Chapter 2 : Force and laws of Motion

Section A

1. Which of the following has the largest inertia?

   a) A pin *b)* Your physics notebook *c)* An inkpot
   d) Your body.

2. SI unit of force is

   (*a*) metre/sec (*b*) Sec/metre (*c*) dyne
   (d) Newton

3. An unbalanced force acts on body. The body

   (a) must remain at rest *(b)* must move with uniform velocity
   (c) must be accelerated *(d)* must move along a circle.

4. By applying a force of 1N, one can approximately hold a body of mass.

   a) 100mg (*b*) 100g (*c*) 1kg (*d*) 10kg

5. If no force acts on a body, it will

   (a) gets de shaped *(b)* move with increasing speed
   (c) break *(d)* either remain at rest or move in straight line

6. A coin flicked across a table stops because

   (a) no force acts on it *(b)* it is very heavy
   (c) the earth attracts it. *(d)* the table exerts a frictional force on it

7. Newton's second law establish relation between

   (a) force and velocity (*b*) mass and velocity
   (c) force and acceleration (*d*) mass and acceleration
   (e) Both c and d

8. A force of a given magnitude acts on a body. The acceleration of the body depends on the

(*a*) mass of the body (*b*) volume of the body
(*c*) density of the body (*d*) shape of the body

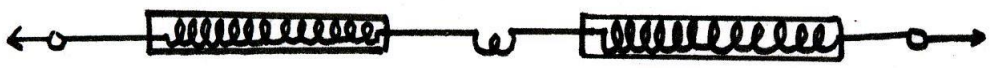
9. The momentum of a body of given mass is proportional to its

(*a*) volume (*b*) shape (*c*) colour (*d*) speed

10. A body at rest can have

(*a*) speed (*b*) energy
(*c*) momentum (*d*) velocity

11. Consider two spring balance hooked as shown in fig. We pull them in opposite directions. If the reading shown by A is 1.5N, the reading shown by B will be



(*a*) 1.5 N (*b*) 2.5 N (*c*) 2.0 N (*d*) Zero

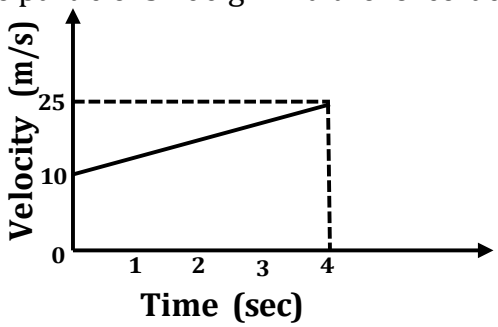
Section B

1. Define balanced and unbalanced forces.
2. What is the law of inertia? Give example of inertia of rest.
3. Explain why
   (a) the passenger fall backward when a bus suddenly starts
   (b) We beat the carpet to remove dust particles
   (c) It is advised to tie the luggage with a rope on the roof of buses
4. In oil tankers some space is left at the top while filling them. Explain.
5. State Newton's I law of motion and deduce it from II law.
6. Why does a moving ship take a much longer time to stop than a car when brakes are applied to both?
7. What is the relation between Newton and a Dyne?
8. Why does the electric fan continue to rotate for some time after the current is switched off?
9. Why does a cricketer lower his hands when holding a catch?

Section C

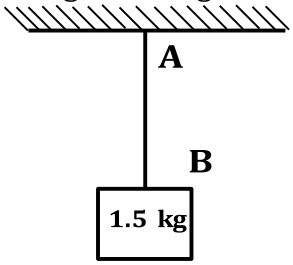
1. A force produces an acceleration of 0.5 m/s^2 in a body of mass 3 kg. If the same force acts on a body of mass 1.5 kg, how much acceleration will be produced in it?

2. The velocity - time graph of a particle moving on the ground is shown in the figure. if the mass of the particle is 100 g. Find the force acting on the particle.



3. A block of mass 1.5 kg is hanging from a fixed support through a string AB.

(a) Find the force exerted by the string on the block.
(b) Find the force exerted by the block on the string.



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Chapter: Force and Laws of Motion

Section A

1. Action – reaction forces

   a) act on same body
   b) act along different lines
   c) act in the same direction
   d) act on different bodies

2. Athlete runs some distance before taking a long jump so that he may

   a) acquire large inertia of motion *b)* overcome inertia of rest
   c) get inertia of direction *d)* acquire kinetic energy

3. A body of mass 10 kg and velocity 10 m/s collides with a stationary body of mass 5 kg. After collision, both bodies stick to each other. The common velocity would be

   a) 3/20 m/s *b)* 20/3 m/s *c)* 10/3 m/s *d)* 3/10 m/s

4. The principle of Conservation of Momentum states that Linear Momentum of a system.

   a) cannot be changed *b)* cannot remain constant
   c) can be changed only if internal forces act.
   d) can be changed only if external forces act.

5. The rate of change of momentum is measured in

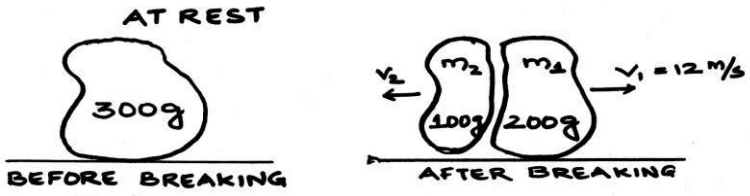
a) kg ms^{-2} *b)* kg ms^{-1} *c)* kg m *d)* kg

Section B

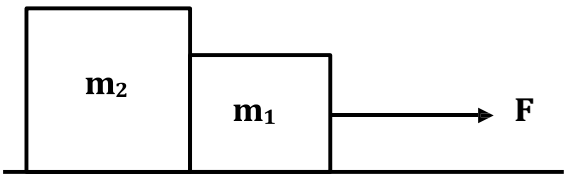
1. State Newton"s III law of motion.
2. Give an example to demonstrate Newton"s III law of motion.
3. Explain why it is difficult for a fireman to hold a hose, which ejects large amounts of water at a high velocity?
4. It is difficult to stop a cricket ball than a tennis ball moving with same speed. Explain why?
5. When you jump from a certain height, why do you bend your legs rather than keep them rigidly straight?
6. Answer the following questions
   (i) Force of action reaction act on two different bodies or same body.
   (ii) Do action reaction cancel each other?
   (iii) Do action reaction produce accelerations of same magnitude?
   (iv) Force of reaction appears after some time of force of action. Is it correct?

Section C

1. A body of mass 300g kept at rest breaks into two parts due to internal forces. One part of mass 200 g is found to move at a speed of 12 m/s towards east. What will be the velocity of other part?



2. Two blocks of mass m_1 = 1 kg and m_2 = 2 kg are placed in contact on a friction less horizontal surface. A force of 10 N is acting on m_1. What is the acceleration of m_1 and m_2. What is the value of action and reaction?



3. A body of mass „m" moving with constant velocity „v" hits another body of same mass moving with same velocity „v" but in opposite direction and sticks to it. What is the velocity of compound body after collision?
4. A boy weighing 30 kg is riding a bicycle weighing 50 kg. If the bicycle is moving at a speed of 9 km/ h towards the west, find the linear momentum of the bicycle - boy system in SI units.