BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Diploma in Mechanical Engineering
Course Name – Strength of Materials
Course Code - DME203
(Semester II)

Time allotted : 1 Hrs.15 Min.   **Full Marks : 60**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)   1 x 60=60

Choose the correct alternative from the following :

(1) Euler's formula holds good only for

   a) short columns
   b) long columns
   c) both short and long columns
   d) weak columns

(2) 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

(3) 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

(4) Strain rosettes are used to

   a) measure shear strain
   b) measure linear strain
   c) measure volumetric strain
   d) relieve strain

(5) When a rectangular beam is loaded transversely, the maximum compressive stress is developed on the

   a) top layer
   b) bottom layer
   c) every cross-section
   d) neutral axis

(6) The point of contraflexure is a point where

   a) bending moment changes sign
   b) shear force is maximum
   c) bending moment is maximum
   d) none of the mentioned

(7) 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

(8) In compression test, the fracture in cast iron specimen would occur along

a) the axis of load

b) an oblique plane

c) at right angles to the axis of specimen

d) would not occur

(9) When a bar is cooled to - 5°C, it will develop

a) no stress

b) shear stress

c) tensile stress

d) compressive stress

(10) 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 mentioned

(11) Rivets are generally specified by

a) thickness of plates to be joined

b) overall length

c) shank diameter

d) diameter of head

(12) The point of contraflexure occurs in

a) cantilever beams

b) simply supported beams

c) overhanging beams

d) fixed beams

(13) 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

(14) The Poisson's ratio for cast iron varies from

a) 0.33 to 0.37

b) 0.21 to 0.26

c) 0.31 to 0.34

d) 0.32 to 0.42

(15) In a beam where shear force changes sign, the bending moment will be

a) zero

b) minimum

c) maximum

d) infinity

(16) he slenderness ratio is the ratio of

a) area of column to least radius of gyration

b) length of column to least radius of gyration

c) least radius of gyration to area of column

d) least radius of gyration to length of column

(17) A column with maximum equivalent length has

a) both ends hinged

b) both ends fixed

c) one end fixed and the other end hinged

d) one end fixed and the other end free

(18) The total strain energy stored in a body is termed as

a) resilience

b) proofresilience

c) impact energy

d) modulus of resilience

(19) 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

(20) 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

(21) 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

(22) 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

(23) The strength of a riveted joint is equal to the

a) pull required to tear off the plate per pitch length (Pt)

b) pull required to shear off the rivet per pitch length (Ps)

c) pull required to crush the rivet per pitch length (Pc)

d) minimum value of Pt, Ps or Pc

(24) The Poisson's ratio for steel varies from

a) 0.23 to 0.27

b) 0.27 to 0.30

c) 0.31 to 0.34

d) 0.32 to 0.42

(25) When a change in length takes place, the strain is known as

a) linear strain

b) lateral strain

c) volumetric strain

d) shear strain

(26) A spring used to absorb shocks and vibrations is

a) conical spring

b) torsion spring

c) leaf spring

d) disc spring

(27) At the neutral axis of a beam, the shear stress is

a) zero

b) minimum

c) maximum

d) infinity

(28) A pressure vessel is said to be a thick shell, when

a) it is made of thick sheets

b) the internal pressure is very high

c) the ratio of wall thickness of the vessel to its diameter is less than 1/10.

d) the ratio of wall thickness of the vessel to its diameter is greater than 1/10.

(29) The tensile test is carried on _____ materials.

a) ductile

b) brittle

c) malleable

d) plastic

(30) 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

(31) 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

(32) 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) zig-zag riveted

c) diamond riveted

d) none of these

(33) 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

(34) The hoop stress in a thin cylindrical shell is

a) longitudinal stress

b) compressive stress

c) radial stress   d) circumferential tensile stress

(35) 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

(36) A riveted joint may fail by

     a) tearing of the plate at an edge   b) tearing of the plate across a row of rivets

     c) shearing of rivets   d) any one of these

(37) A beam supported on more than two supports is called

     a) simply supported beam   b) fixed beam

     c) overhanging beam   d) continuous beam

(38) A beam extending beyond the supports is called

     a) simply supported beam   b) fixed beam

     c) overhanging beam   d) cantilever beam

(39) The compression test is carried on _____ materials.

     a) ductile   b) brittle

     c) malleable   d) plastic

(40) The bending stress in abeam is _____ bending moment.

     a) equal to   b) less than

     c) more than   d) directly proportional to

(41) A leaf spring is supported at the

     a) ends and loaded at the centre   b) centre and loaded at the ends

     c) ends and loaded anywhere   d) centre and loaded anywhere

(42) The modulus of elasticity for mild steel is approximately equal to

     a) 10 kN/mm2   b) 80 kN/mm2

     c) 100 kN/mm2   d) 210 kN/mm2

(43) The Rankine's formula holds good for

     a) short columns   b) long columns

     c) both short and long columns   d) weak columns

(44) In a watch, the spring is used to store strain energy. This energy is released

     a) to stop the watch   b) to run the watch

     c) to change the time   d) all of these

(45) A flitched beam is used to

     a) change the shape of the beam   b) effect the saving in material

     c) equalise the strength in tension and   d) increase the cross-section of the beam
        compression

(46) Hook's law holds good up to

     a) yield point   b) elastic limit

     c) plastic limit   d) breaking point

(47) 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

(48) A continuous beam is one which has

     a) less than two supports   b) two supports only

     c) more than two supports   d) none of the above

(49) Factor of safety for ductile material is

a) yield stress by working stress

b) ultimate stress by working stress

c) working stress by yield stress

d) working stress by ultimate stress

(50) Maximum distortion energy theory is also known as….

a) Von Mises theory

b) shear strain energy theory

c) maximum strain energy theory

d) both option 1 and 2

(51) If a material expands freely due to heating it will develop

a) thermal stresses

b) tensile stress

c) bending

d) no stress

(52) Which of the following is a material property

a) Strain energy

b) Resilience

c) Proof Resilience

d) Modulus of Resiliene

(53) In symmetrical cross section beams, the maximum shear stress occurs at _____

a) Neutral axis

b) Top extreme fibre

c) Bottom Extreme fibre

d) All of the option

(54) Shearing stress in a beam is maximum at

a) At Neutral axis

b) In between

c) Outer fibre

d) All of the option

(55) Maximum shear stress theory is also called as

a) Coulomb Theory

b) Rankine's Theory

c) St. Venant's Theory

d) Von Mises Theory

(56) Rankine-Gordon's empirical formula is applicable for

a) long column

b) short column

c) both a. and b.

d) none of the option

(57) The maximum shear stress is equal to …..of the Mohr's circle.

a) radius

b) diameter

c) circumference

d) area

(58) Greater portion of shear force in a beam of I sectionis shared by

a) Lower flange

b) Upper flange

c) Web

d) none of the option

(59) The angle made by the resultant stress with the normal stress is called as

a) angle of repose

b) angle of twist

c) friction angle

d) angle of obliquity

(60) If polar modulus for solid circular shaft is 2388.98 mm3, then diameter of shaft in mm is

a) 20

b) 21

c) 22

d) 23