. 1. Strain energy 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 a specimen

C. maximum strain energy which can be stored in a body

D. proof resilience per unit volume of a material

Answer: Option **A**

2. A vertical column has two moments of inertia (i.e. Ixx and Iyy). The column will tend to buckle in the direction of the

A. axis of load

B. perpendicular to the axis of load

C. maximum moment of inertia

D. minimum moment of inertia

Answer: Option D

3. 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

Answer: Option **A**

4. Euler's formula holds good only for

A. short columns

B. long columns

C. both short and long columns

D. weak columns

Answer: Option **B**

5. 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

Answer: Option **A**

6. If the slenderness ratio for a column is 100, then it is said to be a _____ column.

A. long

B. medium

C. short

Answer: Option **A**

7. A masonry dam may fail due to

A. tension in the masonry of the dam and its base

B. overturning of the dam

C. crushing of masonry at the base of the dam

D. any one of the above

Answer: Option **D**

8. Compression members always tend to buckle in the direction of the

A. axis of load

B. perpendicular to the axis of load

C. minimum cross section

D. least radius of gyration

Answer: Option **D**

9. Rivets are generally specified by

A. thickness of plates to be joined

B. overall length

C. shank diameter

D. diameter of head

Answer: Option **C**

10.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

Answer: Option **D**

11.When a column is subjected to an eccentric load, the stress induced in the column will be

A. direct stress only

B. bending stress only

C. shear stress only

D. direct and bending stress both

Answer: Option **D**

12. 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.

Answer: Option **D**

13. 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

Answer: Option **C**

14. When a shaft, is subjected to torsion, the shear stress induced in the shaft varies from

A. minimum at the centre to maximum at the circumference

B. maximum at the centre to minimum at the circumference

C. zero at the centre to maximum at the circumference

D. maximum at the centre to zero at the circumference

Answer: Option **C**

15. A shaft of diameter D is subjected to a twisting moment (T) and a bending moment (M). If the maximum bending stress is equal to maximum shear stress developed, then M is equal to

A. $T/2$

B. T

C. $2T$

D. $4T$

Answer: Option **A**

16. A spring used to absorb shocks and vibrations is

A. conical spring

B. torsion spring

C. leaf spring

D. disc spring

Answer: Option **C**

17. The shear stress at the centre of a circular shaft under torsion is

A. zero

B. minimum

C. maximum

D. infinity

Answer: Option **A**

18. At the neutral axis of a beam, the shear stress is

A. zero

B. minimum

C. maximum

D. infinity

Answer: Option **C**

19.Two shafts '*A*' and '*B*' are made of same material. The shaft '*A*' is of diameter *D* and shaft '*B*' is of diameter *D*/2. The strength of shaft '*B*' is _____ as that of shaft '*A*'

A. one-eighth

B. one-fourth

C. one-half

D. four times

Answer: Option **A**

20. The bending moment on a section is maximum where shear force is

A. minimum

B. maximum

C. changing sign

D. zero

Answer: Option **C**

21.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

Answer: Option **C**

22. A beam supported on more than two supports is called

A. simply supported beam

B. fixed beam

C. overhanging beam

D. continuous beam

Answer: Option **D**

23. 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

Answer: Option **B**

24. A beam extending beyond the supports is called

A. simply supported beam

B. fixed beam

C. overhanging beam

D. cantilever beam

Answer: Option **C**

25.The maximum shear stress developed in a beam of circular section is _____ the average shear stress.

A. equal to

B. 4/3 times

C. 1.5 times

D. twice

Answer: Option **B**

26. When a body is subjected to a direct tensile stress (σ) 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. 90°

Answer: Option **A**

. 27. 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

Answer: Option **C**

28. In leaf springs, the maximum bending stress developed in the plates is (where *W* = Load acting on the spring, *l*= Span of the spring, *n* = Number of plates, *b* = Width of plates, and *t* = Thickness of plates)

A. $\frac{Wl}{nbt^2}$

B. $\frac{3Wl}{2nbt^2}$

C. $\frac{2Wl}{nbt^2}$

D. $\frac{3Wl}{nbt^2}$

Answer: Option **B**

29.The unit of stress in S.I. units is

A. N/mm^2

B. kN/mm^2

C. N/m^2

D. any one of these

Answer: Option **D**

30. The modulus of elasticity for mild steel is approximately equal to

A. 10 kN/mm^2

B. 80 kN/mm^2

C. 100 kN/mm^2

D. 210 kN/mm^2

Answer: Option **D**

31. A pressure vessel is said to be a thin shell when the ratio of wall thickness of the vessel to its diameter is _____ 1/10.

A. equal to

B. less than

C. greater than

Answer: Option **B**

32. According to Euler's column theory, the crippling load of a column is given by $p = \pi^2 EI/Cl^2$. In the Euler's formula, the value of C for a column with one end fixed and the other end hinged, is 1/2.

A. True

B. False

Answer: Option **A**

33. 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

Answer: Option **C**

34. Two closely coiled helical springs '*A*' and '*B*' are equal in all respects but the diameter of wire of spring '*A*' is double that of spring '*B*' The stiffness of spring '*B*' will be _____ that of

spring '*A*'

A. one-sixteenth

B. one-eighth

C. one-fourth

D. one-half

Answer: Option **A**

35. When a closely-coiled helical spring of mean diameter (*D*) is subjected to an axial load (*W*), the stiffness of the spring is given by

A. $\frac{C\,d^4}{D^3\,n}$

B. $\frac{C\,d^4}{2D^3\,n}$

C. $\frac{C\,d^4}{4D^3\,n}$

D. $\frac{C\,d^4}{8D^3\,n}$

Answer: Option **D**

36. 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

Answer: Option **D**

37. 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. $wl/4$

C. $wl/2$

D. $wl^2/2$

Answer: Option **A**

38. The proof resilience per unit volume of a material is known as modulus of resilience.

A. True

B. False

Answer: Option **A**

39. According to Unwin's formula, the relation between diameter of rivet hole (d) and thickness of plate (t) is given by
(where d and t are in mm)

A. $d = t$

B. $d = 1.6\ t$

C. $d = 2t$

D. $d = 6\ t$

Answer: Option **D**

40. The relation between equivalent length (L) and actual length (l) of a column for one end fixed and the other end hinged is

A. $L = l/2$

B. $L = l/2$

C. $L = l$

D. $L = 4l$

Answer: Option **B**

41.The total strain energy stored in a body is called proof resilience.

A. Agree

B. Disagree

Answer: Option **B**

42. The thermal stress in a bar is _____ proportional to the change in temperature.

A. directly

B. indirectly

Answer: Option **A**

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

A. $\pi d^2/4$

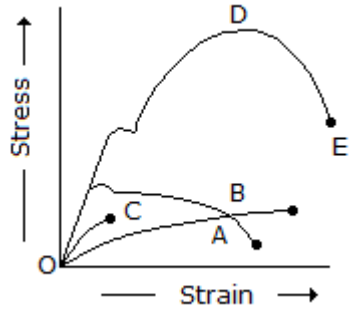
B. $\pi d^2/16$

C. $\pi d^3/16$

D. $\pi d^3/32$

Answer: Option **D**

44. In the below figure, curve *D* represents mild steel.



A. Yes

B. No

Answer: Option **A**

. 45. Which of the following is a proper sequence?

A. proportional limit, elastic limit, yielding, failure

B. elastic limit, proportional limit, yielding, failure

C. yielding, proportional limit, elastic limit, failure

D. none of the above

Answer: Option **A**

46. The neutral axis of a beam is subjected to _____ stress.

A. zero

B. maximum tensile

C. minimum tensile

D. maximum compressive

Answer: Option **A**

47. 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 end

C. in the middle of the beam

D. at a distance 2*l*/3 from free end

Answer: Option **B**

48. The length of a conical bar is *l*, diameter of base is *d* and weight per unit volume is *w*. It is fixea 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. $\frac{wl^2}{8E}$

Answer: Option **C**

49. Which of the following is the correct torsion equation?

A. $\frac{M}{I} = \frac{\sigma}{y} = \frac{E}{R}$

B. $\frac{T}{J} = \frac{\tau}{R} = \frac{C\theta}{l}$

C. $\frac{M}{R} = \frac{T}{J} = \frac{C\theta}{l}$

D. $\frac{T}{l} = \frac{\tau}{J} = \frac{R}{C\theta}$

Answer: Option **B**

50. According to Euler's column theory, the crippling load of a column is given by $p = \pi^2 EI/Cl^2$ In this equation, the value of C for a column with both ends hinged, is

A. 1/4

B. 1/2

C. 1

D. 2

Answer: Option **C**

51. The strength of the shaft is judged by the torque transmitted by the shaft.

A. Yes

B. No

Answer: Option **A**

52. The shear force at a certain point on a beam changes sign from +ve value to -ve value or vice versa. The bending moment at that point will be zero.

A. True

B. False

Answer: Option **B**

. 53. In a riveted joint, when the number of rivets decreases from the inner most row to outer most row, the joint is said to be

A. chain riveted

B. zigzag riveted

C. diamond riveted

D. none of these

Answer: Option **C**

54. A spring, when loaded, is permanently distorted and recover its original shape when the load is removed.

A. Agree

B. Disagree

Answer: Option **A**

55. 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

Answer: Option **B**

56. The hoop stress in a thin cylindrical shell is

A. longitudinal stress

B. compressive stress

C. radial stress

D. circumferential tensile stress

Answer: Option **D**

57. 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. 250 MPa

C. 300 MPa

D. 400 MPa

Answer: Option **D**

58. 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

Answer: Option **B**

59. The moment of resistance of a balanced reinforced concrete beam is based on the stresses in

A. steel only

B. concrete only

C. steel and concrete both

D. none of these

Answer: Option **C**

60. The load at which the column just buckles, is known as

A. buckling load

B. critical load

C. crippling load

D. any one of these

Answer: Option **D**

61. The Rankine's constant for a mild steel column with both ends hinged is

A. 1/750

B. 1/1600

C. 1/7500

D. 1/9000

Answer: Option **C**

62. 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

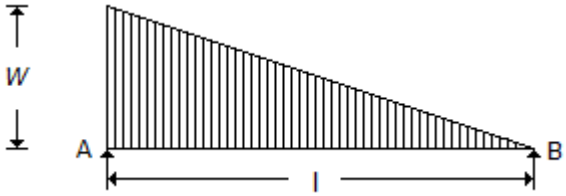
B. one-halt

C. one-fourth

D. one-eighth

Answer: Option **B**

63. A simply supported beam with a gradually varying load from zero at *B* and *w* per unit length at *A* is shown in the below figure. The shear force at *B* is equal to



A. *wl*/6

B. *wl*/3

C. *wl*

D. 2 *wl*/3

Answer: Option **A**

64. 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

Answer: Option **B**

65. In a simply supported beam carrying a uniformly distributed load w per unit length, the point of contraflexure

A. lies in the centre of the beam

B. lies at the ends of the beam

C. depends upon the length of beam

D. does not exist

Answer: Option **D**

66. A spring used to absorb shocks and vibrations is

A. conical spring

B. torsion spring

C. leaf spring

D. disc spring

Answer: Option **C**

67. The shear stress at the centre of a circular shaft under torsion is

A. zero

B. minimum

C. maximum

D. infinity

Answer: Option **A**

68. At the neutral axis of a beam, the shear stress is

A. zero

B. minimum

C. maximum

D. infinity

Answer: Option **C**

69. 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

Answer: Option **D**

70. A thin cylindrical shell of diameter (d), length (l) and thickness (t)is subjected to an internal pressure (p). The hoop stress in the shell is

A. pd/t

B. $pd/2t$

C. $pd/4t$

D. *pd*/6*t*

Answer: Option **B**

71. When a body is subjected to a direct tensile stress (σ) in one plane, then tangential or shear stress on an oblique section of the body inclined at an angle θ to the normal of the section is

A. σ sin 2θ

B. σ cos 2θ

C. σ/2 sin 2θ

D. σ/2 cos 2θ

Answer: Option **C**

72. The distance between the centre of a rivet hole to the nearest edge of plate, is called

A. margin

B. pitch

C. back pitch

D. diagonal pitch

Answer: Option **A**

73. A localised 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

Answer: Option **C**

74. Poisson's ratio is the ratio of linear stein to the volumetric strain.

A. True

B. False

Answer: Option **B**

75.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

Answer: Option **C**

76. When a body is subjected to two equal and opposite forces, acting tangentially across the resisting section, as a result of which the body tends to shear off across the section, the stress and strain induced is

A. tensile stress, tensile strain

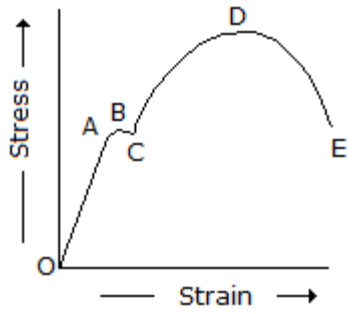
B. compressive stress, compressive strain

C. shear stress, tensile strain

D. shear stress, shear strain

Answer: Option **D**

77. In the below figure, the plastic range occurs



A. before point *A*

B. beyond point *A*

C. between points *A* and *D*

D. between points *D* and *E*

Answer: Option **B**

78. The values of equivalent length (*L*) and actual length (*l*) of a column for both ends hinged is the same

A. Yes

B. No

Answer: Option **A**

79.The planes, which carry no shear stress, are known as principal planes.

A. True

B. False

Answer: Option **A**

80.The stiffness of a closely-coiled helical spring is _____ proportional to number of turns.

A. directly

B. inversely

Answer: Option **B**