

Time: -3 hours

M.M.: 70

Instructions:

1. All questions are compulsory.
2. Question numbers 1 to 4 are objective type.
3. Question numbers 5 to 14 are very short answer questions. In each question internal options are given and 2 marks are allotted.
4. Question numbers 15 to 19 are short answer questions. Each question is given an internal option and 3 marks are allotted.
5. Question numbers 20 to 22 are long-range questions. In each question internal options are given and 5 marks are allotted.

Q1 Choose the correct option - 1x5 = 5

1. An example of simple linear motion is

- (a) the speed of the boat in a pond (b) the speed of the ball freely falling under gravity
(c) the speed of the projectile (d) all of the above

2. Which of the following amount is a vector

- (A) pressure (B) kinetic energy (c) Area (D) electric current

3. To maintain uniform velocity of a car on a flat road –

- (A) Net force required in the direction of motion is (B) External force equal to dynamic friction and in opposite direction is required (C) A little more force is needed in dynamic direction than dynamic friction. (D) None of the above

4. Preserves / resides in unpredictable impact.

- (A) Dynamic energy (b) Momentum (c) both (D) None of the above.

5. The SI unit of moment of inertia is-

- (a) kg m^2 (B) kg m^{-2} (c) $\text{kg}^2 \text{m}$ (d) kg m^{-1}

Q02 Fill in the blank 1x5= 5

The number of significant digits in 12300 cm is

2. If an object covers the same distance in the same time interval, its speed is called.....

3. Magnitude of zero vector is

4. Work done on an object is equal to the change in.....

5. $\vec{A} \times \vec{A} = \dots\dots\dots$

Q 03 Answer in a word or a sentence 1x5 = 5

1. What is the relative velocity?
2. What are the basic units called?
3. What is friction?
4. What is called the force of force?
5. What is the center of the moving force?

Q 04 Match the correct pair 1x5 = 5

column (A)

column (B)

- | | |
|-----------------------------------|------------------------------|
| 1. Centrifugal force | a) $t = 0$ |
| 2 Instantaneous acceleration | b) μ^2 / r |
| 3 momentum conservation | c) $\Delta k + \Delta v = 0$ |
| 4. Mechanical energy conservation | d) $\Delta p = 0$ |
| 5. Force moment | e) dv / dt |
| | f) $r \times F$ |

Q 5 The length, width and thickness of a rectangular sheet are 4.234m, 1.005m and 2.01cm respectively Find the area and volume of this sheet in appropriate meaningful digits.

Or

A new unit of length has been selected. According to which the speed of light in vacuum is 1. What is the distance between the sun and the earth in terms of the length of the new unit, light takes 8 minutes and 20 seconds to cover this distance.

Q 6 When a player throws a ball upwards from the initial speed of 29 ms^{-1} , what will be the direction of acceleration during the upward motion of the ball?

Or

What will be the velocity and acceleration at the highest point of motion in the above example.

Q.7 Explain two differences in distance and displacement.

Or

Write the definition and formula of average velocity and enamel velocity.

Q.8 Explain the triangle law of the sum of vectors by the diagram. Explain the associative rule related to the sum of vectors.

Q.9 What is \hat{i} , \hat{j} & \hat{k} .

Or

The x direction component of a vector \vec{A} is A_x and the component of y direction is A_y , then express it as two dimensional components.

Q.10 Any rain drop of m mass is falling below a uniform speed. Explain the magnitude and direction of net force on it.

Or

A block is stationary on the table while F force is acting in horizontal direction. Draw the necessary pictures on which forces are working on it. What is the net force on the block?

Q.11 Write the work energy theorem.

Or

Define kinetic energy.

Q.12 If $f = 3\hat{i} + 4\hat{j} - 5\hat{k}$ and $d = 5\hat{i} + 4\hat{j} + 3\hat{k}$, calculate the work. Explain

or

Explain Negative function with an example.

Q.13. A bike is moving at a uniform velocity of 3ms^{-1} . If 250N friction force is applied between the road and the tire, what is the power expended by the engine of the bike?

Or

Calculate the work done by lifting an object of 10kg from the surface of the earth 10m.

Q.14. What is angular velocity?

Or

Write the rule of angular momentum conservation.

Q.15. Famous relation of Physics. The moving mass of a particle, m break mass m_0 . It is between its speed v and the speed of light c . A student remembers this relationship almost correctly but forgets to set a constant. He writes $m = m_0 / \sqrt{(1-v^2)}$. Guess where. Write the correct relationship. By dimensional equilibrium, show whether this relationship is true or false.

Or

Time period of simple pendulum is $T = 2\pi\sqrt{g/l}$ is told by a student. Show whether this relationship is true or false by dimensional equation

Q.16. A person goes from the house to the market at a speed of 60ms^{-1} and immediately returns from the 40ms^{-1} speed after the market is closed. Calculate the average speed.

Or

Acceleration can be nonzero even if any moment speed is zero. Explain with an example.

Q.17 What is uniform circular motion? For this, write the sources of concentration force and concentration acceleration.

Or

Prove that the path of the projectile is parabolic.

Q.18 Explain the reason - a horse cannot run while pulling a car in an empty space.

or

A lawn mower are easier to pull than to push.

Q.19 Establish a formula for the potential energy of a spring.

Or

Definition of power Write unit and dimensional formula. Find the formula $P = F.V$.

Q.20 A cricket ball is thrown at a speed of 20ms^{-1} , making an angle of 30° above the horizontal. Calculate ($g = 10\text{ms}^{-2}$)

(a) Maximum height attained by the ball

(b) Maximum distance traveled by the ball in the horizontal

Or

A cricket player can throw a ball up to a maximum horizontal distance of 100m. To what height can the player throw the same ball above the ground?

Q.21 Where does a car get centripetal force on a flat road get its circular motion? Establish a formula for safe maximum speed of the car.

Or

A block of mass m is placed on the horizontal plane. The plane is slowly inverted until it starts gliding at an angle θ from the horizontal. Establish a relationship between the coefficient of static friction between the surface and the horizontal and angle θ of the plane.

Q.22 What is a couple (bal yugma)? Give two examples of Balayugam in daily life. Establish a formula for the moment of Balyugam and write its unit and dimensional formula.

Or

What is rotatory motion? Establish the formula for the total kinetic energy of the body moving at the rotational speed.

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