

MECHANICS (MASS, FORCE, ACCELERATION, WORK, ENERGY, MOMENTUM, VELOCITY) BASED GENERAL SCIENCE MCQ PRACTICE QUESTIONS AND ANSWERS PDF WITH EXPLANATION

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Q1. The number of significant figures in 0.00060 m is

- a) 3
 - b) 2
 - c) 1
 - d) 4
-

Q2. For a body falling freely under gravity from a height

- a) both kinetic energy as well as potential energy go on increasing
 - b) only the kinetic energy goes on increasing
 - c) only the potential energy goes on increasing
 - d) the kinetic energy goes on increasing while potential energy goes on decreasing
-

Q3. A parrot is sitting on the floor of a closed glass cage which is in a boy's hand. If the parrot starts flying with a constant speed, the boy will feel the weight of the cage as

- a) increased
 - b) reduced
 - c) unchanged
 - d) nothing can be said
-

Q4. The pressure exerted on the ground by a man is greatest

- a) when the stands with both foot flat on the ground

- b) when the stands on the toes of one foot
- c) when the lies down in the ground
- d) all of the above yield the same pressure

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Q5. A particle is projected at some angle from the surface of the planet. The motion of the particle is described by the equation; $x = t$, $y = t - t^2$. Then match the following columns and select the correct answer using the codes given below the lists.

Column I (Quantity)	Column II (Magnitude only)
A. velocity of projection	1. 1
B. acceleration	2. 2
C. time of flight	3. 2
D. maximum height attained	4. $1/4$

Choose the correct option from the codes given below:

- a) A – 2 ; B – 3 ; C – 1 ; D – 4
- b) A – 2 ; B – 1 ; C – 4 ; D – 3
- c) A – 1 ; B – 2 ; C – 3 ; D – 4
- d) A – 4 ; B – 3 ; C – 2 ; D – 1

Q6. Two masses m and $9m$ are moving with equal kinetic energies. The ratio of the magnitudes of their momenta is

- a) 3 : 1
- b) 1 : 3
- c) 1 : 1
- d) 1 : 9

Q7. Which of the following is not a vector quantity?

- a) Force
 - b) Velocity
 - c) Displacement
 - d) Volume
-

Q8. Swimming is possible on account of

- a) third law of motion
 - b) second law of motion
 - c) first law of motion
 - d) Newton's law of gravitation
-

Q9. A boy has four options to move a body through 3m as indicated. In which case is maximum work done?

- a) Push over smooth rollers
 - b) Lift vertically upwards
 - c) Push over an inclined plane
 - d) Push on a plane horizontal surface
-

Q10. A solid sphere is rotating in free space. If the radius of the sphere is increased keeping mass same which one of the following will not be affected ?

- a) Moment of inertia
 - b) Angular momentum
 - c) Angular velocity
 - d) Rotational kinetic energy
-

Q11. Light year is

- a) the distance travelled by light in free space in one year.
 - b) time taken by light to travel from sun to earth.
 - c) light emitted by the sun in one year.
 - d) time taken by earth to go once around the sun.
-

Q12. The numerical ratio of average velocity to average speed is

- a) always more than one
- b) always equal to one
- c) always less than one
- d) equal to or less than one

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Q13. A spherical body moves with a uniform angular velocity (ω) around a circular path of radius r . Which one of the following statements is correct?

- a) The body has a radial acceleration $2\omega^2 r$ directed away from the centre of the path
 - b) The body has no acceleration
 - c) The body has a radial acceleration $\omega^2 r$ directed toward centre of path
 - d) The body has an acceleration $\omega^2 r$ tangential to its path
-

Q14. A jet engine works on the principle of conservation of

- a) energy
 - b) angular momentum
 - c) linear momentum
 - d) mass
-

Q15. A vector quantity is a physical quantity which needs

- a) magnitude
- b) direction
- c) both (a) and (b)
- d) time

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Answers to the above questions :

Q1. Answer: (b)

According to rules of significant figures.

Q2. Answer: (d)

Q3. Answer: (c)

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Q4. Answer: (b)

Q5. Answer: (a)

A ? (2) ; B ? (3) ; C ? (1) ; D ? (4)

Option: (A) $U_x = \frac{dx}{dt} = 1$ and $U_y = \frac{dy}{dt} = 1 - 2t$

? $U_{t=0} = \sqrt{U_x^2 + U_y^2} = \sqrt{1^2 + 1^2} = \sqrt{2}$ m/s.

Option: (B) $a_x = \frac{d^2x}{dt^2} = 0$

$a_y = \frac{d^2y}{dt^2} = -2$

Option: (C) For the time of flight,

$y = 0$

or $0 = t - t^2$

? $t = 1$ s.

Option: (D) For maximum height, $t = \frac{1}{2}$ s.

? $H = t - t^2 = \frac{1}{2} - \left(\frac{1}{2}\right)^2 = \frac{1}{4}$ m.

Q6. Answer: (b)

Q7. Answer: (d)

Q8. Answer: (a)

When the swimmer push some water in backward direction, then he get some momentum in forward direction from water & starts to swim. This is according to Newton's third law. (action-reaction force).

Q9. Answer: (b)

Q10. Answer: (b)

Q11. Answer: (a)

1 light year = speed of light in vacuum \times no. of seconds in one year

$$= (3 \times 10^8) \times (365 \times 24 \times 60 \times 60) = 9.467 \times 10^{15} \text{ m.}$$

Q12. Answer: (d)

It is equal to or less than one.

Q13. Answer: (c)

A body moving with a uniform angular velocity ω on a circular path of radius r has radial acceleration equal $\omega^2 r$ directed towards the centre of the path.

Q14. Answer: (c)

Q15. Answer: (b)

A physical quantity which can be specified completely by giving a single number and the appropriate unit alongside it is known as a scalar quantity. Scalar quantities that have the same physical units can be added or subtracted according to the strict mathematical rules of algebra for numbers.

There are a lot of physical quantities which cannot be described by just a single number of physical units. For example in order to fetch a ball which is thrown it is not only important to know the speed with which it is thrown but also the direction in which it is thrown so that it is easier to locate the ball. Physical quantities which are specified completely by giving a number of units (magnitude) and a direction alongside it are known as vector quantities.

Thus we see that a vector quantity has **both magnitude and direction**.

Thus, we see that the correct answer to this question is (B).

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