

1. A beam curved in plan is designed for
 - (A) Shear only
 - (B) Bending only
 - (C) Bending moment, shear and torsion
 - (D) Shear and torsion
2. A fixed beam of span L is loaded with uniformly distributed load throughout the span. The contraflexure point will be at
 - (A) $0.30 L$
 - (B) $0.25 L$
 - (C) $0.15 L$
 - (D) $0.21 L$
3. An example of a light moment connections is
 - (A) Framed connection
 - (B) Clip angle section
 - (C) Split beam connection
 - (D) Unstiffened seat connection
4. A cantilever sheet pile derives its stability from
 - (A) The anchor rod
 - (B) Lateral resistance of soil
 - (C) Self weight
 - (D) None of the above
5. A continuous beam of constant M_p has three equal spans (L) and carries uniformly distributed load on each span. The value of collapse load for the beam will be
 - (A) $9.656 M_p/L$
 - (B) $11.656 M_p/L$
 - (C) $4 M_p/L$
 - (D) $12 M_p/L$
6. According to IS specifications, the minimum depth of foundation in sand and clay should be respectively
 - (A) 1000 mm and 1200 mm
 - (B) 1000 mm and 800 mm
 - (C) 800 mm and 900 mm
 - (D) 700 mm and 900 mm

7. The rate of consolidation

- (A) Increases with increase in temperature
- (B) Is independent of temperature
- (C) Increases with decrease in temperature
- (D) None of the above

8. A continuous beam is deemed to be a deep beam when the ratio of effective span to overall depth is less than

- (A) 3.5
- (B) 3.0
- (C) 2.0
- (D) 2.5

9. The design wind speed is assumed to be constant from the mean ground level upto a height of

- (A) 20 m
- (B) 10 m
- (C) 4 m
- (D) 8 m

10. The ratio of the undisturbed shear

strength to the remoulded shear strength in cohesive soils under undrained conditions is

- (A) 1
- (B) Between 0 and 1
- (C) Greater than 1
- (D) Zero

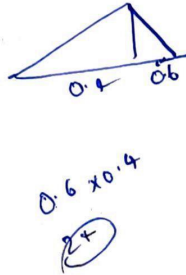
11. In case of well foundation, grip length is defined as the

- (A) Length below the top of the well cap to the cutting edge
- (B) Length between the bottoms of the well cap to the cutting edge
- (C) Depth of the bottom of the well below the maximum scour level
- (D) Depth of the bottom of the well below the minimum scour level

12. The equation of a parabolic arch of span 'L' and central height h is given by
- ☒ (A) $y = 8h \times (L - x)/L^2$
- (B) $y = 3h \times (L - x)/L^2$
- (C) $y = h \times (L - x)/L^2$
- (D) $y = 4h \times (L - x)/L^2$
13. Residual soils are formed by
- ☒ (A) Weathering of the parent rocks
- (B) Wind
- (C) Water
- (D) Glaciers
14. Eigen values of a square matrix are always
- (A) Real and imaginary
- (B) Positive
- (C) Negative
- ☒ (D) Both negative and positive
15. The degree of freedom of a block type machine foundation is
- (A) 2
- (B) 3
- (C) 6
- (D) 4
16. Inorganic soils with low compressibility are represented by
- (A) MH
- (B) SL
- (C) CH
- ☒ (D) ML
17. Lime stabilization is very effective in treating
- ☒ (A) Plastic clayey soil
- (B) Non-cohesive
- (C) Silty soil
- (D) Sandy soil

18. A load W is moving on a simply supported beam of span L from left to right. The maximum bending moment at $0.4L$ from left support is

- (A) $0.24 WL$
(B) $0.2 WL$
(C) $0.8 WL$
(D) $0.16 WL$



19. Beam-columns are the structural members subjected to
- (A) Bending moment and shear force
(B) Axial tension and bending moment
(C) Axial compression and bending moment
(D) All the above

20. A fully compensated raft foundation for a building is

- (A) Designed as a completely flexible raft
(B) Designed as a very rigid raft
(C) Such that the weight of the excavated soil is equal to the load due to the building
(D) Supported by piles of short length

21. The purpose of reinforcement in pre-stressed concrete is

- (A) To resistance tensile stresses
(B) To impart initial compressive stress in concrete
(C) To develop sufficient bond stress
(D) None of the above

22. For a linear elastic structural element

- (A) Stiffness is directly proportional to the flexibility
(B) Stiffness may not be correlated with flexibility
(C) Stiffness is equal to flexibility
(D) Stiffness is inversely proportional to the flexibility

23. The best tension member section will be a
- (A) Bolted angle section
 - (B) Welded single angle section
 - (C) Channel section
 - ✓(D) Double angle section on opposite side of gusset plate
24. Shear strength of a soil is a unique function of
- (A) Total stress only
 - (B) Both effective and total stress
 - ✓(C) Effective stress only
 - (D) None of the above
25. If the strain energy absorbed in a cantilever beam in bending under its weight is X times greater than the strain energy absorbed in an identical simply supported beam in bending under its own weight, then the magnitude of X is
- (A) 16
 - (B) 12
 - (C) 6
 - (D) 8
26. The slenderness ratio of lacing flats is limited to
- (A) 110
 - (B) 145
 - ✓(C) 350
 - (D) 225
27. The % of voids in cement is approximately
- (A) 40%
 - (B) 50%
 - (C) 80%
 - (D) 60%
28. According to Whitney's theory, depth of stress block for a balanced section of a concrete beam is limited to
- ✓(A) 0.537 d
 - (B) 0.637 d
 - (C) 0.8 d
 - (D) 0.75 d

29. Coarse grained soils are the best compacted by a

- (A) Rubber tyred roller
- (B) Drum roller
- (C) Sheep's foot roller
- ☒ (D) Vibratory roller

30. For a propped cantilever subjected to a point load at mid span, the value of collapse load is

- ☒ (A) 12 Mp/L
- (B) 4 Mp/L
- (C) 6 Mp/L
- ☒ (D) 8 Mp/L

31. If the degree of saturation of a partially saturated soil is 60%, then the air content of the soil is

- (A) 80%
- (B) 20%
- (C) 60%
- ☒ (D) 40%

32. To determine the modulus of rupture, the size of test specimen used is

- (A) $150 \times 150 \times 500$ mm
- (B) $150 \times 150 \times 200$ mm
- ☒ (C) $150 \times 150 \times 700$ mm
- (D) $150 \times 150 \times 100$ mm

33. The effective length of a battened column is

- (A) 30%
- ☒ (B) 25%
- (C) Increased by 5%
- (D) 20%

34. If one end of a prismatic beam AB with fixed ends is given a transverse displacement (Δ) without rotation, then the moment induced at A or B due to the displacement is

- (A) $12EI \Delta / L^2$
- (B) $EI \Delta / L^3$
- (C) $12EI \Delta / L^3$
- ☒ (D) $6EI \Delta / L^2$

35. The maximum energy stored at elastic limit of a material is called
- ☒ (A) Proof resilience
- (B) Modulus of resilience
- (C) Resilience
- (D) Bulk resilience
36. The minimum cover to the ties or spirals should **not** be less than
- (A) 25 mm
- ☒ (B) 20 mm
- (C) 10 mm
- ☒ (D) 15 mm
37. The upstream slope of an earth dam under steady seepage condition is
- (A) Equipotential line
- (B) Flow line
- (C) Seepage line
- (D) Phreatic line
38. In a two hinged parabolic an increase in temperature will
- (A) decrease the horizontal thrust
- ☒ (B) make no change in the horizontal thrust
- (C) decrease the bending moment
- (D) increase the horizontal thrust
39. For a base failure, the depth factor D_f is
- (A) 1
- (B) Zero
- ☒ (C) $D_f > 1$
- (D) None of the above
40. For large span and heavy gravity loads, which of the following will be economical ?
- (A) Beam
- ☒ (B) Truss
- (C) Plate girder
- (D) Arch

41. If the building height greater than 50 m, but less than or equal to 250 m, then the building is known as
- ☒ (A) Medium rise building
- (B) Low rise building
- ☒ (C) Tall building
- (D) Super tall building
42. The shear lag effect in beam flanges are disregarded when the outstand of the beam flange is less than or equal to
- ☒ (A) $L_o/10$
- (B) $L_o/20$
- (C) L_o
- (D) $L_o/15$
43. When the plastic limit of a soil is greater than the liquid limit, then the plasticity index is reported as
- ☒ (A) Zero
- (B) 1
- (C) Negative
- (D) Positive
44. The rotational stiffness coefficient K_{11} for the frame having two members of equal EI/L is given by
- (A) $7 EI/L$
- (B) $9 EI/L$
- (C) $8 EI/L$
- ☒ (D) $6 EI/L$
45. Total number of stress components at a point within a soil mass loaded at its boundary is
- ☒ (A) 6
- (B) 9
- (C) 18
- (D) 12
46. The fixed support in a real beam becomes in the conjugate beam as
- ☒ (A) Free support
- (B) Hinged support
- (C) Roller support
- (D) Fixed support

47. A slab is designed as one way if the ratio of long span to short span is
- (A) Greater than 3
 - (B) Between 2 and 3
 - (C) Between 1 and 1.5
 - (D) Greater than 2
48. For economical spacing of roof truss, if t , p , r are the cost of truss, purlin and roof coverings respectively, then
- (A) $t = 2p + r$
 - (B) $t = 3p + 2r$
 - (C) $t = p + 2r$
 - (D) $t = p + 3r$
49. In an internally indeterminate truss if the area of cross section of a redundant member is double
- (A) The force in that member will be twice
 - (B) The force in that member will not be affected
 - (C) The force in that member will be four times
 - (D) The force in that member will be halved
50. Which of the following losses of pre-stress occurs only in pre-tensioning and not in post-tensioning ?
- (A) Elastic shortening of concrete
 - (B) Shrinkage of concrete
 - (C) Loss due to friction
 - (D) Creep of concrete