

**Objective questions on Machine design and drawing (MET-10)**

1. A cotter joint is used to connect two .....rods.
  - a) Co-axial
  - b) Perpendicular
  - c) Parallel
  - d) None of these
  
2. The rated life of bearing varies
  - a) Directly as load
  - b) Inversely as square of load
  - c) Inversely as cube of load
  - d) None
  
3. The bending stress in a curved beam is
  - a) Zero at centroidal axis
  - b) Zero at point other than centroidal axis
  - c) Maximum at neutral axis
  - d) None of above
  
4. The centre to centre distance between two consecutive rivets in a row is
  - a) Margin
  - b) Pitch
  - c) Back pitch
  - d) Diagonal pitch
  
5. In a gear having involute teeth, normal to involute teeth is tangent to the
  - a) Base circle
  - b) Pitch circle
  - c) Addendum circle
  - d) Dedendum circle
  
6. According to Owin's formula the relation between diameter of rivet hole (d) and thickness of plate (t) is given by
  - a)  $d = \sqrt{t}$
  - b)  $d = 1.6 \sqrt{t}$
  - c)  $d = 2\sqrt{t}$
  - d)  $d = 6\sqrt{t}$
  
7. In a boundary lubricated bearing there is a .....of lubricant between the journal and bearing.
  - a) Thick film
  - b) Thin film
  - c) Any of the above
  - d) None

8. The edge of plates of cylindrical vessels are usually bevelled to an angle of  $80^\circ$  for
  - a) Reducing stress concentration
  - b) Ease of manufacture
  - c) Safety
  - d) Filleting and caulking
  
9. Transverse fillet weld joint are designed for
  - a) Tensile strength
  - b) Compressive strength
  - c) Shear strength
  - d) Bending strength
  
10. In a flange coupling bolts are subjected to
  - a) Tensile strength
  - b) Compressive strength
  - c) Shear strength
  - d) Bending strength
  
11. When the shaft rotates in anti-clockwise direction at slow speed in a bearing, it will
  - a) Have contact at bottom most of the bearing
  - b) Move towards right of the bearing no metal to metal contact
  - c) Move towards right of the bearing metal to metal contact
  - d) Move towards left of the bearing metal to metal contact
  
12. The objective of idler pulley in belt drive is to
  - a) Decrease tendency of belt to slip
  - b) Increase the power transmission capacity
  - c) Increase belt tension
  - d) All of above
  
13. The objective of 'crowning' of the flat pulleys of belt drive is to
  - a). Prevent the belt from running off the pulley
  - b). Increase the power transmission capacity
  - c). Increase the belt velocity
  - d). Prevent the belt joint from damaging the belt surface
  
14. The size of a cam depends upon
  - a) Base circle
  - b) Pitch circle
  - c) Prime circle
  - d) Pitch curve
  
15. 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 above
  
16. The coefficient of friction between the belt and pulley depends upon the
  - a) Material of belt and pulley
  - b) Slip of belt
  - c) Speed of belt
  - d) All of these

17. Which one of the following loading is considered for the design of axles?
- Bending moment only
  - Twisting moment only
  - Combined bending moment and twisting moments
  - Combined action of bending moment, twisting moment and axial thrust
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19. The groove angle of the pulley for rope drive is usually
- 20°
  - 35°
  - 45°
  - 60°
20. The valve rod in a steam engine is connected to an eccentric rod by
- Cotter joint
  - Bolted joint
  - Knuckle joint
  - Universal coupling
21. A double strap butt joint (with equal straps) is
- Always in single shear
  - Always in double shear
  - Either in single shear or double shear
  - Any one of these
22. In designing thick cylinders, the equation used is
- Lame's equation
  - Birnie's equation
  - Clavarinos' equation
  - All of these
23. The yield point in static loading is \_\_\_\_\_ as compared to fatigue loading
- Higher
  - Lower
  - Same
  - None of these
24. The buckling load will be maximum for a column, if
- One end of the column is clamped and the other end is free
  - Both ends of the column are clamped
  - Both ends of the column are hinged
  - One end of the column is hinged and the other end is free
25. When screw threads are to be used in a situation where power is being transmitted in one direction only, then the screw threads suitable for this will be
- Knuckle threads
  - Square threads
  - Acme threads
  - Buttress threads

26. The property of a material which enables it to be drawn into wires with the application of a tensile force, is called
- Plasticity
  - Elasticity
  - Ductility
  - Malleability
27. The root angle of a bevel gear is equal to
- Pitch angle - addendum angle
  - Pitch angle + addendum angle
  - Pitch angle - addendum angle
  - Pitch angle + dedendum angle
28. The face angle of a bevel gear is equal to
- Pitch angle - addendum angle
  - Pitch angle + addendum angle
  - Pitch angle - addendum angle
  - Pitch angle + addendum angle
29. The longitudinal joint in boilers is used to get the required
- Length of boiler
  - Diameter of boiler
  - Length and diameter of boiler
  - Efficiency of boiler
30. The usual proportion for the width of key is (where  $d$  = Diameter of shaft or diameter of hole in the hub)
- $d/8$
  - $d/6$
  - $d/4$
  - $d/2$
31. The suitable material for belt used in flour mill is
- Leather
  - Rubber
  - Canvas or cotton duck
  - Balata gum
32. When a machine member is subjected to torsion, the torsional shear stress set up in the member is
- Zero at both the centroidal axis and outer surface of the member
  - Maximum at both the centroidal axis and outer surface of the member
  - Zero at the centroidal axis and maximum at the outer surface of the member
  - Maximum at the centroidal axis and zero at the outer surface of the member
33. Wahl's stress factor \_\_\_\_\_ very rapidly as the spring index decreases.
- Increases
  - Decreases
  - Remain same
  - None of these
34. In the levers of first type, the mechanical advantage is \_\_\_\_\_ one.
- Less than
  - Equal to
  - More than
  - None of these

35. Stress concentration is caused due to
- Variation in properties of material from point to point in a member
  - Pitting at points or areas at which loads on a member are applied
  - Abrupt change of section
  - All of the above
36. According to Indian standards, a bolt thread of 6 mm size of coarse pitch and with allowance on the threads and normal tolerance grade is designated as
- M6
  - M8
  - M6 - 8d
  - M8 - 6d
37. A connecting rod is designed as a
- Long column
  - Short column
  - Strut
  - All of these
38. The sleeve or muff coupling is designed as a
- Dun cylinder
  - Hollow shaft
  - Solid shaft
  - Thick cylinder
39. When the fulcrum is in between the load and effort, the lever is said to be of
- First type
  - Second type
  - Third type
  - Any one of these
40. In block brakes, the ratio of shoe width to wheel diameter is taken between
- 0.1 and 0.25
  - 0.25 and 0.50
  - 0.50 and 0.75
  - 0.75 and 1
41. Auto frottage is the method of
- Joining thick cylinders
  - Calculating stresses in thick cylinders
  - Pre-stressing thick cylinders
  - Increasing the life of thick cylinders
42. A feather key is generally
- Loose in shaft and tight in hub
  - Tight in shaft and loose in hub
  - Tight in both shaft and hub
  - Loose in both shaft and hub
43. In leaf springs, the longest leaf is known as
- Master leaf
  - Lower leaf
  - Upper leaf
  - None of these

44. The pipe joint mostly used for pipes carrying water at low pressures is
- Socket joint
  - Nipple joint
  - Union joint
  - Spigot and socket joint
45. Belt slip may occur due to
- Heavy load
  - Loose belt
  - Driving pulley too small
  - All of the above
46. The speed of the sprocket reduces as the chain pitch \_\_\_\_\_ for a given number of teeth.
- Increases
  - Decreases
  - Remain same
  - None of these
47. For longitudinal joint in boilers, the type of joint used is
- Butt joint with single cover plate
  - Butt joint with double cover plate
  - Lap joint with one ring overlapping the other
  - Any one of the above
48. For circumferential joint in boilers, the type of joint used is
- Butt joint with single cover plate
  - Butt joint with double cover plate
  - Lap joint with one ring overlapping the other
  - Any one of the above
49. The casting produced by forcing molten metal under pressure into a permanent metal mould is known as
- Permanent mould casting
  - Slush casting
  - Die casting
  - Centrifugal casting
50. The metal is subjected to mechanical working for
- Refining grain size
  - Reducing original block into desired shape
  - Controlling the direction of flow lines
  - All of above
51. The process extensively used for making bolts and nuts is
- Hot piercing
  - Extrusion
  - Cold preening
  - Cold heading
52. A basic shaft is one whose
- Lower deviation is zero
  - Upper deviation is zero
  - Both are zero
  - None of above

53. A rivet is specified by
- Shank diameter
  - Length of rivet
  - Type of head
  - Length of tail
54. The diameter of the rivet hole is usually .....the nominal diameter of the rivet
- Equal to
  - Less than
  - More than
  - Not defined
55. The rivet head used for boiler plate riveting is usually
- Snap head
  - Pan head
  - Counter sunk head
  - Conical head
56. The line joining centre of rivets and parallel to the edge of the plate is known as
- Back pitch
  - Marginal pitch
  - Gauge line
  - Pitch line
57. In fusion welding process
- Only heat is used
  - Only pressure is used
  - Combination of heat and pressure is used
  - None of above
58. The electric arc welding is a type of .....welding?
- Forge
  - Fusion
  - Seam welding
  - None of above
59. The principle of applying heat and pressure is welding used in
- Spot welding
  - Seam welding
  - Projection welding
  - All of these
60. In transverse fillet weld joint, the size of weld is equal to
- 0.5 x throat of weld
  - Throat of weld
  - $\sqrt{2}$  x throat of weld
  - 2 x throat of weld
61. The transverse fillet welded joints are designed for
- Tensile strength
  - Compressive strength
  - Bending strength
  - Shear strength

62. The parallel fillet welded joints are designed for
- Tensile strength
  - Compressive strength
  - Bending strength
  - Shear strength
63. A cotter is used to transmit
- Axial tensile load only
  - Axial compressive load only
  - Combined axial and twisting loads
  - Axial tensile or compressive load
64. The taper on cotter varies from
- 1 in 15 to 1 in 10
  - 1 in 24 to 1 in 20
  - 1 in 32 to 1 to 24
  - 1 in 48 to 1 in 24
65. Which of the following cotter joint is used to connect strap end of a connecting rod
- Socket and spigot cotter joint
  - Sleeve and cotter joint
  - Gib and cotter joint
  - None of above
66. In designing a sleeve and cotter joint, the outside diameter of the sleeve is taken as (if  $d$  is diameter of the rod)
- $1.5d$
  - $2.5d$
  - $3d$
  - $4d$
67. The length of the cotter in sleeve and cotter joint is taken as
- $1.5d$
  - $2.5d$
  - $3d$
  - $4d$
68. In Gib and cotter joint, the thickness of Gib is .....thickness of cotter
- More than
  - Less than
  - Equal to
  - None of above
69. In a steam engine, the piston rod is usually to cross head by means of a
- Knuckle joint
  - Universal joint
  - Flange coupling
  - Cotter joint
70. In a steam engine, the valve rod is connected to an eccentric by means of a
- Knuckle joint
  - Universal coupling
  - Flange coupling
  - Cotter joint



71. The taper on a rectangular sunk key is
- 1 in 16
  - 1 in 32
  - 1 in 48
  - 1 in 100
72. The usual proportion for width of key to diameter of shaft is
- $d/8$
  - $d/6$
  - $d/4$
  - $d/2$
73. when a pulley or other mating piece is required to slide along the shaft, a .....shunk key is used
- rectangular
  - square
  - parallel
  - none of above
74. a key made from cylindrical disc having segmental cross section is known as
- feather key
  - gib head key
  - woodruff key
  - flat saddle key
75. A feather key is generally
- Loose in shaft and tight in hub
  - Tight in shaft and loose in hub
  - Tight in both shaft and hub
  - Loose in both shaft and hub
76. The type of stress developed in the key is/are
- Shear stress alone
  - Bearing stress alone
  - Both shear and bearing stress
  - Shearing, bearing and bending stress
77. For a square key made of mild steel, the shear and crushing strength are related as
- Shear strength = crushing strength
  - Shear strength > crushing strength
  - Shear strength < crushing strength
  - None of above
78. A key lowers
- The strength of shaft
  - The rigidity of shaft
  - Both strength and rigidity of shaft
  - The ductility of metal of shaft
79. The sleeve or muff coupling is designed as a
- Thin cylinder
  - Thick cylinder
  - Solid shaft
  - Hollow shaft

80. Oldham coupling is used to connect two shafts
- Which are perfectly aligned
  - Which are not in exact alignment
  - Which have lateral misalignment
  - Whose axes intersect at a small angle
81. A spring used to absorb shock and vibrations is
- Closed coil helical spring
  - Open coiled helical spring
  - Conical spring
  - Leaf spring
82. The spring mostly used in gramophones is
- Helical spring
  - Conical spring
  - Laminated spring
  - Flat spiral spring
83. Which of the following spring is used in mechanical wrist watch
- Helical compression spring
  - Spiral spring
  - Torsion spring
  - Belleville spring
84. When a helical compression spring is subjected to an axial compressive load, the stress included in the wire is
- Tensile stress
  - Compressive stress
  - Shear stress
  - Bending stress
85. When helical compression spring is cut into halves, the stiffness of the resulting spring will be
- Same
  - Double
  - One half
  - One fourth
86. The leaf spring in automobiles is used
- To apply forces
  - To measure forces
  - To absorb shocks
  - To store strain energy
87. In leaf springs, the longest leaf is known as
- Lower leaf
  - Master leaf
  - Upper leaf
  - None of above
88. The size of cam depends upon
- Base circle
  - Pitch circle
  - Prime circle
  - Pitch curve

89. The angle between direction of follower motion and a normal to the pitch curve is called
- Pitch angle
  - Prime angle
  - Base angle
  - Pressure angle
90. A circle drawn with centre as cam centre and radius equal to the distance between cam centre and the point on pitch curve at which the pressure angle is maximum is called
- Base circle
  - Pitch circle
  - Prime circle
  - None of above
91. The cam follower generally used in auto mobile engine is
- Knife edge follower
  - Flat faced follower
  - Spherical faced follower
  - Roller follower
92. The cam follower extensively used in air craft engine is
- Knife edge follower
  - Flat faced follower
  - Spherical faced follower
  - Roller follower
93. In radial cam the follower moves
- In direction perpendicular to cam axis
  - In direction parallel to cam axis
  - In any direction irrespective of cam axis
  - Along the cam axis
94. A radial follower is one
- That reciprocates in the guide
  - That oscillates
  - Translate along an axis passing through centre of cam rotation
  - None of above
95. Offset is provided to cam follower mechanism to
- Minimise the side thrust
  - Accelerate
  - Avoid jerk
  - None of these
96. For low and moderate speed engine the cam follower should move with
- Uniform velocity
  - Simple harmonic motion
  - Uniform acceleration and retardation
  - Cyclonical motion

97. For high speed engine cam should move with
- a) Uniform velocity
  - b) Simple harmonic motion
  - c) Uniform acceleration and retardation
  - d) Cyclonical motion
98. Which of following displacement diagram should be chosen for better dynamic performance of cam follower mechanism?
- a) Simple harmonic motion
  - b) Parabolic motion
  - c) Cyclonical motion
  - d) None of above
99. For a given lift of follower of a cam follower mechanism, a smaller base circle diameter is desired because it will
- a) Give a steeper cam and higher pressure angle
  - b) Profile with lower pressure angle
  - c) Avoid jumping
  - d) None of above
100. The type of threads used in railway carriage coupling is
- a) Square thread
  - b) Acme thread
  - c) Buttress thread
  - d) Knuckle thread