BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Diploma in Mechanical Engineering
Course Name – Design of Machine Elements
Course Code - DME602
(Semester VI)

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) Hooke's law is applicable within
a) Elastic limit
b) Fracture point
c) Plastic limit
d) Ultimate strength

(2) Young's Modulus of elasticity is
a) Shear stress/ Shear strain
b) Tensile stress / Tensile strain
c) Tensile strain / Tensile stress
d) None of the mention

(3) Which of the following material has maximum ductility
a) Mild steel
b) Nickel
c) Copper
d) Aluminium

(4) Cast iron is a
a) ductile material
b) brittle material
c) malleable material
d) tough material

(5) The property of a material due to which it breaks with little permanent distortion, is called
a) brittleness
b) ductility
c) malleability
d) plasticity

(6) The sleeve or muff coupling is designed as a
a) dun cylinder
b) solid shaft
c) thick cylinder
d) hollow shaft

(7) Slenderness ratio is the ratio of
a) maximum size of column to minimum size of column
b) effective length of column to width of column

c) width of column to depth of column

d) effective length of column to least radius of gyration of the column

(8) Which of the subsequent must not be a section of cotter joint

a) Socket

b) Cotter

c) Spigot

d) Collar

(9) Cotter joints is used for transforming..........

a) Axial tensile or compressive load

b) Axial tensile load

c) Axial compressive load

d) Twisting load

(10) A transmission shaft subjected to pure bending moment should be designed on the basis of

a) Maximum principal stress theory

b) Distortion energy theory

c) Maximum shear stress theory

d) Goodman or Soderberg diagrams

(11) A bushed-pin type flange coupling is used

a) For intersecting shafts

b) For small shafts rotating at slow speeds

c) When the shafts are not in exact alignment

d) For parallel shafts

(12) Which theory gives satisfactory results for brittle materials

a) Maximum shear stress theory

b) Maximum principle stress theory

c) Shear strain energy theory

d) None of the mention

(13) Which of the following property is essential for spring materials

a) Stiffness

b) Ductility

c) Resilience

d) Plasticity

(14) Which of the following screw thread is stronger than other threads?

a) Square threads

b) Trapezoidal threads

c) Buttress threads

d) V-threads

(15) A cup is provided in screw jack

a) To reduce the friction

b) To prevent rotation of load

c) To increase load capacity

d) To increase efficiency

(16) Springs are used,

a) To absorb shocks and vibrations

b) To measure force

c) To store and release energy

d) For any of the mention

(17) Surface endurance limit of gear material is dependent upon its

a) Elastic strength

b) Yield strength

c) Brinell hardness number

d) Toughness

(18) The type of key used when the gear is required to slide on the shaft is

a) Sunk key

b) Feather key

c) Woodruff key

d) Kennedy key

(19) The standard taper for sunk key is

a) 1 in 100

b) 1 in 10

c) 1 in 50

d) 1 in 1000

(20) According to I.B.R., the thickness of the boiler shell should not be less than

a) 4mm

b) 5mm

c) 6mm

d) 7mm

(21) The rocker arms in internal combustion engines are of

a) First type levers
b) Second type levers
c) Third type levers
d) None of these

(22) In designing a sleeve coupling, outer diameter of the sleeve is taken as (where d = Diameter of the shaft)

a) d + 17 mm
b) 2d + 13 mm
c) 2d + 20 mm
d) 3.5d

(23) The belt slip occurs due to

a) Heavy load
b) Loose belt
c) Driving pulley too small
d) All of the mention

(24) Within the external combination engine, a piston rod is usually connected to the cross head by means of

a) Cotter joints
b) Universal joints
c) Cotter joints
d) Bearing

(25) Which of the following property is desirable in parts subjected to shock and impact loads

a) Strength
b) Stiffness
c) Brittleness
d) Toughness

(26) The difference between the upper limit and lower limit of a dimension is called

a) Nominal size
b) Basic size
c) Actual size
d) Tolerance

(27) Yield point in fatigue loading as compared to static loading is

a) Same
b) Lower
c) Higher
d) Depends

(28) The arms of the pulleys for flat belt drive have

a) Elliptical cross-section
b) Major axis in plane of rotation
c) Major axis twice the minor axis
d) All the three characteristics

(29) In a marine flange coupling, the thickness of flange is taken as

a) d/2
b) 3d/4
c) d/3
d) d/4

(30) Which of the following has threads at both ends?

a) Bolt
b) Stud
c) Tap bolt
d) None of the option

(31) Wahl's stress factor _____ very rapidly as the spring index decreases.

a) Increases
b) Decreases
c) Remain same
d) None of the mention

(32) A transmission shaft includes

a) Over head shaft
b) Counter shaft
c) Line shaft
d) All of the mention

(33) In a horizontal flat belt drive, it is customary to use

a) Bottom side of belt as slack side
b) Top side of belt as slack side
c) Idler pulley
d) None of the mention

(34) Ball bearing type screws are found in following application

a) Screw jack
b) Aeroplane engines

c) Crane
d) Steering mechanism

(35) The contact ratio is the ratio of

a) Length of arc of recess to the circular pitch
b) Length of path of contact to the circular pitch

c) Length of arc of contact to the circular pitch
d) Length of arc of approach to the circular pitch

(36) Which of the following can be used for power transmission in intersecting shafts.

a) Spur Gear
b) Helical Gear

c) Bevel Gear
d) None of the mention

(37) The two gears are said to have conjugate motion if

a) They have constant angular velocity ratio
b) Variable angular velocity ratio

c) Infinitely small angular velocity ratio
d) None of the mention

(38) Bevel gears impose _____ loads on the shafts.

a) Radial and thrust
b) Radial

c) Thrust
d) Neither radial nor thrust

(39) Cycloidal teeth consist of

a) Hypocycloid curve
b) Epicycloid gear

c) Both hypocycloid curve and epicycloid curve
d) None of the mentioned

(40) While designing a flange coupling, care is taken so that

a) Shaft is the weakest component
b) Bolts are the weakest component

c) Key is the weakest component
d) The flange is the weakest component

(41) Splines are commonly used in

a) Machine tool gear box
b) Hoist and crane gear box

c) Automobile gear box
d) Bicycle

(42) The angle of twist for a transmission shaft is inversely proportional to

a) Shaft diameter
b) (Shaft diameter)2

c) (Shaft diameter)3
d) (Shaft diameter)4

(43) The function of key is

a) To connect transmission shaft to a rotating machine elements like gears
b) To transmit torque from shaft to hub and vice versa

c) To prevent relative rotational motion between the shaft and the connected element
d) All of above three functions

(44) The key, which consists of two square keys, is called,

a) Saddle key
b) Feather key

c) Woodruff key
d) Kennedy key

(45) Which is the correct statement?

a) Cold rolling produces stronger shafts than hot rolling
b) Hot rolling produces stronger shafts than cold rolling Strength of shaft is independent

c) Cold rolling and hot rolling produces equally strong shafts
d) None of the mention

(46) Which of the following screw thread is adaptable to split type nut?

a) Square threads
b) Buttress threads

c) Trapezoidal threads
d) V-threads

(47) Power screws for transmission of power should have

a) High efficiency
b) Low efficiency

c) Self-locking characteristic   d) Over hauling characteristic

(48) Young's modulus is defined as the ratio of

    a) volumetric stress and volumetric strain   b) longitudinal stress and longitudinal strain

    c) lateral stress and lateral strain   d) shear stress to shear strain

(49) The materials having same elastic properties in all directions are called

    a) ideal materials   b) uniform materials

    c) paractical materials   d) isotropic materials

(50) The intensity of stress which causes unit strain is called

    a) unit stress   b) bulk modulus

    c) modulus of rigidity   d) modulus of elasticity

(51) If a part is constrained to move and heated, it will develop

    a) principal stress   b) tensile stress

    c) compressive stress   d) None of the

(52) The ends of spring, which are in contact with the seat, are

    a) Active coils   b) Inactive coils

    c) Transmit maximum force   d) Do not transmit any force

(53) When a helical spring is cut into two halves, the stiffness of each half spring will be,

    a) Same as original spring   b) Double of original spring

    c) Half of original spring   d) One fourth of original spring

(54) Why are mechanical springs used?

    a) To apply force   b) To store energy

    c) To measure force   d) All of the above

(55) Solid length for helical compression springs having square and ground ends is given as

    _____.

    a) $(n + 2)d$ b) $(n + 3)d$

    c) $(n + 1)d$ d) None of the mention

(56) When the bearing is subjected to large fluctuations of load and heavy impacts, the bearing characteristic number should be _____ the bearing modulus.

    a) 10 times   b) 5 times

    c) 15 times   d) 20 times

(57) In hydrodynamic bearings

    a) The oil film pressure is generated only by the rotation of the journal   b) The oil film is maintained by supplying oil under pressure

    c) Do not require external supply of lubricant   d) Grease is used for lubrication

(58) A spring is defined as a(an) ____ machine element.

    a) plastic   b) elastic

    c) special purpose   d) none of the above

(59) In which of the following item(s), spring is used to store energy.

    a) clocks   b) toys

    c) circuit breakers   d) all of the above

(60) Torsional shear stresses are induced in the spring wire when

    a) spring is under compression   b) spring is under tension

c) both (A) and (B)   d) none of the above