UNIT-01

1. Elastic Modulus of Steel is _____

(A) 1.5 × 109 N/mm21.5 × 109 N/mm2
(B) 2.0 × 105 N/mm22.0 × 105 N/mm2
(C) 2.0 × 105 N/m22.0 × 105 N/m2
(D) 1.5 × 109 N/m21.5 × 109 N/m2
2. Steel is mainly an alloy of

a) **Iron and Carbon**

b) Sulphur and Zinc

c) Zinc and tin

d) Phosphorous and Tin
3. Which of the following is a disadvantage of Steel?

a) High strength per unit mass

b) High durability

c) Fire and corrosion resistance

d) Reusable
4. Structural Steel normally has carbon content less than _____
a) 1.0%
b) 0.6%
c) 3.0%
d) 5.0%

5.Which of the following is the property of high carbon steel?
a) high toughness
b) reduced ductility
c) high strength
d) reduced strength

6. Which of the following is correct criteria to be considered while designing?
a) Structure should be aesthetically pleasing but structurally unsafe
b) Structure should be cheap in cost even though it may be structurally unsafe
c) Structure should be structurally safe but less durable
d) Structure should be adequately safe, should have adequate serviceability

7. What is serviceability?
a) It refers to condition when structure is not usable
b) It refers to services offered in the structure
c) It means that the structure should perform satisfactorily under different loads, without discomfort to user
d) It means that structure should be economically viable

8. Which method is mainly adopted for design of steel structures as per IS code?
a) Limit State Method
b) Working Stress Method
c) Ultimate Load Method
d) Earthquake Load Method

9. Which IS code is used for general construction of steel?
a) IS 456
b) IS 256
c) IS 800
d) IS 100

10. Which of the following relation is correct?
a) Permissible Stress = Yield Stress x Factor of Safety
b) Permissible Stress = Yield Stress / Factor of Safety
c) Yield Stress = Permissible Stress / Factor of Safety
d) Permissible Stress = Yield Stress – Factor of Safety

11. In Working Stress Method, which of the following relation is correct?
a) Working Stress ≤ Permissible Stress
b) Working Stress ≥ Permissible Stress
c) Working Stress = Permissible Stress
d) Working Stress > Permissible Stress

12. What is Load Factor?
a) ratio of working load to ultimate load
b) product of working load and ultimate load

c) product of working load and factor of safety
d) ratio of ultimate load to working load

13. Limit State Method is based on _____
a) calculations on service load conditions alone
b) calculations on ultimate load conditions alone
c) calculations at working loads and ultimate loads
d) calculations on earthquake loads

14. What is limit state?
a) Acceptable limits for safety and serviceability requirements before failure occurs
b) Acceptable limits for safety and serviceability requirements after failure occurs
c) Acceptable limits for safety after failure occurs
d) Acceptable limits for serviceability after failure occurs

15.Which of the following factors is included in the limit state of strength?
a) Fire
b) Failure by excessive deformation
c) Corrosion
d) Repairable damage or crack due to fatigue

16. Which of the following factors is included in the limit state of serviceability?
a) Brittle facture
b) Fracture due to fatigue
c) Failure by excessive deformation
d) Deformation and deflection adversely affecting appearance or effective use of structure

17. Which of the following relation is correct?
a) Design Load = Characteristic Load
b) Design Load = Characteristic Load + Partial factor of safety
c) Design Load = Characteristic Load / Partial factor of safety
d) Design Load = Characteristic Load x Partial factor of safety

18. The partial factor of safety for resistance governed by ultimate strength is:
a) 1.10
b) 1.5
c) 2.0
d) 1.25

19. Which IS code is used for calculating different loads on different structures?
a) IS 800
b) IS 200
c) IS 300
d) IS 875

20. Which IS Code is used for designing a structure considering earthquake loads?
a) IS 800
b) IS 875
c) IS 1893
d) IS 456

21. What is structural response factor?
a) factor denoting the acceleration response spectrum of the structure subjected to earthquake ground vibrations
b) factor by which the actual base shear force is reduced
c) factor to obtain the design spectrum
d) factor used to obtain the design seismic force

22. Wind pressure acting normal to individual is element or claddity unit is _____
a) $F = [(C_{pe} – C_{pi})A/p_d]$.
b) $F = [(C_{pe} + C_{pi})A/p_d]$.
c) $F = [(C_{pe} – C_{pi})Ap_d]$.
d) $F = [(C_{pe} – C_{pi})/Ap_d]$.

23. What is the yield strength of bolt of class 4.6?
a) 400 N/mm^2
b) 240 N/mm^2
c) 250 N/mm^2
d) 500 N/mm^2

24. Which of the following is correct?
a) size of hole = nominal diameter of fastener – clearances
b) size of hole = nominal diameter of fastener x clearances
c) size of hole = nominal diameter of fastener / clearances
d) size of hole = nominal diameter of fastener + clearances

25. High strength bolt is used for _____
a) shear connection
b) slip resistant connection only
c) bearing type connection only
d) both slip resistant and bearing type connection

26. What is the minimum pitch distance?
a) 2.0 x nominal diameter of fastener
b) 3.0 x nominal diameter of fastener
c) 1.5 x nominal diameter of fastener
d) 2.5 x nominal diameter of fastener

27. Maximum pitch distance = _____
a) 16 x thickness of thinner plate
b) 32 x thickness of thinner plate
c) 40 x thickness of thinner plate
d) 20 x thickness of thinner plate

28. Minimum edge distance and end distance for rolled, machine flame cut is
a) 1.7 x hole diameter
b) 1.2 x hole diameter
c) 1.5 x hole diameter
d) 2.0 x hole diameter

29. Tacking fasteners are used when _____
a) minimum distance between centre of two adjacent fasteners is exceeded
b) maximum distance between centre of two adjacent fasteners is exceeded
c) maximum distance between centre of two adjacent fasteners is not exceeded
d) for aesthetic appearance

30. Shear strength of bolt is given by ____
a) $f_u(n_nA_{nb}+ n_sA_{sb})/(\sqrt{3} \times 1.1)$
b) $f_y(n_nA_{nb}+ n_sA_{sb})/(\sqrt{3} \times 1.1)$
c) $f_u(n_nA_{nb}+ n_sA_{sb})/(\sqrt{3} \times 1.25)$
d) $f_y(n_nA_{nb}+ n_sA_{sb})/(\sqrt{3} \times 1.25)$

31. Tensile strength of bolt is given by
a) $0.9f_{ub}A_n/1.1$
b) $0.9f_{yb}A_n/1.1$
c) $0.9f_{ub}A_n/1.25$
d) $0.9f_{yb}A_n/1.25$

32. Which of the following type of weld is most suitable for lap and T-joints?
a) Fillet weld
b) Groove weld
c) Slot weld
d) Plug weld

33. The maximum size of fillet weld is obtained by _____
a) adding 1.5mm to thickness of thinner member to be jointed
b) adding 3mm to thickness of thinner member to be jointed
c) subtracting 3mm from thickness of thinner member to be jointed
d) subtracting 1.5mm from thickness of thinner member to be jointed

34. What is the minimum specified length of fillet weld?
a) two times the size of weld
b) four times the size of weld
c) six times the size of weld
d) half the size of weld

35. The design nominal strength of fillet weld is given by _____
a) f_u
b) $\sqrt{3}\ f_u$
c) $f_u/\sqrt{3}$
d) $f_u/(1.25 \times \sqrt{3})s$

36. What are steel tension members?
a) Structural elements that are subjected to direct compressive loads
b) Structural elements that are subjected to direct tensile loads
c) Structural elements that are subjected to indirect compressive loads
d) Structural elements that are subjected to indirect tensile loads

37. Which of the following type of tension member is not mainly used in modern practice?
a) open section such as angles
b) flat bars

c) double angles
d) circular section

38. What is slenderness ratio of a tension member?
a) ratio of its least radius of gyration to its unsupported length
b) ratio of its unsupported length to its least radius of gyration
c) ratio of its maximum radius of gyration to its unsupported length
d) ratio of its unsupported length to its maximum radius of gyration

39. What is gross section yielding?
a) considerable deformation of the member in longitudinal direction may take place before it fractures, making the structure unserviceable
b) considerable deformation of the member in longitudinal direction may take place before it fractures, making the structure serviceable
c) considerable deformation of the member in lateral direction may take place before it fractures, making the structure unserviceable
d) considerable deformation of the member in lateral direction may take place before it fractures, making the structure serviceable

40. The design strength of tension member corresponding to gross section yielding is given by :
a) $\gamma_{m0}\ f_y A_g$
b) $\gamma_{m0} f_y / A_g$
c) $f_y / A_g\ \gamma_{m0}$
d) $f_y A_g / \gamma_{m0}$

41. Determine the effective net area for angle section ISA 100 x 75 x 12 mm, when 100mm leg is connected to a gusset plate using weld of length 140mm.
a) 1795 mm2
b) 1812 mm2
c) 1956 mm2
d) 2100 mm2

42. The shape factor does not depend on ___
a) material properties
b) cross sectional shape
c) moment of resistance
d) section modulus

43. What is plastic hinge?
a) zone of bending due to flexure in a structural member

b) zone of yielding due to flexure in a structural member
c) zone of non-yielding due to flexure in a structural member
d) zone of yielding due to twisting in a structural member

44. What is compression member?
a) structural member subjected to tensile force
b) structural member subjected to compressive force
c) structural member subjected to bending moment
d) structural member subjected to torsion

45. What are loads on columns in industrial buildings?
a) wind load only
b) crane load only
c) wind and crane load
d) load from foundation

46. For very short compression member
a) failure stress will be greater than yield stress
b) failure stress will be less than yield stress
c) failure stress will equal yield stress
d) failure stress will be twice the yield stress

47. Effective length of compression member is _____
a) distance between ends of members
b) distance between end point and midpoint of member
c) distance between points of contraflexure
d) distance between end point and centroid of member

48. What is the effective length when both ends of compression member are fixed?
a) 0.65L
b) 0.8L
c) L
d) 2L

49. What is the effective length when one end of compression member is fixed and another end is hinged?
a) 0.65L
b) 0.8L
c) L
d) 2L

50. Euler critical load for column with both the ends hinged is given by
a) $P_{cr} = 2\pi^2EI/L^2$
b) $P_{cr}= \pi^2EIL^2$
c) $P_{cr} = 2\pi^2EIL^2$
d) $P_{cr} = \pi^2EI/L^2$

51. What is the relation between critical stress and slenderness ratio?
a) critical stress is directly proportional to slenderness ratio
b) critical stress is inversely proportional to slenderness ratio
c) critical stress is square of slenderness ratio
d) critical stress is cube of slenderness ratio

52. Why is built up section used?
a) to sustain seismic loads only
b) for aesthetic appearance
c) used when rolled section do not furnish required sectional area
d) for resisting bending moment

53. Generally the purlins are placed at the panel points so as to avoid

(A) Axial force in rafter
(B) Shear force in rafter
(C) Deflection of rafter
(D) Bending moment in rafter
54. Generally, the purlins are placed at the panel points so as to avoid_____

(A) Axial force in rafter
(B) Shear force in rafter
(C) Deflection of rafter
(D) Bending moment in rafter
55. Area of openings for buildings of large permeability is more than

(A) 10% of wall area
(B) 20% of wall area
(C) 30% of wall area
(D) 50% of wall area
56. Live load for roof truss should not be less than

(A) 0.4 kN/m2
(B) 0.2 kN/m2
(C) 0.75 kN/m2

(D) 0.8 kN/m2kN/m2

57. Which of the following load combination is not considered for design of roof strusses?

(A) Dead load + crane load
(B) Dead load + wind load
(C) Dead load + earthquake load
(D) Dead load + live load + wind load

58. Allowable deflection for Purlin sections supporting Galvanised Iron sheets is _____

(A) Span/150
(B) Span/180
(C) Span/300
(D) Span/240

59. A tension member, if subjected to possible reversal of stress due to wind, the slenderness ratio of the member should not exceed _____

(A) 180
(B) 200
(C) 300
(D) 350

60. The minimum recommended rise of trusses with Galvanised Iron sheets is

(A) 1 in 12
(B) 1 in 6
(C) 1 in 10
(D) 1 in 18