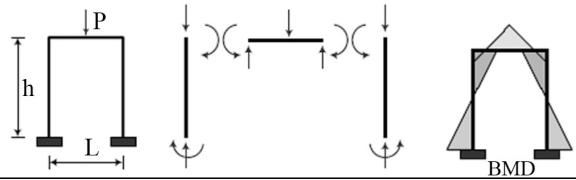
Structure 10	

Multiple Choice Questions

1. Which structure will perform better during earthquake?
   a. Statically determinate and indeterminate b. Depends upon magnitude of earthquake
   c. Statically indeterminate d. Statically determinate
2. Which of the following structural loads are not applied commonly to a building?
   a. Environmental load b. Live load c. Dead load d. Rain load
3. The deformation per unit length is called
   a. tensile stress b. compressive Stress
   c. shear stress d. strain
4. The property of a material by which it can be beaten or rolled into thin plates is called
   a. Elasticity b. Plasticity c. Ductility d. Malleability
5. The compression test is carried on............. materials.
   a. ductile b. brittle c. malleable d. plastic
6. The moment of inertia of a body is always minimum with respect to its
   a. Base b. Centroidal axis
   c. Vertical axis d. Horizontal axis
7. Moment of inertia is the
   a. Second moment of area b. Second moment of mass
   c. Second moment of force d. All of these
8. Sagging, the bending moment occurs at the........... of the beam.
   a. At supports b. Mid span
   c. Point of contra flexure d. Point of emergence
9. Why is base plate provided in short roof trusses?
   a. As provision for temperature related expansion/contraction
   b. For rigidity c. To transmit load effectively
   d. For stability
10. Which law is also called as the elasticity law?
    a. Bernoulli's law b. Hooke's law c. Stress law d. Poisson's law
11. Whenever a material is loaded within elastic limit, stress is............. strain.
    a. equal to b. directly Proportional to
    c. inversely Proportional to d. None of the above
12. The ratio of linear stress to the linear strain is called
    a. modulus of rigidity b. modulus of elasticity c. bulk modulus d. Poisson's ratio
13. The unit of modulus of elasticity is same as those of
    a. stress, strain and pressure b. stress, force and modulus of rigidity
    c. strain, force and pressure d. stress, Pressure and modulus of rigidity
14. When a change in length takes place, the strain is known as
    a. linear strain b. lateral strain c. volumetric strain d. shear strain
15. The change in length due to a tensile or compressive force acting on a body is given by
    a. $\frac{P.l.A}{E}$ b. $\frac{Pl}{AE}$ c. $\frac{E}{P.l.A}$ d. $\frac{AE}{Pl}$

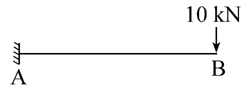
    where, P = Tensile or compressive force acting on the body,
    l = Original length of the body, A = Cross-sectional area of the body, and
    E = Young's modulus for the material of the body.

16. If we use link support in a structural system, then how many unknowns would we have?
a. 4 b. 2 c. 0 d. 1

17. Young's modulus may be defined as the ratio of
a. linear stress to lateral strain b. lateral strain to linear strain
c. linear stress to linear strain d. shear stress to shear strain

18. Modulus of rigidity may be defined as the ratio of
a. linear stress to lateral strain b. lateral strain to linear strain
c. linear stress to linear strain d. shear stress to shear strain

19. What will be the variation in BMD for the diagram?
[Assume $l = 2$m].



a. Rectangular b. Trapezoidal
c. Triangular d. Square

20. Two bars of different materials and same size are subjected to the same tensile force. If the bars have unit elongation in the ratio of 2:5, then the ratio of modulus of elasticity of the two materials will be
a. 2:5 b. 5:2 c. 4:3 d. 3:4

21. When a bar of length l and diameter d is rigidly fixed at the upper end and hanging freely, then the total elongation produced in the bar due to its own weight is
a. $\frac{wl}{2E}$ b. $\frac{wl^3}{2E}$ c. $\frac{wl^2}{2E}$ d. $\frac{wl^4}{2E}$
where w = Weight per unit volume of the bar.

22. The deformation of a bar under its own weight is .... the deformation, if the same body is subjected to a direct load equal to weight of the body.
a. equal to b. half c. double d. quadruple

23. The elongation of a conical bar under its own weight is........... that of prismatic bar of the same length.
a. equal to b. half c. one-third d. two-third

24. The length of a conical bar is l, diameter of base is d and weight per unit volume is w. It is fixed at its upper end and hanging freely. The elongation of the bar under the action of its own weight will be
a. $\frac{wl^2}{2E}$ b. $\frac{wl^2}{4E}$ c. $\frac{wl^2}{6E}$ d. $\frac{wl^2}{8E}$

25. Strain rosetters are used to
a. measure shear strain b. measure linear strain
c. measure volumetric strain d. relieve strain

26. A bar of length L metres extends by l mm under a tensile force of P. The strain produced in the bar is
a. $\frac{l}{L}$ b. $0.1\frac{l}{L}$ c. $0.01\frac{l}{L}$ d. $0.001\frac{l}{L}$

27. The extension of a circular bar tapering uniformly from diameter d_1 at one end to diameter d_2 at the other end, and subjected to an axial pull of P is given by
a. $\delta l = \frac{4PE}{\pi l d^2}$ b. $\delta l = \frac{4\pi l d^2}{PE}$ c. $\delta l = \frac{4\,Pl}{\pi E d_1 d_2}$ d. $\delta l = \frac{4PlE}{\pi d_1 d_2}$

28. The extension of a circular bar tapering uniformly from diameter d_1 at one end to diameter d_2 at the other end, and subjected to an axial pull of P is............... the extension of a circular bar of diameter $\sqrt{d_1 d_2}$ subjected to the same load P.
a. equal to b. less than c. greater than d. none of above

29. The tensile test is carried on............. materials
a. ductile b. brittle c. malleable d. plastic

30. The maximum stress produced in a bar of the tapering section is at
a. smaller end b. larger end c. middle d. anywhere

31. Modular ratio of the two materials is the ratio of
a. linear stress to linear strain b. shear stress to shear strain
c. their modulus of elasticities d. their modulus of rigidities

32. The shear modulus of most materials with respect to the modulus of elasticity is
a. equal to half b. less than half c. more than half d. none of these

33. A rod is enclosed centrally in a tube and the assembly is tightened by rigid washers. If the assembly is subjected to a compressive load, then
   a. rod is under compression b. tube is under compression
   c. both rod and tube are under compression d. the tube is under tension and rod is under compression
34. A bolt is made to pass through a tube and both of them are tightly fitted with the help of washers and nuts. If the nut is tightened, then
   a. bolt and tube are under tension b. bolt and tube are under compression
   c. bolt is under compression and tube is under tension
   d. bolt is under tension and tube is under compression
35. When a bar is subjected to a change of temperature and its deformation is prevented, the stress induced in the bar is
   a. tensile stress b. compressive stress c. shear stress d. thermal stress
36. A steel bar of 5 mm is heated from 15°C to 40°C and it is free to expand. The bar will induce
   a. no stress b. shear stress c. tensile stress d. compressive stress
37. When a bar is cooled to –5°C, it will develop.
   a. no stress b. shear stress c. tensile stress d. compressive stress
38. A bar of copper and steel form a composite system, which is heated to a temperature of 40°C. The stress induced in the copper bar will be
   a. tensile b. compressive c. shear d. zero
39. The thermal stress in a bar is .... proportional to the change in temperature.
   a. directly b. indirectly c. no change d. any of these
40. The thermal stress............. upon the cross-sectional area of the bar.
   a. depends b. does not depend c. both d. can't say
41. The relation between slope and maximum bending moment is
   a. Directly proportion b. Inversely proportion c. Relative proportion d. Mutual incidence
42. The thermal or temperature stress is a function of
   a. increase in temperature b. modulus of elasticity
   c. coefficient of linear expansion d. all of these
43. The ratio of the largest load in a test to the original cross-sectional area of the test piece is called
   a. elastic limit b. yield stress c. ultimate stress d. breaking stress
44. Which of the following statement is correct?
   a. The stress is the pressure per unit area.
   b. The strain is expressed in mm.
   c. Hook's law holds good up to the breaking point.
   d. Stress is directly proportional to strain within elastic limit.
45. The deformation of the bar per unit length in the direction of the force is known as
   a. linear strain b. lateral strain
   c. volumetric strain d. shear strain
46. Every direct stress is always accompanied by a strain in its own direction and an opposite kind of strain in every direction, at right angles to it. Such a strain is known as
   a. linear strain b. lateral strain c. volumetric strain d. shear strain
47. The ratio of the lateral strain to the linear strain is called
   a. modulus of elasticity b. modulus of rigidity
   c. bulk modulus d. Poisson's ratio
48. The tensile test is carried on............. materials
   a. ductile b. brittle c. malleable d. plastic
49. A steel bar 2 m long, 20 mm wide and 10 mm thick is subjected to a pull of 2 kN. If the same bar is subjected to a push of 2 kN, the Poission's ratio of the bar in tension will be...... the Poisson's ratio for the bar in compression.
   a. equal to b. less than c. greater than d. any of these
50. *The Poisson's ratio for steel varies from
   a. 0.23 to0.27 b. 0.25 to 0.33 c. 0.31 to 0.34 d. 0.32 to 0.42

51. The Poisson's ratio for cast iron varies from
a. 0.23 to 0.27 b. 0.25 to 0.33 c. 0.31 to 0.34 d. 0.32 to 0.42

52. When a bar of length l, width b and thickness t is subjected to a pull of P, its
a. length, width and thickness increases b. length, width and thickness decreases
c. length increases, width and thickness decreases d. length decreases, width and thickness increases

53. The ratio of change in volume to the original volume is called
a. linear strain b. lateral strain c. volumetric strain d. Poisson's ratio

54. The bending equation is
a. $\frac{M}{I}=\frac{\sigma}{y}=\frac{E}{R}$ b. $\frac{T}{J}=\frac{\tau}{r}=\frac{C\theta}{L}$ c. $\frac{M}{y}=\frac{\sigma}{L}=\frac{E}{R}$ d. $\frac{T}{r}=\frac{\tau}{J}=\frac{Cq}{L}$

55. The volumetric strain is the ratio of the
a. original thickness to the change in thickness b. change in thickness to the original thickness
c. original volume to the change in volume d. change in volume to the original volume

56. The product of the tangential force acting on the shaft and its distance from the axis of shaft (i.e. radius of shaft) is known as
a. bending moment b. twisting moment
c. torsional rigidity d. flexural rigidity

57. When a shaft is subjected to a twisting moment, every cross-section of the shaft will be under
a. tensile stress b. compressive stress c. shear stress d. bending stress

58. When a body is subjected to three mutually perpendicular stresses, of equal intensity, the ratio of direct stress to the corresponding volumetric strain is known as
a. Young's modulus b. modulus of rigidity c. bulk modulus d. Poisson's ratio

59. The relation between Young's modulus (E) and bulk modulus (K) is given by
a. $K=\frac{3m-2}{mE}$ b. $K=\frac{mE}{3m-2}$ c. $K=\frac{3(m-2)}{mE}$ d. $K=\frac{mE}{3(m-2)}$

60. *The ratio of bulk modulus to Young's modulus for a Poisson's ratio of 0.25 will be
a. $\frac{1}{3}$ b. $\frac{2}{3}$ c. 1 d. $\frac{3}{2}$

61. When a cube is subjected to three mutually perpendicular tensile stresses of equal intensity (σ), the volumetric strain is
a. $\frac{3\sigma}{E}\left(1-\frac{2}{m}\right)$ b. $\frac{E}{3\sigma}\left(1-\frac{2}{m}\right)$ c. $\frac{3\sigma}{E}\left(\frac{2}{m}-1\right)$ d. $\frac{E}{3\sigma}\left(\frac{2}{m}-1\right)$

62. The relation between modulus of elasticity (E) and modulus of rigidity C is given by
a. $C=\frac{m\,E}{2\,(m+1)}$ b. $C=\frac{2(m+1)}{mE}$ c. $C=\frac{2mE}{m+1}$ d. $C=\frac{m+1}{2mE}$

63. The maximum shear stress developed in a beam of circular section is .... the average shear stress.
a. equal to b. $\frac{4}{3}$ times c. 1.5 times d. twice

64. The relation between Young's modulus (E), shear modulus (C) and bulk modulus (K) is given by
a. $E=\frac{3K.C}{3K+C}$ b. $E=\frac{6K.C}{3K+C}$ c. $E=\frac{9K.C}{3K+C}$ d. $E=\frac{12K.C}{3K+C}$

65. *The ratio of shear modulus to the modulus of elasticity for a Poisson's ratio of 0.4 will be
a. $\frac{5}{7}$ b. $\frac{7}{5}$ c. $\frac{5}{14}$ d. $\frac{14}{5}$

66. If the modulus of elasticity for a given material is twice its modulus of rigidity, then bulk modulus is equal to
a. 2C b. 3C c. $\frac{2C}{3}$ d. $\frac{3C}{2}$

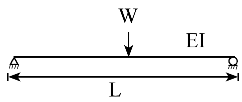
67. The Young's modulus of a material is 125 GPa and Poissons ratio is 0.25. The modulus of rigidity of the material is
a. 30GPa b. 50GPa c. 80GPa d. 100GPa

68. Which of the following statement is wrong?
    a. The deformation of the bar per unit length in the direction of the force is called linear strain.
    b. The Poisson's ratio is the ratio of lateral strain to the linear strain.
    c. The ratio of change in volume to the original volume is called volumetric strain.
    d. The bulk modulus is the ratio of linear stress to the linear strain.
69. A section of beam is said to be in pure bending, if it is subjected to :
    a. constant bending moment and constant Shear force
    b. constant shear force and zero bending moment
    c. constant bending moment and zero shear force
    d. none of the above
70. Within elastic limit, shear stress is................ shear strain.
    a. equal to b. less than
    c. directly proportional to d. inversely proportional to
71. Shear modulus is the ratio of
    a. linear stress to linear strain b. linear stress to lateral strain
    c. volumetric strain to linear strain d. shear stress to shear strain
72. A localized compressive stress at the area of contact between two members is known as
    a. tensile stress b. bending stress c. crushing stress d. shear stress
    Note: If bearing stress is available in option, select that one.
73. A beam which is fixed at one end and free at the other is called
    a. simply supported beam b. fixed beam
    c. overhanging beam d. cantilever beam
74. The maximum diameter of the hole that can be punched from a plate of maximum shear stress 1/4th of its maximum crushing stress of punch, is equal to
    a. t b. 2t c. 4t d. 8t
    where t = Thickness of the plate.
75. The rectangular beam 'A' has length l, width b and depth d. Another beam 'B' has the same width and depth but length is double that of 'A'. The elastic strength of beam 'B' will be .... as compared to beam A.
    a. same b. one-half c. one-fourth d. one-eighth
76. The rectangular beam 'A' has length l, width b and depth d. Another beam 'B' has the same length and width but depth is double that of 'A'. The elastic strength of beam B will be........ as compared to beam A.
    a. same b. double c. four times d. six times
77. A fletched beam is used to
    a. change the shape of the beam b. effect the saving on material
    c. equalize the strength in tension and compression d. increase the cross-section of the beam
78. Whenever some external system of forces acts on a body, it undergoes some deformation. As the body undergoes some deformation, it sets up some resistance to the deformation. This resistance per unit area to deformation is called
    a. strain b. stress c. pressure d. modulus of elasticity
79. In a beam subjected to pure bending, the intensity of stress in any fiber is......... the distance of the fiber from the neutral axis.
    a. equal to b. less than c. more than d. directly proportional to
80. The bending moment at the free end of a cantilever beam is
    a. zero b. minimum c. maximum d. Negligible
81. When a body is subjected to a direct tensile stress in one plane, then maximum normal stress occurs at a section inclined at .... to the normal of the section.
    a. 0° b. 30° c. 45° d. 9°
82. The external indeterminacy in a two hinged arch is
    a. 4 b. 3 c. 2 d. 1
83. A body is subjected to a direct tensile stress in one plane. The shear stress is maximum at a section inclined at .... to the normal of the section.
    a. 45° and 90° b. 45° and 135° c. 60° and 150° d. 30° and 135°

84. When a body is subjected to direct tensile stress in one plane, the maximum shear stress is....... the maximum normal stress.
a. equal to b. one-half c. two-third d. twice

85. Principal plane is a plane on which the shear stress is
a. zero b. minimum c. maximum d. Any of these

86. For a beam, as shown in Figure below, when the load W is applied in the center of the beam, the maximum deflection is



a. $\frac{Wl^3}{48\ EI}$ b. $\frac{5W\ l^3}{384\ EI}$
c. $\frac{W\ l^3}{192\ EI}$ d. $\frac{W\ l^3}{384\ EI}$

87. A beam of the triangular section is placed with its base horizontal. The maximum shear stress occurs at
a. apex of the triangle b. mid of the height
c. center of gravity of the triangle d. base of the triangle

88. *The neutral axis of the cross-section a beam is that axis at which the bending stress is
a. zero b. minimum c. maximum d. infinity

89. *A body is subjected to a direct tensile stress of 300 MPa in one plane accompanied by a simple shear stress of 200.MPa. The maximum normal stress will be
a. –100 MPa b. 250MPa c. 300MPa d. 400MPa

90. The section modulus (Z) of a beam is given by
a. $\frac{I}{y}$ b. Ly c. $\frac{y}{I}$ d. $\frac{M}{I}$

91. The ratio of maximum shear stress developed in a rectangular beam and a circular beam of the same cross-sectional area is
a. $\frac{2}{3}$ b. $\frac{3}{4}$ c. 1 d. $\frac{9}{8}$

92. The bending stress in a beam is ....section modulus.
a. directly proportional to b. inversely proportional to
c. equal to d. square of

93. The maximum shear stress developed in a beam of rectangular section is.........the average shear stress.
a. equal to b. $\frac{4}{3}$ times c. 1.5 times d. twice

94. At the neutral axis of a beam, the shear stress is
a. zero b. minimum c. maximum d. infinity

95. *A body is subjected to a tensile stress of 1200 MPa on one plane and another tensile stress of 600 MPa one plane at right angles to the former. It is also subjected to a shear stress of 400 MPa on the same planes. The maximum normal stress will be
a. 400 MPa b. 500MPa c. 900MPa d. 1400MPa

96. The stress developed in the material without any permanent set is called a
a. elastic limit b. yield stress c. ultimate stress d. breaking stress

97. A tensile test is performed on a mild steel round bar. Its diameter after fracture will
a. remain same b. increase
c. decrease d. depend upon rate of loading

98. A body is subjected to two normal stresses 20 KN/m^2 (tensile) and 10 kN/m^2 (compressive) acting perpendicular to each other. The maximum shear stress is
a. $5kN/m^2$ b. $10kN/m^2$ c. $15kN/m^2$ d. $20kN/m^2$

99. The ratio of stiffness factor of a member when the far end is hinged to the stiffness factor of the same member when the far end is fixed
a. $\frac{1}{4}$ b. $\frac{1}{3}$ c. $\frac{1}{2}$ d. $\frac{3}{4}$

100. A tensile test is performed on a round bar. After fracture it has been found that the diameter remains approximately same at fracture. The material under test was
a. mild steel b. cast iron c. glass d. copper

101. The maximum shear stress is............... the algebraic difference of maximum and minimum normal stresses.

a. equal to b. one-fourth c. one-half d. twice

102. The maximum deflection of a cantilever beam of length l with a uniformly distributed load of w per unit length is

a. $\frac{W l^3}{3EI}$ b. $\frac{W l^3}{8EI}$ c. $\frac{W l^3}{16 EI}$ d. $\frac{W l^3}{48 EI}$

where, W = wl

103. The maximum deflection of a cantilever beam of length / with a point load W at the free end is

a. $\frac{Wl^3}{3 EI}$ b. $\frac{Wl^3}{8EI}$ c. $\frac{W l^3}{16 EI}$ d. $\frac{Wl^3}{48 EI}$

104. A beam of T-section is subjected to a shear force of F. The maximum shear force will occur at the

a. top of the section b. bottom of the section
c. neutral axis of the section d. junction of web and flange

105. For a given stress, the ratio of moment of resistance of a beam of square cross-section when placed with its two sides horizontal to the moment of resistance with its diagonal horizontal, is .

a. $\frac{1}{2}$ b. 1 c. $\frac{1}{\sqrt{2}}$ d. $\sqrt{2}$

106. The rectangular beam '4' has length l, width b and depth d. Another beam 'B' has the same width and depth but length is double that of 'A'. The elastic strength of beam 'B' will be............as compared to beam A.

a. same b. one-half c. one-fourth d. one-eighth

107. Mohr's circle is used to determine the stresses on an oblique section of a body subjected to

a. direct tensile stress in one plane accompanied by a shear stress
b. direct tensile stress in two mutually perpendicular directions
c. direct tensile stress in two mutually perpendicular directions accompanied by a simple shear stress
d. all of the above

108. Which of the following statement is wrong?

a. In the theory of simple bending, the assumption is that the plane sections before bending remains plane after bending.
b. Ina beam subjected to bending moment, the strain is directly proportional to the distance from the neutral axis.
c. At the neutral axis of a beam, the bending stress is maximum.
d. The bending stress in a beam is inversely proportional to the section modulus.

109. A square beam and a circular beam have the same length, same allowable stress and the same bending moment. The ratio of weights of the square beam to the circular beam is

a. $\frac{1}{2}$ b. 1 c. $\frac{1}{1.12}$ d. $\frac{1}{\sqrt{2}}$

110. The extremities of any diameter on Mohr's circle represent

a. principal stresses b. normal stresses on planes at 45°
c. shear stresses on planes at 45° d. normal and shear stresses on a plane

111. Two beams, one of circular cross-section and the other of square cross-section, have equal areas of cross-sections. When these beams are subjected to bending,

a. both beams are equally economical b. square beam is more economical
c. circular beam is more economical d. none of these

112. The energy stored in a body when strained within elastic limit is known as

a. resilience b. proof resilience c. strain energy d. impact energy

113. The total strain energy stored in a body is termed as

a. resilience b. proof resilience c. impact energy d. modulus of resilience

114. At the neutral axis of a beam

a. the layers are subjected to maximum bending stress b. the layers are subjected to minimum bending stress
c. the layers are subjected to compression d. the layers do not undergo any strain

115.The section modulus of a rectangular section about an axis through its C.G., is

a. $\frac{b}{2}$ b. $\frac{d}{2}$ c. $\frac{bd^2}{2}$ d. $\frac{bd^2}{6}$

116. Strain energy is the
 a. energy stored in a body when strained within elastic limits
 b. energy stored in a body when strained up to the breaking of a specimen
 c. maximum strain energy which can be stored in a body
 d. proof resilience per unit volume of a material
117. The strain energy stored in a body, when suddenly loaded, is.......... the Strain energy stored when same load is applied gradually.
 a. equal to b. one-half c. twice d. four times
118. Resilience is the
 a. energy stored in a body when strained within elastic limits
 b. energy stored in a body when strained upto the breaking of the specimen
 c. maximum strain energy which-can be stored in a body
 d. none of the above
119. When a beam is subjected to bending moment, the stress at any point is .... the distance of the point from the neutral axis.
 a. equal to b. directly proportional to
 c. inversely proportional to d. independent of
120. In a beam where shear force changes sign, the bending moment will be
 a. zero b. minimum c. maximum d. infinity
121. The neutral axis of a transverse section of a beam passes through the centre of gravity of the section and is
 a. in the vertical plane b. in the horizontal plane
 c. in the same plane in which the beam bends d. at right angle to the plane in which the beam bends.
122. *The stress induced in a body, when suddenly loaded, is........... the stress induced when the same load is applied gradually.
 a. equal to b. one-half c. twice d. four times
123. The strain energy stored in a spring, when subjected to maximum load, without suffering permanent distortion, is known as
 a. impact energy b. proof resilience c. proof stress d. modulus of resilience
124. The capacity of a strained body for doing work on the removal of the straining force, is called
 a. strain energy b. resilience c. proof resilience d. impact energy
125. Which of the following statement is correct?
 a. The energy stored in a body, when strained within elastic limit is known as strain energy.
 b. The maximum strain energy which can be stored in a body is termed as proof resilience.
 c. The proof resilience per unit volume of a material is known as modulus of resilience.
 d. all of the above
126. *The strain energy stored in a body due to shear stress, is
 a. $\frac{\tau}{2C} \times V$ b. $\frac{2C}{tV}$ c. $\frac{t^2}{2C} \times V$ d. $\frac{2C}{t^2 v}$

 where τ = Shear stress,
 C = Shear modulus, and
 V = Volume of the body
127. A beam of uniform strength may be obtained by
 a. keeping the width uniform and varying the depth
 b. keeping the depth uniform and varying the width
 c. varying the width and depth both
 d. any one of the above
128. * If the depth is kept constant for a beam of uniform strength, then its width will vary in proportional to
 a. M b. $\sqrt{M}$ c. M^2 d. M^3
 where M= Bending moment.
129. A beam extending beyond the supports is called
 a. simply supported beam b. fixed beam
 c. overhanging beam d. cantilever beam
130. A beam encastered at both the ends is called
 a. simply supported beam b. fixed beam
 c. cantilever beam d. continuous beam

131. A beam supported on more than two supports is called
a. simply supported beam
b. fixed beam
c. overhanging beam
d. continuous beam

132. A cantilever beam is one which is
a. fixed at both ends
b. fixed at one end and free at the other end
c. supported at its ends
d. supported on more than two supports

133.The maximum deflection of a fixed beam of length l carrying a central point load W is
a. $\frac{wl^3}{8EI}$
b. $\frac{wl^3}{96EI}$
c. $\frac{wl^3}{192EI}$
d. $\frac{wl^3}{384EI}$

134. A beam of uniform strength has
a. same ‘cross-section throughout the beam
b. same bending stress at every section
c. same bending moment at every section
d. same shear stress at every section

135. When the shear force diagram is a parabolic curve between two points, it indicates that there is a
a. point load at the two points
b. no loading between the two points
c. uniformly distributed load between the two points
d. uniformly varying load between the two points

136. A continuous beam is one which is
a. fixed at both ends
b. fixed at one end and free at the other end
c. supported on more than two supports
d. extending beyond the supports

137. A concentrated load is one which
a. acts at a point on a beam
b. spreads non-uniformly over the whole length of a beam
c. spreads uniformly over the whole length of a beam
d. varies uniformly over the whole length of a beam

138. The bending moment in the centre of a simply supported beam carrying a uniformly distributed load of w per unit length is
a. zero
b. $\frac{wl^2}{2}$
c. $\frac{wl^2}{4}$
d. $\frac{wl^2}{8}$

139. A simply supported beam is loaded with w uniformly through out the length of the beam The bending moment will be
a. $\frac{wl^2}{4}$
b. $\frac{wl^2}{2}$
c. $\frac{wl}{4}$
d. $\frac{wl^2}{8}$

140. The bending moment diagram for a simply supported beam carrying a uniformly distributed load of w per unit length, will be
a. a horizontal line
b. a vertical line
c. an inclined line
d. a parabolic curve

141. In a simply supported beam carrying a uniformly distributed load w per unit length, the point of contraflexure
a. lies in the center of the beam
b. lies at the ends of the beam
c. depends upon the length of beam
d. does not exist

142. A simple supported beam carries a varying load from zero at one end and w at the other end. If the length of the beam is a the shear force will be zero at a distance x from least loaded point where x is
a. $\frac{a}{2}$
b. $\frac{a}{3}$
c. $\frac{a}{\sqrt{3}}$
d. $\frac{a\sqrt{3}}{2}$

143. The bending moment on a section is maximum where shear force is
a. minimum
b. maximum
c. changing sign
d. zero

144. When a cantilever beam is loaded at its free end, the maximum compressive stress shall develop at
a. bottom fiber
b. top fiber
c. neutral axis
d. centre of gravity

145. When a load on the free end of a cantilever beam is increased, failure will occur
a. at the free end
b. at the fixed e d
c. in the middle of the beam
d. at a distance $\frac{2}{3}$ from free end

146. A simply supported beam carries varying load from zero at one end and w at the other end. If the length of the beam is a the maximum bending moment will be
a. $\frac{wa}{27}$
b. $\frac{wa^2}{27}$
c. $\frac{w^2a}{\sqrt{27}}$
d. $\frac{wa^2}{9\sqrt{3}}$

147. The stress at which the extension of the material takes place more quickly as compared to the increase in load, is called

a. elastic limit b. yield point c. ultimate point d. breaking point

148. When a cantilever beam is loaded with concentrated loads, the bending moment diagram will be a

a. horizontal straight line b. vertical straight line

c. inclined straight line d. parabolic curve

149. The point of contra flexure is the point where

a. B.M. changes sign b. B.M. is maximum c. B.M. is minimum d. B.M. is zero

150. The shape factor of standard rolled beam section varies from

a. 1.1 to 1.2 b. 1.2 to 1.25 c. 1.3 to 1.45 d. 1.1 to 1.3

151. The point of contraflexure is the point where

a. B.M. changes sign b. B.M. is maximum c. B.M. is minimum d. none of the above

152. The shear force of a cantilever beam of length l carrying a uniformly distributed load of w per unit length is............ at the free end.

a. zero b. $\frac{wl}{4}$ c. $\frac{wl}{2}$ d. wl

153. The ratio of section modulus of a square section of side b and that of a circular section of diameter d is

a. $\frac{2\pi}{16}$ b. $\frac{3\pi}{16}$ c. $\frac{3\pi}{8}$ d. $\frac{\pi}{16}$

154. The shear force diagram of a cantilever beam of length/and carrying a uniformly distributed load of w per unit length will be

a. aright angled triangle b. an isosceles triangle

c. an equilateral triangle d. a rectangle

155. The bending moment of a cantilever beam of length l and carrying a uniformly distributed load of w per unit length is .... at the free end.

a. zero b. $\frac{wl}{4}$ c. $\frac{wl}{2}$ d. wl

156. The shear force and bending moment are zero at the free end of a cantilever beam, if it carries a

a. point load at the free end b. point load at the middle of its length

c. uniformly distributed load over the whole length d. none of the above

157. The bending moment of a cantilever beam of length l and carrying a uniformly distributed load of w per unit length is ....at the fixed end.

a. $\frac{wl}{4}$ b. $\frac{wl^2}{2}$ c. wl d. $\frac{wl}{2}$

158. The moment of inertia of a triangular section (height h, base b) about its base is

a. $\frac{bh^2}{12}$ b. $\frac{b^2h}{12}$ c. $\frac{bh^3}{12}$ d. $\frac{b^3h}{12}$

159. The shear force diagram for a cantilever beam of length l and carrying a gradually varying load from zero at free end and w per unit length at the fixed end is a

a. horizontal straight line b. vertical straight line

c. inclined line d. parabolic curve

160. The shear force at the centre of a simply supported beam with a gradually varying load from zero at both ends to w per metre at the centre, is

a. zero b. $\frac{wl}{4}$ c. $\frac{wl}{2}$ d. $\frac{wl^2}{2}$

161. The shear force of a cantilever beam of length l and carrying a gradually varying load from zero at the free end and w per unit length at the fixed end is .... at the fixed end.

a. zero b. $\frac{wl}{4}$ c. $\frac{wl}{2}$ d. wl

162. The bending moment of a cantilever beam of length l and carrying a gradually varying load from zero at free end and w per unit length at the fixed end is .... at the fixed end.

a. $\frac{wl}{2}$ b. wl c. $\frac{wl^2}{2}$ d. $\frac{wl^2}{6}$

163. The ratio of moments of inertia of a triangular section about its base and about a centroidal axis parallel to its base is

a. 1.0 b. 3.0 c. 1.5 d. 2.5

164. The maximum bending moment of a simply supported beam of span/and carrying a point load W at the centre of beam, is

a. $\frac{Wl}{4}$ b. $\frac{Wl}{2}$ c. Wl d. $\frac{Wl^2}{4}$

165. The bending moment diagram for a simply supported beam loaded in its centre is

a. aright angled triangle b. an issoscles triangle
c. an equilateral triangle d. a rectangle

166. In a tensile test, when the material is stressed beyond elastic limit, the tensile strain .... as compared to the stress.

a. decreases slowly b. increases slowly
c. decreases more quickly d. increases more quickly

167. The product of Young's modulus (E) and moment of inertia (l) is known as

a. modulus of rigidity b. bulk modulus c. flexural rigidity d. torsional rigidity

168. A bar of square section of area a^2 is held such that its one of its diameter is vertical. The maximum shear stress will develop at a depth where λ is

a. $\frac{2\sqrt{3}}{4}$ b. $\frac{3\sqrt{2}}{4}$ c. $\frac{2}{\sqrt{3}}$ d. $\frac{\sqrt{3}}{4}$

169. The shear force in the center of a simply supported beam carrying a fate a uniformly distributed load of w per unit length, is

a. zero b. $\frac{wl^2}{2}$ c. $\frac{wl^2}{4}$ d. $\frac{wl}{8}$

170. The ratio of the deflections of the free end of a cantilever due to an isolated load at $\frac{1}{3}$rd and $\frac{2}{3}$rd of the span is

a. $\frac{1}{7}$ b. $\frac{2}{7}$ c. $\frac{3}{7}$ d. $\frac{2}{5}$

171. The shear force at the ends of a simply supported beam carrying a uniformly distributed load of w per unit length is

a. zero at its both ends b. wl at one end and $-wl$ at the other end
c. $\frac{wl}{2}$ at one end and $-\frac{wl}{2}$ at the other end d. $\frac{wl^2}{2}$ at one end and $-\frac{wl^2}{2}$ at the other end

172. The shear force diagram for a simply supported beam carrying a uniformly distributed load of w per unit length, consists of

a. one right angled triangle b. two right angled triangles
c. one equilateral triangle d. two equilateral triangles

173. The ratio of the maximum deflection of a simply supported beam with central load w and of a cantilever of same length and with a load w at its free and is

a. $\frac{1}{8}$ b. $\frac{1}{10}$ c. $\frac{1}{12}$ d. $\frac{1}{14}$

174. A simply supported beam A carries a point load at its midspan. An another identical beam B carries the same load but uniformly distributed over the entire span. The ratio of the maximum deflections of the beam A & B, will be

a. $\frac{2}{3}$ b. $\frac{8}{5}$ c. $\frac{3}{2}$ d. $\frac{5}{8}$

175. In a simple bending theory, one of the assumptions is that the material of the beam is isotropic. This assumption means that the

a. normal stress remains constant in all directions b. normal stress varies linearly in the material
c. elastic constants are same in all the directions d. elastic constants varies linearly in the material

176. If the section modulus of a beam is increased, the bending stress in the beam will

a. not change b. increase c. decrease d. Remains constant

177. If percentage reduction in area of a certain specimen made of material 'A' under tensile test is 60% and 'the percentage reduction in area of a specimen with same dimensions made of material 'B' is 40%, then

a. the material A is more ductile than material B b. the material B is more ductile than material A
c. the ductility of material A and B is equal d. the material A is brittle and material B is ductile

178. A simply supported beam 'A' of length l, breadth b, and depth d carries a central point load W. Another beam 'B' has the same length and depth but its breadth is doubled. The deflection of beam "B' will be .... as compared to beam 'A'.

a. one-fourth b. one-half c. double d. four times

179. A simply supported beam 'A' of length l, breadth b and depth d carries a central load W. Another beam 'B' of the same dimensions carries a central load equal to 2 W. The deflection of beam 'B' will be .... as that of beam 'A'.

a. one-fourth b. one-half c. double d. four times

180. The maximum deflection of a fixed beam of length l carrying a total load W uniformly distributed over the whole length is

a. $\frac{wl^3}{48EI}$ b. $\frac{wl^3}{96EI}$ c. $\frac{wl^3}{192EI}$ d. $\frac{wl^3}{384EI}$

181. The maximum deflection of a fixed beam carrying a central point load lies at

a. fixed ends b. centre of beam
c. $\frac{l}{3}$ from fixed ends d. none of these

182. The point of contra flexure is a point where

a. shear force changes sign b. bending moment changes sign
c. shear force is maximum d. bending moment is maximum

183. When shear force at a point is zero, then bending moment is .... at that point.

a. zero b. minimum c. maximum d. infinity

184. A truss containing j joints m members will be a simple truss if

a. m = 2j–3 b. j = 2m – 3 c. m = 3j–2 d. j = 3m – 2

185. When there is a sudden increase or decrease in shear force diagram between any two points, it indicates that there is a

a. point load at the two points b. no loading between the two points
c. uniformly distributed load between the two points d. uniformly varying load between the two points

186. If m_1 and m_2 are the members of two individual simple trusses of a compound truss. The compound truss will be rigid and determinate if

a. $m = m_1 + m_2$ b. $m = m_2 + 1$ c. $m = m_1 + m_2 + 2$ d. $m = m_1 + m_2 + 3$

187. The forces in the members of a simple trusses may be analysed by

a. graphical method b. method of joints c. method of sections d. All of above

188. The section modulus of a circular section about an axis through its C.G., is

a. $\pi\frac{d^2}{4}$ b. $\pi\frac{d^2}{16}$ c. $\pi\frac{d^2}{16}$ d. $\pi\frac{d^3}{32}$

189. Which of the following statement is correct?

a. A continuous beam has only two supports at the ends.
b. A uniformly distributed load spreads uniformly over the whole length of a beam.
c. The bending moment is maximum where shear force is maximum.
d. The maximum bending moment of a simply supported beam of length / with a central point load W is Wl/8.

190. A rectangular beam of length l supported at its two ends carries a central point load W. The maximum deflection occurs

a. at the ends b. at l/3 from both ends
c. at the centre d. none of these

191. When a beam is Subjected to a bending moment, the strain in a layer is............ the distance from the neutral axis.

a. equal to b. directly proportional to
c. inversely proportional to d. independent of

192. *The point of contra flexure occurs in
   a. cantilever beams
   b. simply supported beams
   c. overhanging beams
   d. fixed beams

193. The bending moment at a section tends to bend or deflect the beam and the internal stresses resist its bending. The resistance offered by the internal stresses, to the bending, is called
   a. compressive stress
   b. shear stress
   c. bending stress
   d. elastic modulus

194. The assumption, generally, made in the theory of simple bending is that
   a. the beam material is perfectly homogenous and isotropic
   b. the beam material is stressed within its elastic limit
   c. the plane sections before bending remain plane after bending
   d. all of the above

195. If D and d are external and internal diameters of circular shaft respectively, its polar moment of inertia is
   a. $\frac{\pi}{2}(D^4 - d^4)$
   b. $\frac{\pi}{4}(D^4 - d^4)$
   c. $\frac{\pi}{64}(D^4 - d^4)$
   d. $\frac{\pi}{32}(D^4 - d^4)$

196. In a simple bending of beams, the stress in the beam varies
   a. linearly
   d. parabolically
   c. hyperbolically
   d. elliptically

197. In a simple bending theory, one of the assumptions is that the plane sections before bending remain plane after bending. This assumption means that
   a. stress is uniform throughout the beam
   b. strain is uniform throughout the beam
   c. stress is proportional to the distance from the neutral axis
   d. strain is proportional to the distance from the neutral axis

198. The greatest load which a spring can carry without getting permanently distorted is called
   a. stiffness
   b. proof resilience
   c. proof stress
   d. proof load

Answers

1.c	2.d	3.d	4.d	5.b	6.b	7.d	8.b	9.a	10.b	11.b	12.b	13.d	14.a	15.b
16.d	17.c	18.d	19.c	20.b	21.c	22.b	23.c	24.c	25.b	26.d	27.c	28.a	29.a	30.a
31.c	32.b	33.c	34.d	35.d	36.a	37.c	38.b	39.a	40.b	41.b	42.d	43.c	44.d	45.a
46.b	47.d	48.a	49.a	50.b	51.a	52. c	53. c	54.a	55.d	56.b	57.c	58.c	59.d	60.b
61.a	62.a	63.b	64.c	65.c	66.c	67.b	68.d	69.c	70.c	71. d	72.c	73.d	74.c	75.b
76.c	77.c	78.b	79.d	80.a	81.a	82.d	83.b	84.b	85.a	86.a	87.b	88.a	89.d	90.a
91.d	92.b	93.c	94.c	95.d	96.a	97.c	98.c	99.b	100.b	101.c	102.b	103.a	104.c	105.d
106.b	107.d	108.c	109.c	110.b	111.b	112.c	113.a	114.d	115.d	116.a	117.d	118.d	119.b	120.c
121.d	122.c	123.b	124.b	125.d	126.c	127.d	128.a	129.c	130.b	131.d	132.b	133.c	134.b	135.d
136.c	137.a	138.d	139.d	140.d	141.d	142.c	143.c	144.a	145.b	146.d	147.b	148.c	149.d	150.a
151.a	152.a	153.b	154.a	155.a	156.c	157.a	158.c	159.d	160.a	161.c	162.d	163.b	164.a	165.b
166.d	167.c	168.b	169.a	170.b	171.c	172.b	173.a	174.b	175.c	176.c	177.a	178.b	179.c	180.d
181.b	182.b	183.c	184.a	185.a	186.d	187.d	188.d	189.b	190.c	191.b	192.c	193.c	194.d	195.d
196.a	197.d	198.d												

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