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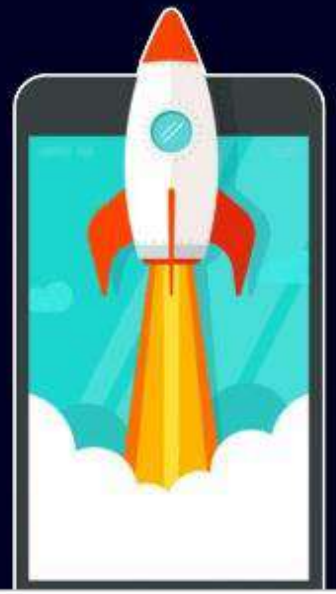

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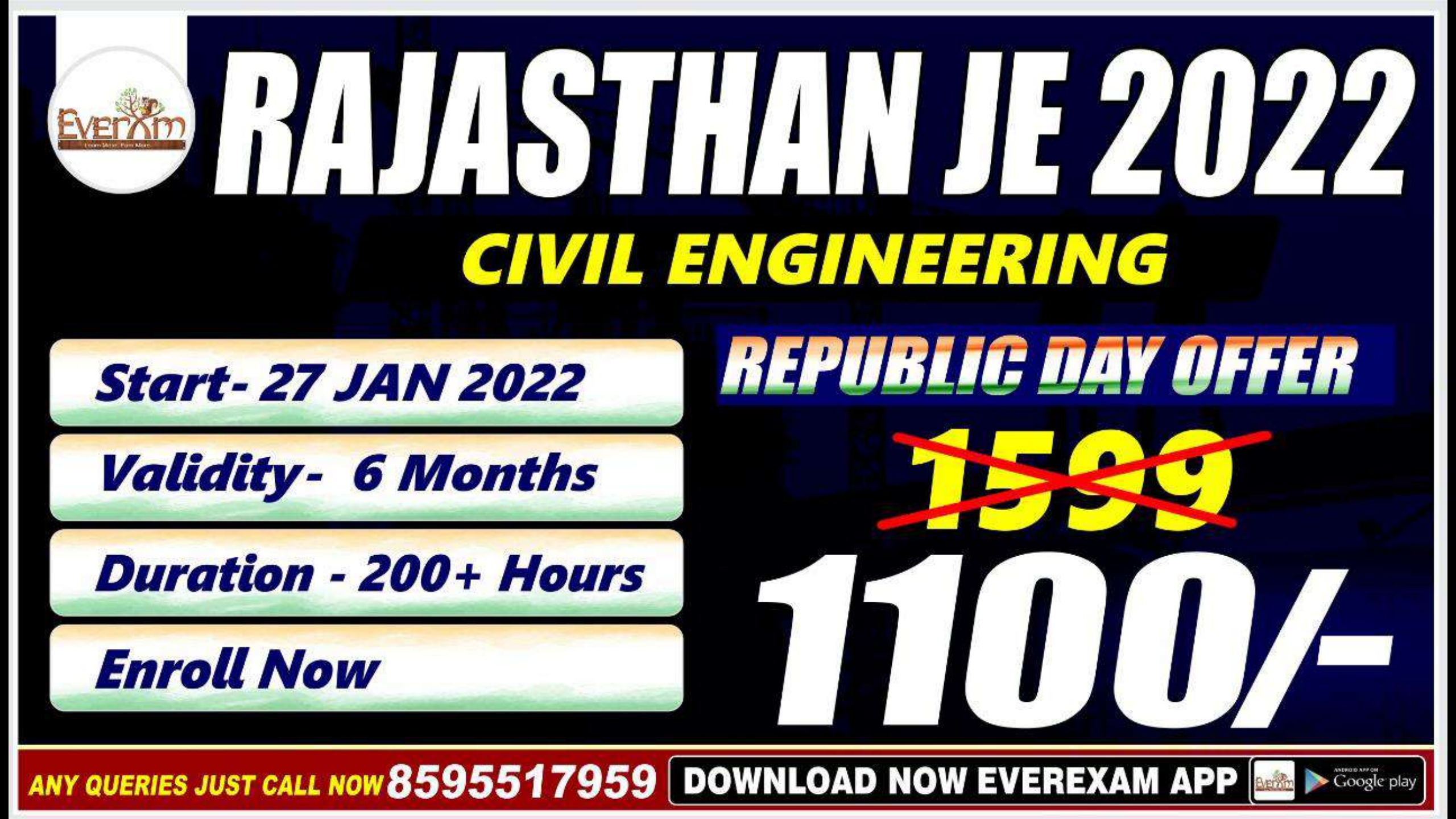
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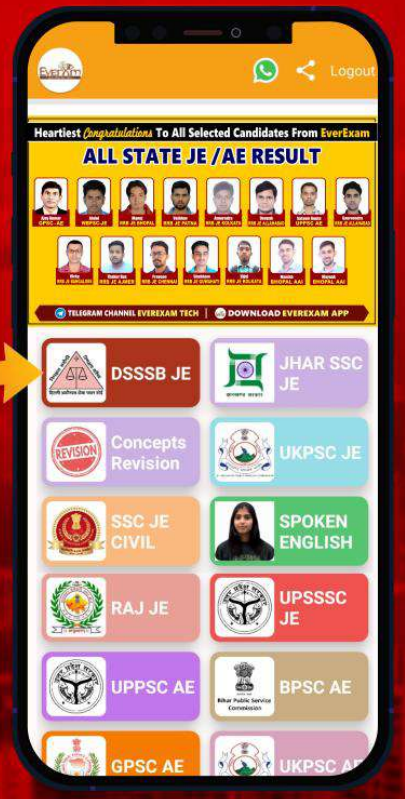

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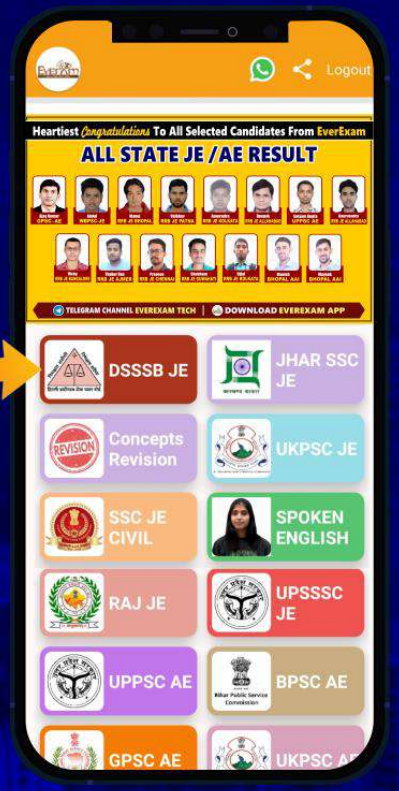

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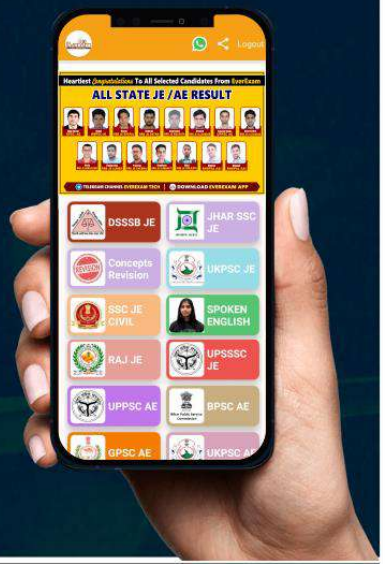

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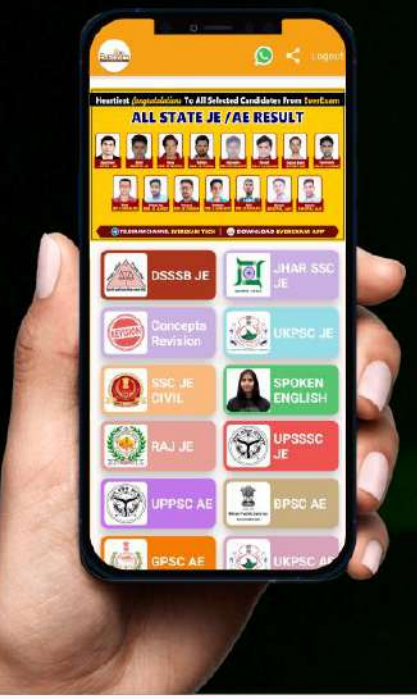

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BPSC AE MOCK -1

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Q.1) For a 2-hinged arch, if one of the supports settles down vertically, then the horizontal thrust

A : Is increased

B : Is decreased

C : Remains unchanged

D : Becomes zero

Q.2) The maximum bending moment due to a train of wheel loads on a simply supported grider

A : Always occurs at the centre of span

B : Always occurs under a wheel load

C : Never occurs under a wheel load

D : None of the above

Q.3) The unit of coefficient of consolidation is

A : cm^2/gm

B : cm^2/sec

C : $gm/cm^2/sec$

D : gm-cm/sec

Q.4) Which of the following gives the correct decreasing order of the densities of a soil sample?

A : Saturated, submerged, wet, dry

B : Saturated, wet, submerged, dry

C : Saturated, wet, dry, submerged

D : Wet, saturated, submerged, dry

Q.5) For sampling natural sands and other soft and wet soils satisfactorily, the most suitable soil sampler is

A : Open drive thin-walled tube sampler

B : Standard split-spoon sampler

C : Stationary piston sampler

D : Roatary sampler

Q.6) During seepage through an earth mass, the direction of seepage is

A : Parallel to the equipotential lines

B : Perpendicular to the stream lines

C : Perpendicular to the equipotential lines

D : Along the direction of gravity

Q.7) A sample of clay and a sample of sand have the same specific gravity and void ratio. Their permeabilities would differ because

A : Their porosities would be different

B : Their degrees of saturation would be different

C : Their densities would be different

D : The size ranges of their voids would be different

Q.8) In a saturated clay layer undergoing consolidation with single drainage at its top, the pore water pressure would be the maximum at its

A : Top

B : Middle

C : Bottom

D : Top as well as bottom

Q.9) A saturated clay stratum of thickness 10 m, bounded on top and bottom by medium coarse sand layers, has a coefficient of consolidation of 0.002 cm^2/s. If this stratum is subjected to loading, it is likely that itn would undergo 50% of its primary consolidation in

A : 1136 days

B : 227 days

C : 284 days

D : 568 days

Q.10) Which of the following parameters can be used to estimate the angle of internal friction of sandy soil?

A : Particle size

B : Roughness of particle

C : Particle size distribution

D : Density index

Q.11) A cantilever sheet pile derives its stability from

A : Lateral resistance of soil

B : Self-weight

C : The dead man

D : The anchor rod

Q.12) Deflection of a sheet pile in a braced cut

A : Increases from top to bottom

B : Decreases from top to bottom

C : Increases from top and then decreases

D : Decreases from top and then increases

Q.13) The time t required for attracting a certain degree of consolidation of a clay layer is proportional to

A : H^2 and C_v

B : H^2 and $\frac{1}{C_v}$

C : $\frac{1}{H^2}$ and C_v

D : $\frac{1}{H^2}$ and $\frac{1}{C_v}$

Q. 14) The static cone penetration test and a standard penetration test are performed on a soil at a certain depth. The value of static cone penetration test is 8 MPa and the N value is 20. The soil met with at that depth is

A : Sandy silt

B : Clay-silt mixture

C : Sand and gravel mixture

D : Medium dense sand

Q.15) A clear dry sand sample is tested in direct shear test. The normal stress and the shear stress at failure are both equal to 120 kN/m^2. The angle of shearing resistance of the sand will be

A : 25 degree

B : 35 degree

C : 45 degree

D : 55 degree

Q.16) An initial cross-sectional area of a clay sample was 15 cm^2. The failure strain was 25% in an unconfined compression test. The corrected area of the sample at failure would be

A : 15 cm^2

B : 20 cm^2

C : 25 cm^2

D : 30 cm^2

Q. 17) Under a given load, a clay layer attains 30% degree of consolidation in 100 days. The time taken by the same clay layer to attain 60% degree of consolidation will be

A : 1600 days

B : 800 days

C : 400 days

D : 200 days

Q.18) For a sandy soil, the angle of internal friction is 30 degree. If the major principal stress is 50 kN/m^2 at failure, then the corresponding minor principal stress (in kN/m^2) will be

A : 12.2

B : 16.66

C : 20.8

D : 27.2

Q.19) The factor of safety of an infinite slope in a sand deposit is found to be 1.732. The angle of shearing resistance of the sand in 30 degree. The average slope of the sand deposit is given by

A : $\sin^{-1}(0.333)$

B : $\cos^{-1}(0.252)$

C : $\tan^{-1}(0.333)$

D : $\cot^{-1}(0.621)$

Q.20) The maximum compressive stress in concrete for design purposes is based on a partial safety factor of

A : 1.55

B : 1.50

C : 1.85

D : 2.20

Q.21) The creep strains are

A : caused due to dead loads only

B : caused due to live loads only

C : caused due to both dead load and live loads

D : independent of loads

Q.22) Due to shrinkage stresses, simple supported beam having reinforcement only at the bottom tends to deflect

A : downward

B : upward

C : downward or upward

D : None of the above

Q.23) In a spherical dome subjected to concentrated load at crown or uniformly distributed load, the meridional force is always

A : Zero

B : Tensile

C : Compressive

D : Tensile or compressive

Q.24) Normally prestressing wires are arranged in the

A : Upper part of the beam

B : Lower part of the beam

C : Centre

D : Anywhere

Q.25) The purpose of lateral ties in short RC column is to

A : Avoid buckling of longitudinal bars

B : Facilitate construction

C : Facilitates compaction of concrete

D : Increase the load carrying capacity of the columns

Q.26) The side face reinforcement, if required in a T-beam will be

A : 0.1% of the web area

B : 0.15% of the web area

C : 0.2% to 0.3% of the web area depending upon web area depending upon the breadth of the web

D : Half the longitudinal reinforcement

Q.27) Deep beams are designed for

A : Shear force only

B : Bending moment only

C : Both shear force and bending moment

D : Bearing

Q. 28) The bending moment at the edges of a square l due to a lateral pressure ρ per unit area is

A : $\frac{\rho l^2}{12}$

B : $\frac{\rho l^2}{10}$

C : $\frac{\rho l^2}{16}$

D : $\frac{\rho l^2}{11}$

Q. 29) The minimum clear covers (in mm) to the main still bars in slab, beam, column and footing are respectively

A : 10, 15, 20, 25,

B : 15, 25, 40, 75

C : 20, 25, 30, 40

D : 20, 35, 40, 75

Q.30) The main reinforcement of an RC slab consists of 10 mm bars at 10 cm spacing. If it is desired to replace 10 mm bars by 12 mm bars, then the spacing of 12 mm bars should be

A : 12.0 cm

B : 14.0 cm

C : 14.4 cm

D : 16.0 cm

Q. 31) The minimum pitch of the rivets shall not be less than

A : 1.5d

B : 2.0d

C : 2.5d

D : 3.0d

Q.32) A still beam supporting loads from the floor slabs as well as from wall is termed as

A : Stringer beam

B : lintel beam

C : Spandrel beam

D : Header beam

Q.33) The channels or angles in the compression chords of the steel truss girder bridges are turned outward in order to increase

A : Cross-sectional area

B : Section modulus

C : Torsional constant

D : Radius of gyration

Q.34) The angle dispersion of a concentrated load on the flange to the web plate of a steel beam is

A : 90 degree with the horizontal

B : 60 degree with the vertical

C : 45 degree with the horizontal

D : 30 degree with the vertical

Q.35) A welded steel plate grider consisting of two flange plates of 350 mm × 16 mm and web plate of 1000 mm × 6 mm requires

A : No stiffeners

B : Vertical stifferes

C : Immediate vertical stiffeners

D : Vertical and horizontal stiffeners

Q.36) The absolute maximum bending moment in a simply supported beam of span 20 m due to moving u.d.l. of 4 kN/m spanning over 5 m is

A : 87.5 kNm at the support

B : 87.5 kNm near the mid-point

C : 3.5 kNm at the mid-point

D : 87.5 kNm at the mid-point

Q.37) In a two-hinged arch, an increase in temperature in duces

A : No bending moment in the arch rib

B : The uniform bending moment in the arch rib

C : The maximum bending moment at the crown

D : The minimum bending moment at the crown

Q.38) A symmetrical two-hinged parabolic arch when subjected to a uniformly distributed load on the entire horizontal span, is subjected to

A : Radial shear alone

B : Normal thrust alone

C : Normal thrust and bending moment

D : Normal thrust, radial shear and bending moment

Q.39) A fixed beam of span L is carrying a point load P at its mid-span. If the moment of inertia of the middle half-length is two times that of the remaining length, then the fixed end moment will be

A : $\frac{PL}{32}$

B : $\frac{5PL}{48}$

C : $\frac{3PL}{32}$

D : $\frac{5PL}{32}$

Q. 40) The influence line for horizontal thrust in two-hinged parabolic arch is

A : Parabolic

B : Cubic

C : Triangular

D : Rectangular

Q.41) For a single-point load W moving on symmetrical 3-hinged parabolic arch of span L, the maximum sagging moment occurs at a distance x from ends. The value of x is

A : 0.211L

B : 0.25L

C : 0.34L

D : 0.5L

Q.42) In which of the following truss members the stress depends upon whether the load is moving on top chord of bottom chord?

A : Top chord or bottom chord

B : Verticals

C : Diagnals

D : Verticals and diagonals

Q.43) Which of the following methods of structural analysis is a force method?

A : Slope deflection method

B : Column analogy method

C : Moment distribution method

D : None of the above

Q.44) Which of the following methods of structural analysis is a displacement method?

A : Three-moment equation

B : Column analogy method

C : Moment distribution method

D : None of the above

Q.45) In the displacement method of structural analysis, the basic unknown are

A : Displacement

B : Forces

C : Displacement and forces

D : None of the above

Q.46) The fixed support in a real beam becomes in the conjugate beam at

A : Roller support

B : Hinged support

C : Fixed support

D : Free end

Q.47) The width of the analogous column in the method of column analogy is

A : $\frac{2}{EI}$

B : $\frac{1}{EI}$

C : $\frac{1}{2EI}$

D : $\frac{1}{4EI}$

Q. 48) A simply supported beam deflects by 5 mm when it is subjected to a concentrated load of 10 kN at its centre. What will be the deflection in a 1/10 model of the beam, if the model is subjected to a 1 kN load at its centre?

A : 5 mm

B : 0.5 mm

C : 0.05 mm

D : 0.005 mm

Q.49) The deformation of a spring produced by a unit load is called

A : Stiffness

B : Flexibility

C : Influence coefficient

D : Unit strain

Q. 50) The Castigliano's 2nd theorem can be used to compute deflections

A : In statically determinate structures only

B : For any type of structure

C : At the point under the load only

D : For beam and frames only

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