achievement
test(i)
ACHIEVEMENT TEST (I)
(Pre-Test)

Time: 40 Minutes

Q.1 Which of the following physical quantities is dimensionless?
   a. Mass
   b. Force
   c. Strain
   d. Stress.

Q.2 Dimension of Energy are:
   a. $M^1 L^2 T^{-2}$
   b. $M L^2 T^{-2}$
   c. $M^0 L^2 T^{-2}$
   d. $M^2 L^2 T^{-2}$

Q.3 Which of the following physical quantities has dimensions?
   a. Angle
   b. $\sin \theta$
   c. Gravitational constant
   d. Efficiency.

Q.4 Time period of oscillation of pendulum does not depend on the
   a. length of pendulum
   b. mass of pendulum bob
   c. acceleration due to gravity.
   d. none of the above factors.

Q.5 Oscillations of which of the following atoms are used as standard for time?
   a. Radium
   b. Plutonium
   c. Uranium
   d. Cesium

Q.6 Wavelength of light emitted by which of the following decaying atoms is used as standard for length?
   a. Chlorine
   b. Argon
   c. Xenon
   d. None of the above.

Q.7 There are two equal vectors. At what angle will the sum be equal to either of the component vectors?
   a. 60°
   b. 120°
   c. 0°
   d. 180°
A car gets displaced by 4 m due East and then gets displaced by 3 m due North. The vector subtraction of these two displacements is:

- 5 m in some N-E direction
- 5 m in some W-N direction
- 1 m in some N-E direction
- 5 m in some S-E direction

Cross-product of two vectors is zero, when angle between them is:

- 0°
- 90°
- 45°
- 30°

In which of following cases no work is being done?

- A car is moving uphill.
- A coolie is lifting the load
- A stone tied to a string is whirled in a circle.
- An arrow is shot from a bow.

Dimensions of angular velocity are:

- $M^0 L^1 T^{-1}$
- $M^0 L^0 T^{-1}$
- $M^0 L^1 T^{-1}$
- $M^1 L^1 T^{-1}$

The unit of solid angle is:

- steradian
- radian
- degree
- none of the above.

SI unit of intensity of light is:

- lux
- lumen
- candela
- flux.

Dimensions of angular velocity are:

- $M^1 L^1 T^{-1}$
- $M^0 L^1 T^{-1}$
- $M^0 L^0 T^{-1}$
- $M^0 L^1 T^{-2}$

Unit of energy is:

- Newton
- Joule
- Watt
- None of the above.
TEST (I) - contd.

Q.16 Unit of moment of inertia is:
   a. Kg-m²
   b. Kg-m
   c. Kg/m²
   d. Kg/m

Q.17 In the following arrangement, the tension in the string is:

   \[ \text{\text{Diagram of a string arrangement}} \]

   - a. 4 kgf.
   - b. 2 kgf.
   - c. 0 kgf.
   - d. None of the above.

Q.18 Which of the following interactions does not obey the inverse square law?
   a. Interaction between two masses.
   b. Interaction between two nuclear particles.
   c. Interaction between two charges.
   d. Interaction between two magnetic poles.

Q.19 If the velocity of launch of a projectile is doubled, its range becomes:
   a. half
   b. double
   c. one-fourth
   d. four times.

Q.20 Ball A is thrown horizontally from a cliff and another ball B is just dropped from the cliff simultaneously, then:
   a. Ball A will hit the ground first.
   b. Ball B will hit the ground first.
   c. Balls A and B will hit the ground simultaneously.
   d. Ball A will hit the ground first if thrown with a high velocity.

Q.21 Unit of torque is:
   a. Newton - metre²
   b. Newton - metre
   c. Newton
   d. Newton / metre.

Q.22 The mass of body A is greater than of body B. The two bodies possess the same amount of kinetic.
   a. A will have greater momentum
   b. B will have greater momentum
   c. A and B will have equal momentum.
   d. none of the above.

contd... P.4/
Q. 23 A body 'A' of very small mass collides with another body 'B' of big mass while travelling in the same direction. After collision,
   a. A will rebound
   b. A and B will keep on travelling in the same direction.
   c. B will rebound
   d. none of the above.

Q. 24 When velocity and radius for a body in uniform circular motion are doubled, the centripetal force becomes:
   a. 4 times
   b. 8 times
   c. 2 times
   d. No change.

Q. 25 For a simple pendulum, the tension in the string is:
   a. maximum at the mean position
   b. maximum at the extreme position
   c. unchanged during the oscillation.

Q. 26 There is a disc A and a ring B of the same mass and radius with momentum inertia $I_1$ and $I_2$ respectively. In such a situation,
   a. $I_1 > I_2$
   b. $I_1 < I_2$
   c. $I_1 = I_2$

Q. 27 Two identical hoop rings are made of wood and steel. They are allowed to roll down an inclined plane. In such a situation:
   a. wooden ring will roll down faster
   b. steel ring will roll down faster
   c. both the rings will roll down with equal speed.

Q. 28 The dimensions of gravitational potential are:
   a. $M^0 L^2 T^{-2}$
   b. $M^1 L T^{-2}$
   c. $M^0 L^2 T^{-1}$
   d. None of the above.

Q. 29 The gravitational potential is zero:
   a. On the surface of the Earth
   b. at infinity.
   c. at the centre of the Earth.

Q. 30 An Engine of a fixed power has to overcome more load, it should be operated on:
   a. a high velocity only.
   b. low velocity only.
   c. any velocity.
Q. 31 If the angle of launch of projectile is doubled, its range will get:
   a. doubled.
   b. half.
   c. three times.
   d. none of the above.

Q. 32 Maximum height gained by an object, when the angle of launch is:
   a. 90°
   b. 45°
   c. 0°
   d. 60°

Q. 33 One horse-power is equal to:
   a. 546 watts.
   b. 846 watts.
   c. 730 watts.
   d. 746 watts.

Q. 34 In the case of banked roads, which of the following components provides the necessary centripetal force?
   (Where: W: Weight, R: Normal Reaction, G: Banking angle)
   a. W sin G
   b. W Cos G
   c. R Sin G
   d. R Cos G

Q. 35 In the following situations, where will the acceleration due to gravity be maximum for the Earth?
   a. At the poles
   b. At the equator.
   c. At the centre of the Earth.
   d. At some altitude above the Earth.

Q. 36 Which of the following statements is true for moving a lawn roller?
   a. More force is needed to push it than to pull it.
   b. More force is needed to pull it than to push it.
   c. Equal force is needed to pull or push it.

Q. 37 Which of the following is not a fundamental physical quantity?
   a. Temperature.
   b. Mole.
   d. Heat.

Q. 38 A picture frame is hung on a nail using a string as shown below. The tension in the string will increase:
   ![String diagram](image)
Q. 38 contd.

a. on increasing the length of the string
b. on decreasing the length of the string.
c. Tension will remain unchanged.

Q. 39 For a body having a uniform circular motion:

a. speed is changing all the time
b. angular speed is changing all the time.
c. velocity is changing all the time.
d. acceleration is changing all the time.

Q. 40 For a body having a uniform circular motion:

a. speed is changing all the time
b. angular speed is changing all the time.
c. velocity is changing all the time.
d. acceleration is changing all the time.

Q. 41 An object tied to a string is whirled by a person. The reaction to the centripetal force will be experienced by the:

a. Object.
b. Person
c. string.
d. none of the above.

Q. 42 An object tied to a string is whirled by a person. The reaction to the centripetal force will be experienced by the:

a. Object.
b. Person
c. string.
d. none of the above.

Q. 41 Moment of inertia of a cylinder of mass M and Radius R is:

a. MR^2
b. 2 MR^2
c. 1/2 MR^2
d. 3 MR^2

Q. 42 The magnitude of the resultant vector of two vectors will be less than the magnitude of its component vectors when the angle between them is:

a. less than 90°
b. between 90° and 180°
c. more than 270°
d. None of the above.

Q. 43 If \( \vec{A} \times \vec{B} = \vec{C} \times \vec{B} \) and the angle between \( \vec{A} \) and \( \vec{B} \) is \( \Theta_1 \), and between \( \vec{C} \) and \( \vec{B} \) is \( \Theta_2 \); then:

a. \( \vec{A} = \vec{C} \)
b. \( A \sin \Theta_1 = C \sin \Theta_2 \)
c. \( A \cos \Theta_1 = C \cos \Theta_2 \)
d. None of the above.

Q. 44 The apparent weight of a person in a moving elevator lift increases when:

a. lift is moving up with a constant speed
b. lift is moving down with a constant speed
c. lift is accelerating down.
d. lift is accelerating up.

contd...P.7/
Q.45 Horizontal range of a projectile is maximum when the angle of launch is:
   a. 90°
   b. 30°
   c. 60°
   d. 45°

Q.46 At what other angle of launch, the range for the projectile will be same as one at 30°?
   a. 75°
   b. 60°
   c. 15°
   d. none of the above.

Q.47 A car, having a mass M and velocity v, has a head on collision with another car of mass 2M. Both the cars come to rest after collision. The velocity of second car is:
   a. v
   b. 2v
   c. v/4
   d. v/2

Q.48 When a body is allowed to fall freely under gravity, its apparent weight becomes:
   a. half
   b. double
   c. zero
   d. none of the above.

Q.49 Energy possessed by coal is:
   a. heat energy
   b. chemical energy
   c. radiant energy
   d. mechanical energy.

Q.50 The unit of torque is:
   a. Kilogramme - metre.
   b. Newton - metre.
   c. Joule
   d. Newton.