Off tracking

D: Sight distance

Q: 40) For a given discharge, the critical flow depth in an open channel flow depends on

A: Channel geometry only

B: Channel geometry and bed slope

C: Channel geometry, bed slope and roughness

D: channel geometry, bed slope, roughness and Reynold's no.

Q: 41) The action of negative skin friction in a pile

A: Reduces the allowable load on pile

B: Increases the ultimate load on the pile

C: Maintains the working load on the pile

D: Reduces the settlement of the pile

Q: 42) In marshal testing of bituminous mix as bitumen content increases, the flow value

A: Remains constant

B: Decreases first and then increases

C: Increases monotonically

D: Increases first and then decreases

Q: 43) Aeration of water is done to remove

A: Suspended impurities

B: Colour

C: Dissolved salts

D: Dissolved gases

Q: 44) A compound column consists of two ISMB 300 sections connected with batten plates at their langes. Find the critical distance between the two sections (centre to centre) for maximum load carrying capacity under compression. (For each USMB, ixx = 8500 cm⁴, Iyy = 500 cm⁴, A = 50 cm²)

A: $\sqrt{80}\ cm$

B: $\sqrt{160}$ cm

C: $\sqrt{320}$ cm

D: $\sqrt{640}$ cm

Q: 45) Consider the different unit process used in water treatment, rapid mixing (RM), flocculation (F), primary sedimentations (PS), secondary sedimentation (SS), Chlorination (C), Rapid sand filter (RSF). The correct order of water treatment plant is

A: PS

Q: 46) A simply supported prismatic beam subjected to transverse load UDL of w and axial compressive load P. Transverse load vs. Vertical deflection (central) curve of the beam will be linear if

A: Material is linear and P > 0

B: Material is linear and P = 0

C: Material is nonlinear and P > 0

D: Material is nonlinear and P = 0

Q: 47) The general shear failure for an isolated footing is sand, in general, decreases with the

A: Decreasing footing depth

B: Increasing footing width

C: Decreasing soil grain compressibility

D: Decreasing inter granular packing of sand

Q: 48) The bentonite is used in bored cast in situpile construction, mainly

A: To make the soil soft for cutting

B: To support the excavated part before concreting

C: To set the concrete quickly

D: To separate water to mix with wet concrete

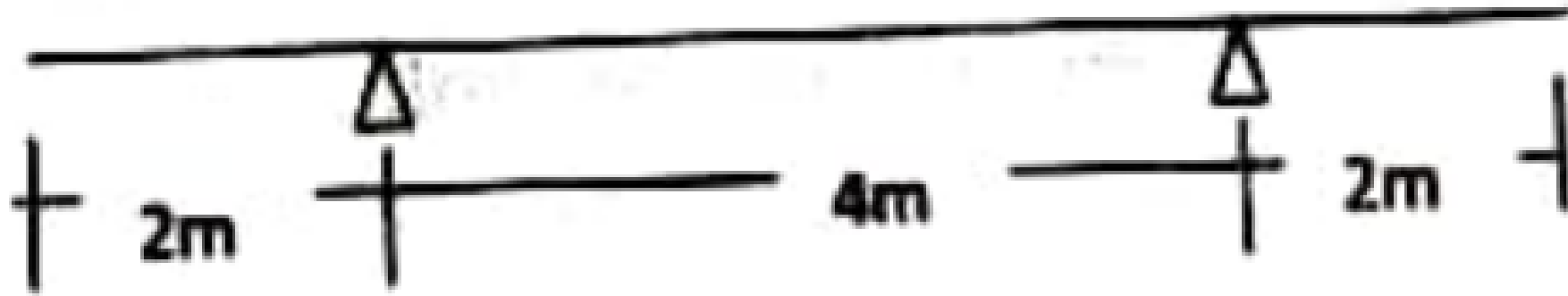**Q: 49) A sand having fineness modulus of 3 is regarded as**

A: Fine

B: Medium

C: Coarse

D: Unusable

Q: 50) A beam is loaded is subjected to udl load w kN/m throughout the whole length of 8 m. Find the bending moment (kNm) at the centre.

A: 2w (sagging)

B: w (sagging)

C: Zero

D: w (hogging)

Q: 51) Lysimeter is used to measure

A: Infiltration

B: Evaporation

C: Evapotranspiration

D: Vapour pressure

Q: 52) For TMT (thermo mechanical treatment) reinforcing steel bars of grade Fe 500, choose the correct statement.
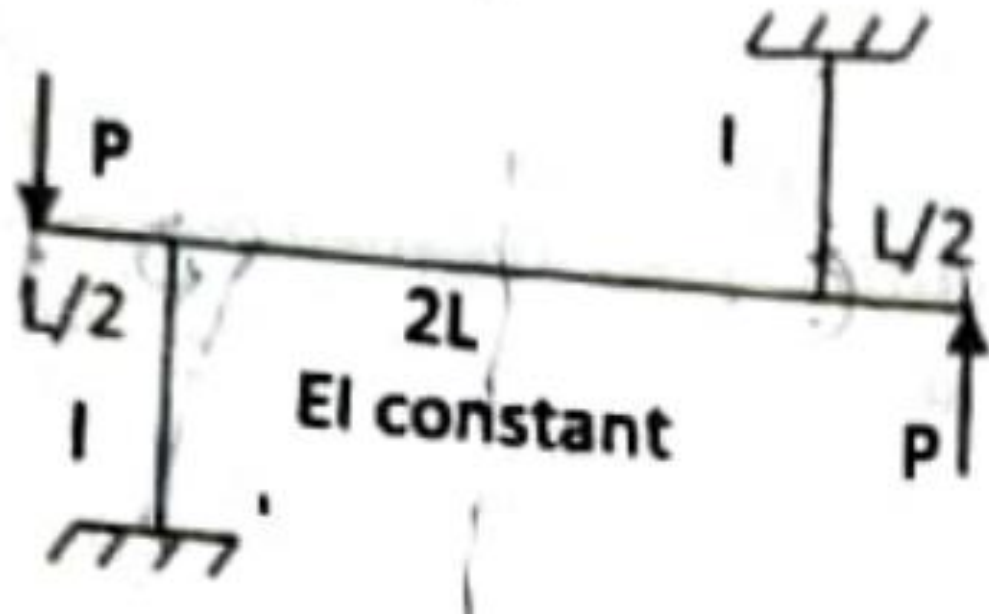
A: Yield stress = 500 MPa

B: 0.2% proof stress = 500 MPa

C: Ultimate tensile strength = 500 MPa

D: Breaking strength = 500 MPa

Q: 53)

The rigid jointed frame (EI = constant) shown will

A: Sway to right

B: Sway to left

C: No sway

D: None of the above

Q: 54) The maximum dose of plasticizer and superplasticizer for concrete, in general, restricted to
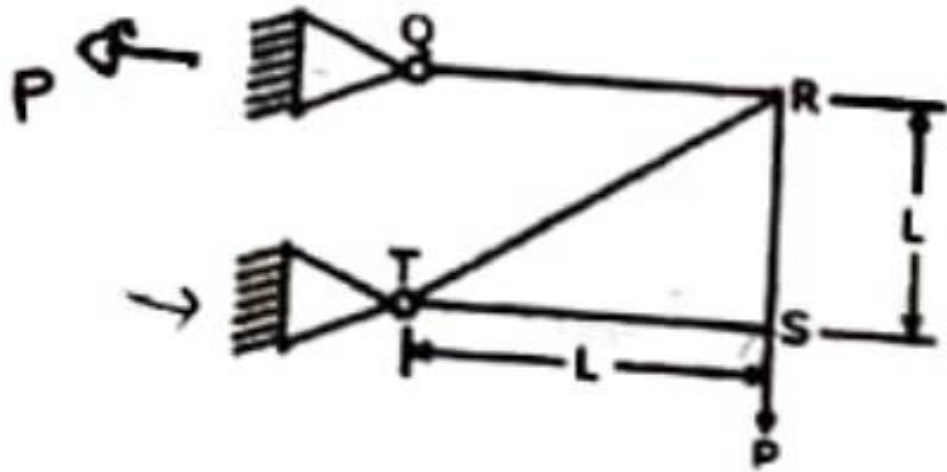
A: 0.5 and 1.0 respectively

B: 1.0 and 1.5 respectively

C: 0.5 and 2.0 respectively

D: 1.0 and 2.0 respectively

Q: 55)

Find the force in the member QR

A: Zero

B: $P/\sqrt{2}$

C: P

D: $\sqrt{2}\,P$

Q: 56) To produce corrosion resistant steel (CRS) bar which element is added?

A: Carbon

B: Phosphorus

C: Sulphur

D: Copper

Q: 57) For a saturated cohesive soil, a tri-axial test yields the angle of internal friction is zero. The conducted test is called

A: Consolidated drain test

B: Consolidated un-drained test

C: Unconfined compression test

D: Unconsolidated un-drained test

Q: 58) What kind of structural system was used for the howrah bridge (Rabindra setu) at Kolkata?

A: Simply supported span

B: Balanced cantilever

C: Cantilever with a suspended span

D: Cable stayed

Q: 59) The range of projectile is maximum, when the angle of projection is

A: 30^0

B: 45^0

C: 60^0

D: 90^0

Q: 60) A critical path in a project management has

A: Zero slack

B: Minimum slack

C: Maximum slack

D: Infinite slack

Q: 61) Quick sand is a

A: Moist sand containing small particles,

B: Condition which occurs in coarse and sand

C: Condition on which a cohesionless soil loses all its strength because of upward flow of water

D: None of the above
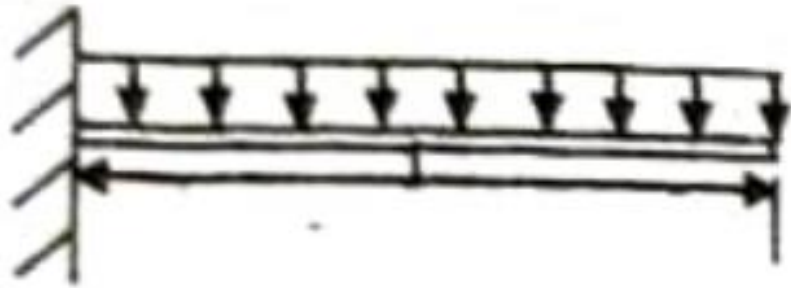
Q: 62) A differential manometer is sued to measure

A: Atmospheric pressure
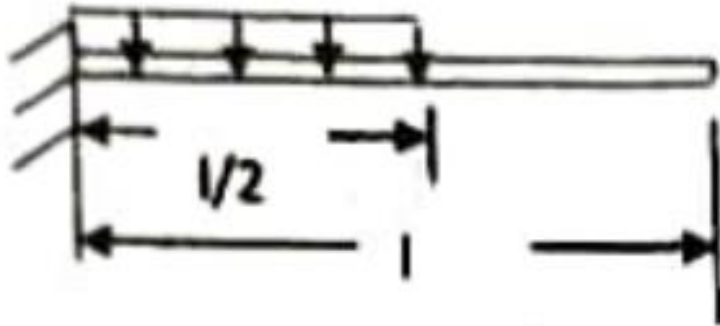
B: Pressure in pipes and channels

C: Pressure in venturimeter

D: Difference of pressures between two points in a pipe

Q: 63) Two cantilever beams A and B are shown in fig. the ratio of maximum deflection of beam A to the beam B is

(a) Beam A   (b) Beam B

A: 8/7

B: 16/7

C: 32/7

D: 48/7

Q: 64) The centre to centre distance between the parallel bars for distribution steel required for shrinkage and temperature effect in a slab should not be more than (d = effective depth of slab) as per IS 456-2000

A: 3d or 300 mm whichever is smaller

A: 3d or 450 mm whichever is smaller

A: 5d or 300 mm whichever is smaller

A: 5d or 450 mm whichever is smaller

Q: 65) The three governing equations used in structural analysis are (i) Equilibrium equations (ii) Compatibility equations and (iii) Constitutive equations. In stiffness matrix method to solve a indeterminate structure, the set of equations used are

A: (i) and (ii)

B: (i) and (iii)

C: (ii) and (iii)

D: (i), (ii), and (iii)

Q: 66) When a vehicle traces a horizontal curve, it is subjected to centrifugal force in _____ direction.

A: Inward

B: Outward

C: Forward

D: Backward

Q: 67) Damage due to alkali aggregate reaction in concrete structure is mainly due to the presence of
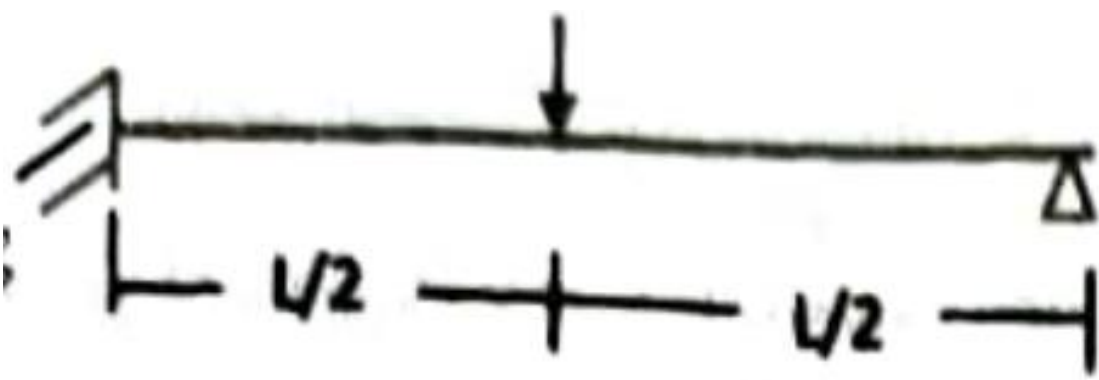
A: Cement with high alkali + reactive aggregate

B: Cement with high alkali + moisture

C: Cement with high alkali + aggregate + moisture

D: Cement with high alkali + reactive aggregate + moisture

Q: 68)

A propped cantilever beam of span L is subjected to central concentrated load P as shown. Find the maximum collapse load P for the beam having plastic moment capacity of M_p as shown

A: $2M_p/L$

A: $4M_p/L$

A: $6M_p/L$

A: $8M_p/L$

Q: 69) Zero hardness of water is achieved by

A: Lime soda process

B: Excess lime process

C: Ion exchange treatment

D: Excess lime and alum treatment

Q: 70) Theoretically, the best cross section for a lined canal is

A: Semicircular

B: Triangular

C: Trapezoidal

D: Egg shaped

Q: 71) The main circular ring beam in a typical intze type overhead water tank supported on columns located in the form of circle symmetrically is subjected to

A: Shear force and bending moment at the column support

B: Shear force, bending moment and torsional moment at the column support

C: Shear force and bending moment at the mid span between two column supports

D: Shear force, bending moment and torsional moment at the mid span between two column support.

Q: 71) Creep strain is due to

A: Dead load only

B: Live load only

C: Cyclic load only

D: Independent of load

Q: 72) Why the curing period of concrete with PPC is more than that OPC?

A: In PPC secondary reaction starts after hydration

B: In PPC primary hydration starts at later stage after adding water

C: In PPC cement particle are coarser than OPC

D: In PPC gypsum addition is more than OPC

Q: 73) With the decrease in lateral stiffness of a regular typical building, the design horizontal seismic coefficient will

A: Increase

B: Decrease

C: Depends on the height

D: Depends on base dimensions

# Q: 74) Find the RL of the station R from the field book as shown:

A: 103.355 m

B: 103.155 m

C: 101.455 m

D: 100.355 m

A tube of outer diameter 150mm is connected to a plate by welding all round as shown. The strength of the weld as per IS 800-2017 is 500 N/mm in limit state method of design. Find the maximum torsional moment can be applied so that the weld will not fail. Take partial load factor = 1.5

A: 5.625 π kNm
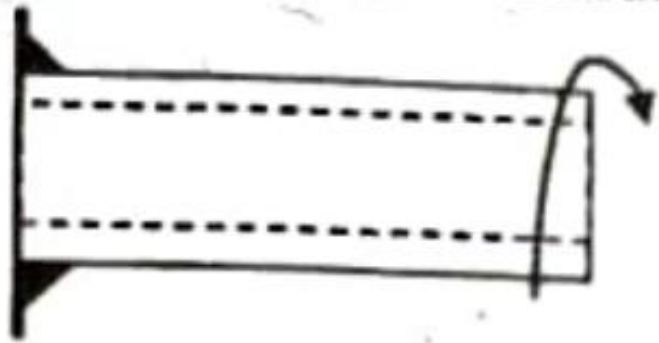
B: 3.75 π kNm

C: 5.625 kNm

D: 3.75 kNm

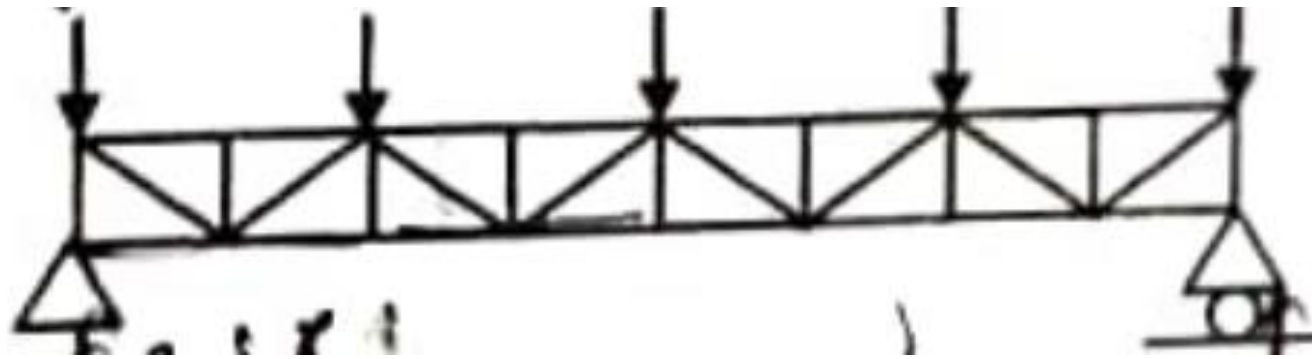Q: 76) The maximum value of compaction factor in concrete workability

A: 0.5

B: 1.0

C: 1.5

D: 2

Q: 77)

The simply supported truss of span 8L (8segment of each length L) and height L is subjected to five concentrated load of each P. Find the maximum tensile in the bottom chords of the truss

A: 2P

B: 4P

C: 6P

D: 8P

Q: 78) Ordinary rails are made of

A: Mild steel

B: Cast iron

C: Wrought iron

D: High carbon steel

Q: 79) The super-elevation in road construction is
A: Directly proportional to velocity of vehicles
B: Inversely proportional to velocity of vehicles
C: Directly proportional to velocity of pavement
D: Inversely proportional to velocity of pavement

Q: 80) The point on the Earth's surface directly above the point where an earthquake originates is called

A: Focus

B: Hypocentre

C: Epicentre

D: Gust point

Q: 81) In limit state method of design, which is not a correct load combination as per IS 456-2000 (DL = dead load, LL = live load, WL = wind load, SL = seismic load)?

A: 1.5 DL + 1.5 LL

B: 1.5 DL + 1.5 SL

C: 0.9 DL + 1.5 SL

D: 1.5 DL + 1.0 SL

Q: 82) Continuity equation in a pipe flow is based on the principle of conservation of

A: Mass

B: energy

C: Momentum

D: None of the above

Q: 83) A thin cylindrical shell of diameter (d), length (l) and thickness (t) subjected to an internal pressure p. The longitudinal stress in the shell is pdl = 2

A: pd/t

B: pd/2t

C: pd/4t

D: pd/6t

Q: 84) Which of the following sewage treatment method has inherent problem of odour, ponding and fly nuisance?

A: Activated sludge process

B: UASB process

C: Trickling filters

D: Stabilization ponds

Q: 85) The PCU (Passenger Car Unit) value for car on an urban road is

A: 0.5

B: 1.0

C: 3.0

D: 4.0

Q: 86) In a steel roof trusses, bracings should be provided at top chord level,

A: In the central panels

B: In the end panels

C: In the last but one end panel

D: Depends on span/depth ratio

Q: 87) The shrinkage index in soil test is equal to

A: liquid limit + plastic limit

B: Plastic limit – liquid limit

C: Liquid limit – shrinkage limit

D: Shrinkage limit – liquid limit

Q: 86) Curvature correction to a staff reading in differential levelling is

A: Always subtractive

B: Always zero

C: Always additive

D: Always dependent on latitude

Q: 87) The presence of hydrogen sulphide in water cause

A: Softening

B: Alkalinity

C: Acidity

D: Bad state

Q: 88) The unit in which both sedimentation and digestion process of sludge takes place simultaneously is

A: Skimming tank

B: Imhoff tank

C: Detritus tank

D: Digestion tank

Q: 89) In a natural condition, a soil sample has a mass of 1.98 kg and volume 0.001 m³.After completely oven dried the mass becomes 1.8 kg. Find the degree of saturation (specific gravity = 2.7).

A: 0.54

B: 0.61

C: 0.65

D: 0.70

Q: 90) Find the maximum bending stress at the fixed end of a cantilever beam of span L subjected to vertical concentrated load P at the free end. The cross-section of the beam is a square section of each side "a" with its diagonal placed in vertical direction.

A: $\dfrac{6\sqrt{2}PL}{a^3}$

B: $\dfrac{6PL}{a^3}$

C: $\dfrac{12\sqrt{2}PL}{a^3}$

D: $\dfrac{12PL}{a^3}$

Q: 91) In natural water, the hardness is due the presence of

A: Ca^{++} and Mn^{++}

B: Na^+ and K^+

C: Ca^{++} and Fe^{++}

D: Ca^{++} and Mg^{++}

Q: 92) For reversal of stresses the most suitable bolt generally used in steel structure is

A: Black bolt

B: Turned bolt

C: HSFG bolt

D: Snap headed both

Q: 93) Find the secondary air pollut NO, SO$_2$, shoot, O$_3$.

A: NO

B: SO^2

C: Shoot

D: O^3