01. **The sway bracing is designed to transfer**
    a. 2 ½ % of the top panel wind load to bottom bracing
    b. 10 % of the top panel wind load to bottom bracing
    c. 25 % of the top panel wind load to bottom bracing
    d. 50 % of the top panel wind load to bottom bracing

02. **Study the following statements.**
    i. Top lateral bracing prevents the sidesway buckling of the chord
    ii. Sway bracing keeps the rectangular shape of the bridge cross-section.
    iii. Sway bracing transfers the load from top of end posts to bearings.
    The correct answer is
    a. Only (i)
    b. Both (i) and (ii)
    c. Both (i) and (iii)
    d. All (i), (ii) and (iii)

03. **The bracing provided in the plane of end posts is called**
    a. Sway bracing
    b. Portal bracing
    c. Top lateral bracing
    d. Bottom lateral bracing

04. **The portal bracing is designed for**
    a. Wind forces only
    b. Wind force + 1 ¼ % of the compression force in two end posts
    c. Wind force + 2 ½ % of the compression force in two end posts
    d. Lateral shear + 2 ½ % of the compression force in two end posts

05. **The pin of a rocker bearing in a bridge is designed for**
    a. Bearing and shear
    b. Bending and shear
    c. Bearing and bending
    d. Bearing, shear and bending

06. **A solid timber column is considered as long column when the slenderness ratio is**
    a. Less than 11
    b. 11
    c. between 11 and $0.702 \sqrt{\frac{E}{f_{cp}}}$
    d. Between $0.702 \sqrt{\frac{E}{f_{cp}}}$ and 50

    Where F_{CP} is the permissible stress in compression parallel to grain and E is Young's modulus of elasticity

07. **the least dimension in case of a circular column of diameter D is taken as**
    a. 0.5 D
    b. 0.68 D
    c. 0.88 D
    d. D

08. **The case of timber structures, the from factor for solid circular cross-section is taken as**
    a. 1 . 18
    b. 1 . 414
    c. 1 . 67
    d. 1 . 81

09. **The case of timber structures, the simple bending formula M = fz may be applied for**
    a. Rectangular beams up to 300 mm depth
    b. All rectangular beams
    c. Solid circular beams only
    d. All square cross-section beams

10. **The elastic strain for steel is about**
    a. 1/12 of strain at the initiation of strain hardening and about 1/120 of maximum strain
    b. 1/2 of strain at the initiation of strain hardening and about 1/12 of maximum strain
    c. 1/12 of strain at the initiation of strain hardening and about 1/200 of maximum strain
   d. 1/24 of strain at the initiation of strain hardening and about 1/200 of maximum strain

11. **The mechanism method and the statical method give**
    a. Lower and upper bounds respectively on the strength of structure
    b. Upper and lower bounds respectively on the strength of structure
    c. Lower bounds on the strength of structure
    d. Upper bound on the strength of structure

12. **For frame with large degree of static indeterminacies the mechanism method is**
    a. Not applicable
    b. Simpler as compared to statical method
    c. Complicated as compared to statical method
    d. None of the above

13. **In the T-section shown in fig. (all dimensions in mm), the distance of plastic neutral axis from top is**
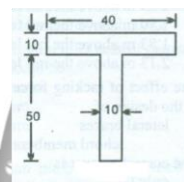
    a. 10 mm
    b. 15 mm
    c. 20 mm
    d. 30 mm

14. **The effect of axial force and shear force on the plastic moment capacity of a section are**
    a. To decrease and to increase the plastic moment respectively
    b. To increase and to decrease the plastic moment respectively
    c. To increase the plastic moment capacity in both cases
    d. To decrease the plastic moment capacity in both cases

15. **If a structure is statically indeterminate to second degree, then the maximum number of plastic hinged required to render the structure a mechanism is**
    a. 1
    b. 2
    c. 3
    d. Infinite

16. **Which of the following sections will have large shape factor ?**
    a. Rectangle
    b. I-section
    c. Solid circular section
    d. Diamond

17. **The shape factor for a solid circular section subjected to bending about its diameter is**
    a. 1 . 12
    b. 1 . 5
    c. 1 . 7
    d. 2 . 00

18. **The plastic section modulus for a rectangular section of width b and depth d is**
    a. $\frac{bd^2}{3}$ b. $\frac{bd^2}{4}$
    c. $\frac{bd^2}{6}$ d. $\frac{bd^2}{12}$

19. Load factor is defined as

$$\frac{\text{ultimate load}}{\text{yield load}}$$

$$\frac{\text{yield load}}{\text{working load}}$$

$$\frac{\text{ultimate lod}}{\text{workong load}}$$

None of the above

20. The moment-curvature relation at a plastic hinged is
   a. Linear
   b. Parabolic
   c. Constant moment for all curvatures
   d. Constant curvatures for all moments

21. Shape factor is a property which depends
   a. Only on the ultimate stress of the material
   b. Only on the yield stress of the material
   c. Only on the geometry stress of the material
   d. Only on the yield stress and ultimate stress of material

22. The statical method of plastic analysis satisfies
   a. Equilibrium and mechanism conditions
   b. Equilibrium and plastic moment conditions
   c. Mechanism and plastic moment conditions
   d. Equilibrium conditions only

23. The mechanism method of plastic analysis satisfies
   a. Equilibrium and mechanism conditions
   b. Equilibrium and plastic moment conditions
   c. Mechanism and plastic moment conditions
   d. Equilibrium conditions only

24. Plastic section modulus for a circular section of diameter d is
   a. $\frac{d^3}{3}$ b. $\frac{d^3}{4}$
   c. $\frac{d^3}{6}$ d. $\frac{d^3}{8}$

25. Load factor is
   a. Always equal to factor of safety
   b. Always less than factor of safety
   c. Always greater than factor of safety
   d. Sometimes greater then factor of safety

26. The ratio of plastic section modulus to elastic section modulus
   a. Is equal to 1
   b. Is always less than 1
   c. Is always greater than 1
   d. Can be less than 1

27. Other conditions being same, the load factor in indeterminate structure is
   a. Equal to load factor in determinate structure
   b. More than the load factor in determinate structure
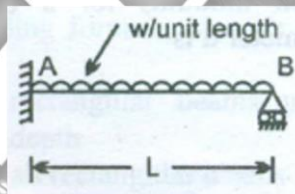   c. Less than the load factor in determinate structure
   d. Unpredictable

28. Which of the following conditions is to be satisfied both in elastic and plastic analysis ?
   a. Equilibrium condition
   b. Yield condition
   c. Plastic moment condition
   d. Mechanism condition

29. In the virtual work method, the virtual quantity is
   a. Displacement
   b. Load
   c. Slope
   d. moment

30.

In a propped cantilever loaded as shown in fig. the plastic hinged will form at
   a. B
   b. At L/2 from B
   c. At 0.414 L from B
   d. At 0.414 L from A