

Objective question on Applied mechanics (MET-1)

1. The unit of force in S.I. units is
 - (a) kilogram
 - (b) Newton
 - (c) Watt
 - (d) Dyne

2. The unit of work or energy in S.I. units is
 - (a) newton
 - (b) pascal
 - (c) kilogram meter
 - (d) Joule

3. The unit of power in S.I. units is
 - (a) newton meter
 - (b) watt
 - (c) joule
 - (d) kilogram meter/sec.

4. Forces are called concurrent when their lines of action meet in
 - (a) one point
 - (b) two points
 - (c) plane
 - (d) perpendicular planes

5. Forces are called coplanar when all of them acting on body lie in
 - (a) one point
 - (b) one plane
 - (c) different planes
 - (d) perpendicular planes

6. A force acting on a body may
 - (a) Introduce internal stresses
 - (b) balance the other forces acting on it
 - (c) retard its motion
 - (d) all of the above.

7. Which is the correct statement about law of polygon of forces if any number of forces acting at a point for overall equilibrium?
 - (a) can be represented by the sides of a polygon taken in order
 - (b) can be represented in direction and magnitude by the sides of a polygon
 - (c) if they are closed then forces are in equilibrium
 - (d) can be represented in direction and magnitude by the sides of a polygon taken in order

8. Effect of a force on a body depends upon

- (a) magnitude
- (b) direction
- (c) position or line of action
- (d) all of the above

9. If a number of forces act simultaneously on a particle, it is possible

- (a) not to replace them by a single force
- (b) to replace them by a single force
- (c) to replace them by a single force through C.G.
- (d) to replace them by a couple

10. A force is completely defined when we specify

- (a) magnitude
- (b) direction
- (c) point of application
- (d) all of the above

11. The algebraic sum of the resolved parts of a number of forces in a given direction is equal to the resolved part of their resultant in the same direction. This is as per the principle of

- (a) forces
- (b) independence of forces
- (c) dependence of forces
- (d) resolution of forces.

12. Which of the following do not have identical dimensions?

- (a) Momentum and impulse
- (b) Torque and energy
- (c) Torque and work
- (d) Moment of a force and angular momentum

13. Which of the following is not the unit of distance ?

- (a) angstrom
- (b) light year
- (c) micron
- (d) milestone

14. Which of the following is not the unit of power ?

- (a) kW (kilowatt)
- (b) hp (horse power)
- (c) kcal/sec
- (d) kcal/kg sec

15. Which of the following is not the unit of work, energy and heat ?

- (a) kcal
- (b) kg m
- (c) kWhr
- (d) hp

16. Which of the following is not the unit of pressure ?

- (a) kg/cm
- b) ata
- (c) atmosphere
- (d) newton

17. The weight of a body is due to

- (a) centripetal force of earth
- (b) gravitational pull exerted by the earth
- (c) forces experienced by body in atmosphere
- (d) gravitational force of attraction towards the centre of the earth.

18. The forces, which meet at one point, but their lines of action do not lie in a plane, are called

- (a) coplanar non-concurrent forces
- (b) non-coplanar concurrent forces
- (c) non-coplanar non-concurrent forces
- (d) intersecting forces

19. When trying to turn a key into a lock, following is applied

- (a) coplanar force
- (b) non-coplanar forces
- (c) lever
- (d) couple

20. Which of the following is not a scalar quantity

- (a) time
- b) mass
- c) volume
- (d) acceleration

21. According to principle of transmissibility of forces, the effect of a force upon a body is

- (a) maximum when it acts at the centre of gravity of a body
- (b) different at different points in its line of action
- (c) the same at every point in its line of action
- (d) minimum when it acts at the C.G. of the body

22. Which of the following is a vector quantity

- (a) energy
- (b) mass
- (c) momentum
- (d) angle

23. A number of forces acting at a point will be in equilibrium if

- (a) their total sum is zero
- (b) two resolved parts in two directions at right angles are equal
- (c) sum of resolved parts in any two perpendicular directions are both zero
- (d) all of them are inclined equally

24. Two non-collinear parallel equal forces acting in opposite direction
- (a) balance each other
 - (b) constitute a moment
 - (c) constitute a couple
 - (d) constitute a moment of couple
25. Which of the following is not a vector quantity
- (a) mass
 - (b) velocity
 - (c) acceleration
 - (d) force
26. D' Alembert's principle is used for
- (a) reducing the problem of kinetics to equivalent statics problem
 - (b) determining stresses in the truss
 - (c) stability of floating bodies
 - (d) designing safe structures
27. A heavy ladder resting on floor and against a vertical wall may not be in equilibrium, if
- (a) the floor is smooth, the wall is rough
 - (b) the floor is rough, the wall is smooth
 - (c) the floor and wall both are smooth surfaces
 - (d) the floor and wall both are rough surfaces
28. According to Lami's theorem
- (a) three forces acting at a point will be in equilibrium
 - (b) three forces acting at a point can be represented by a triangle, each side being proportional to force
 - (c) if three forces acting upon a particle are represented in magnitude and direction by the sides of a triangle, taken in order, they will be in equilibrium
 - (d) if three forces acting at a point are in equilibrium, each force is proportional to the sine of the angle between the other two
29. Two coplanar couples having equal and opposite moments
- (a) balance each other
 - (b) produce a couple and an unbalanced force
 - (c) are equivalent
 - (d) can not balance each other
30. The product of either force of couple with the arm of the couple is called
- (a) resultant couple
 - (b) moment of the forces
 - (c) resulting couple
 - (d) moment of the couple

31. Angle of friction is the
- (a) angle between normal reaction and the resultant of normal reaction and the limiting friction
 - (b) ratio of limiting friction and normal reaction
 - (c) the ratio of minimum friction force to the friction force acting when the body is just about to move
 - (d) the ratio of minimum friction force to friction force acting when the body is in motion
32. The coefficient of friction depends on
- (a) area of contact
 - (b) shape of surfaces
 - (c) strength of surfaces
 - (d) nature of surface
33. Frictional force encountered after commencement of motion is called
- (a) post friction
 - (b) limiting friction
 - (c) kinematic friction
 - (d) dynamic friction
34. Dynamic friction as compared to static friction is
- (a) same
 - (b) more
 - (c) less
 - (d) may be less or more depending on nature of surfaces and velocity
35. Tangent of angle of friction is equal to
- (a) kinetic friction
 - (b) limiting friction
 - (c) angle of repose
 - (d) coefficient of friction
36. A single force and a couple acting in the same plane upon a rigid body
- (a) balance each other
 - (b) cannot balance each other
 - (c) produce moment of a couple
 - (d) are equivalent
37. The maximum frictional force which comes into play when a body just begins to slide over another surface is called
- (a) limiting friction
 - (b) sliding friction
 - (c) rolling friction
 - (d) kinematic friction

38. The amount of matter in an object is called its
- (a) inertia
 - (b) force
 - (c) balance
 - (d) mass
39. The force that one surface exerts on another when the two rub against each other is called
- (a) gravity
 - (b) friction
 - (c) inertia
 - (d) acceleration
40. What is transferred by a force moving an object through a distance?
- (a) motion
 - (b) force
 - (c) energy
 - (d) mass
41. One way to increase acceleration is by
- (a) decreasing force
 - (b) increasing mass
 - (c) decreasing mass
 - (d) increasing both force and mass proportionally
42. In order to calculate pressure exerted on a surface, what quantity is divided by the surface area?
- (a) force
 - (b) mass
 - (c) volume
 - (d) altitude
43. Speed is the ratio of the distance an object moves to
- (a) the displacement of the object
 - (b) the motion of the object
 - (c) the amount of time needed to travel the distance
 - (d) the direction the object moves
44. An inclined plane reduces the effort force by
- (a) reducing the work
 - (b) reducing the effort distance
 - (c) increasing the work
 - (d) increasing the distance through which the force is applied.
45. The energy of motion is called
- (a) thermal energy
 - (b) work
 - (c) kinetic energy
 - (d) potential energy

46. Which of the following increases when an object becomes warmer?
- (a) chemical energy
 - (b) thermal energy
 - (c) elastic potential energy
 - (d) nuclear energy
47. According to Newton's third law of motion, when a hammer strikes and exerts force on a nail, the nail
- (a) disappears into the wood
 - (b) exerts an equal force back on the hammer
 - (c) moves at a constant speed
 - (d) creates a friction with the hammer
48. The power of a machine measures
- (a) its strength
 - (b) the work it does
 - (c) its rate of doing work
 - (d) the force it produces
49. When a pair of balanced forces acts on an object, the net force that results is
- (a) greater in size than one of the forces
 - (b) equal to zero
 - (c) equal in size to one of the forces
 - (d) greater in size than both forces combined
50. According to Newton's second law of motion, the acceleration of an object equals the net force acting on the object divided by the object's
- (a) mass
 - (b) momentum
 - (c) velocity
 - (d) weight
51. The upward force acting on an object submerged in a fluid is called
- (a) drag
 - (b) weight
 - (c) pressure
 - (d) buoyant force
52. Energy from the sun reaches Earth mostly by
- (a) convection
 - (b) conduction
 - (c) thermal expansion
 - (d) radiation
53. Which of the following universal forces is the most effective over long distances?
- (a) gravitational
 - (b) strong nuclear
 - (c) magnetic
 - (d) electric

54. If a bicyclist travels 30 kilometers in two hours, her average speed is _____.

- (a) 60 km/h
- (b) 2 km/h
- (c) 30 km/h
- (d) 15 km/h

55. Speed equals distance divided by _____

- (a) velocity
- (b) motion
- (c) size
- (d) time

56. The force that pulls falling objects toward Earth is called

- (a) air resistance
- (b) acceleration
- (c) gravity
- (d) free fall

57. Newton's third law of motion describes

- (a) net force
- (b) centripetal forces
- (c) balanced forces
- (d) action and reaction forces

58. Which of the following is a unit of temperature?

- (a) calorie
- (b) Celsius degree
- (c) joule
- (d) kilogram

59. What is the momentum of a 50-kilogram ice skater gliding across the ice at a speed of 2 m/s?

- (a) 25
- (b) 48 kg m/s
- (c) 50 kg
- (d) 100 kg m/s

60. Which of these is an example of deceleration?

- (a) a roller coaster moving down a steep hill
- (b) an airplane following a straight flight path
- (c) a bird taking off for flight
- (d) a car approaching a red light

61. An orange might roll off your cafeteria tray when you stop suddenly because of

- (a) the friction forces acting on the orange
- (b) the balanced forces acting on the orange
- (c) the centripetal force acting on the orange
- (d) the orange's inertia

61. The energy stored in gasoline is

- (a) nuclear energy
- (b) chemical energy
- (c) electromagnetic energy
- (d) mechanical energy

62. Which example identifies a change in motion that produces acceleration?
- (a) a ball moving at a constant speed around a circular track
 - (b) a speed skater moving at a constant speed on a straight track
 - (c) a particle moving in a vacuum at constant velocity
 - (d) a vehicle moving down the street at a steady speed
63. A body is moving along a circular path with variable speed. It has
- (a) a radial acceleration
 - (b) a tangential acceleration
 - (c) zero acceleration
 - (d) both tangential and radial accelerations
64. A body is travelling in a circle at constant speed. It
- (a) has constant velocity.
 - (b) has no acceleration
 - (c) has an inward acceleration
 - (d) has an outward radial acceleration
65. A car sometimes overturns while taking a turn. When it overturns, it is
- (a) the inner wheel which leaves the ground first
 - (b) the outer wheel which leaves the ground first
 - (c) both the wheel leave the ground simultaneously
 - (d) either inner wheel or the outer wheel leaves the ground
66. A particle is performing uniform circular motion along a circular path of radius r , with a uniform speed v . Its tangential and radial acceleration are
- (a) zero and infinite
 - (b) v^2/r and zero
 - (c) zero and v^2/r
 - (d) r^2 and infinite
67. A particle revolves round a circular path. The acceleration of the particle is
- (a) along the circumference of the circle
 - (b) along the tangent
 - (c) along the radius
 - (d) zero
68. As per laws of rectilinear motion the rate of change of velocity is called
- (a) momentum
 - (b) speed
 - (c) acceleration
 - (d) none
69. The product of mass and velocity of a moving object is called
- (a) momentum
 - (b) moment
 - (c) torque
 - (d) inertia
70. The property by which an object tries to remain in its position (stationery or dynamic) is called
- (a) moment
 - (b) force
 - (c) inertia
 - (d) weight

71. As per laws for rectilinear motion the distance travelled in a particular moment can be calculated by

- (a) $v^2 = u^2 + 2as$
- (b) $s = u + a/2 (2t-1)$
- (c) $s = ut + at^2/2$
- (d) none

72. As per Newton's first law of motion

- (a) a object remains in its position until an external force is applied on it
- (b) the value of applied force is equal to product of mass and acceleration
- (c) Each action has equal and opposite reaction
- (d) none of the above

73. As per Newton's second law of motion

- (a) a object remains in its position until an external force is applied on it
- (b) the value of applied force is equal to product of mass and acceleration
- (c) Each action has equal and opposite reaction
- (d) none of the above

74. As per Newton's third law of motion

- (a) a object remains in its position until an external force is applied on it
- (b) the value of applied force is equal to product of mass and acceleration
- (c) Each action has equal and opposite reaction
- (d) none of the above

75. If a person is moving down inside a lift his apparent weight will be

- (a) more than actual weight
- (b) less than actual weight
- (c) equal to actual weight
- (d) none of the above

76. If a person is moving up inside a lift his apparent weight will be

- (a) more than actual weight
- (b) less than actual weight
- (c) equal to actual weight
- (d) none of the above

77. If a person is moving inside a lift and the rope breaks then his apparent weight will be

- (a) more than actual weight
- (b) less than actual weight
- (c) equal to actual weight
- (d) zero

78. What is angular velocity in circular motion

- (a) rate of change of angular displacement
- (b) rate of change of linear displacement
- (c) product of mass and radius of circular path
- (d) none

79. What is unit of angular velocity

- (a) meter per second
- (b) square meter per second
- (c) radian per second
- (d) none

80. what is called the time period of any object performing S.H.M.

- (a) number of revolutions per second
- (b) time taken for one complete revolution
- (c) time taken for reaching to point of max. displacement
- (d) none of the above

81. If mass of bob is "m" and spring constant is "k" the time period of a spring pendulum is directly proportional to

- (a) m
- (b) k
- (c) \sqrt{m}
- (d) $1/\sqrt{m}$

82. If a mass "m" is used in simple pendulum of string length "l" then the time period for short oscillations is directly proportional to

- (a) m
- (b) g
- (c) \sqrt{l}
- (d) $1/\sqrt{m}$

83. if a simple pendulum is moved from earth to moon while keeping other thing same, the time period will

- (a) increase
- (b) decrease
- (c) remains the same
- (d) can not be predicted

84. What do we call the distance of particle from the mean position at any instant in S.H.M

- (a) amplitude
- (b) displacement
- (c) frequency
- (d) none

85. In a periodic process, the number of cycles per unit of time is called

- (a) Period
- (b) Frequency
- (c) Amplitude
- (d) Wavelength

86. If three identical balls made up of steel, wood and rubber are dropped from a height which will hit the ground first (consider air resistance negligible)

- (a) steel
- (b) wood
- (c) rubber
- (d) all will hit at same time

87. Which one of above is a vector quantity

- (a) mass
- (b) distance
- (c) heat
- (d) displacement

88. Which one of above is a scalar quantity

- (a) velocity
- (b) momentum
- (c) displacement
- (d) speed

89. if a particle is moving with uniform speed on a circular path which one is correct

- (a) its linear velocity is constant but angular velocity is varying
- (b) its linear velocity is varying but angular velocity is constant
- (c) both linear and angular velocity are constant
- (d) both linear and angular velocity are varying

90. If a force "F" acts on a body at a perpendicular distance "d" what will be the torque exerted on body

- (a) $F \times d$
- (b) $F \times d/2$
- (c) $F \times d^2$
- (d) none of above

91. if two unlike parallel forces each of magnitude "F" are acting at a distance "r" what will be the moment of the couple

- (a) $F \times r$
- (b) $2F \times r$
- (c) $F \times r^2$
- (d) none of above

92. The force which always tends to oppose the relative motion is called

- (a) Friction force
- (b) wander wall force
- (c) force of buoyancy
- (d) none of above

93. Which one is larger in value between sliding friction and rolling friction

- (a) sliding friction
- (b) rolling friction
- (c) both are equal
- (d) none of above

94. The energy stored due to particular condition of an object is called

- (a) kinetic energy
- (b) potential energy
- (c) chemical energy
- (d) none

95. The energy stored in a compressed spring is an example of

- (a) kinetic energy
- (b) potential energy
- (c) chemical energy
- (d) none

96. The centrifuge machine works on the principle of

- (a) centrifugal force
- (b) viscosity
- (c) Buoyancy
- (d) none

97. If a force "F" acting at angle "α" moves the object a displacement of "s" the work done will be

- (a) $F \times s \times \cos \alpha$
- (b) $F \times s^2 \times \cos \alpha$
- (c) $F \times s \times 1/2 \cos \alpha$
- (d) none

98. Which act will require less effort to move a table

- (a) to apply pushing force
- (b) to apply pull force
- (c) both are same
- (d) none of above

99. For crossing a bridge a train has to travel distance of

- (a) its own length
- (b) sum of its own length and length of bridge
- (c) double of its own length
- (d) none of above

100. Magnitude of which one of the above forces is largest in nature

- (a) Gravitational force
- (b) Electrostatic force
- (c) Electromagnetic force
- (d) Nuclear forces