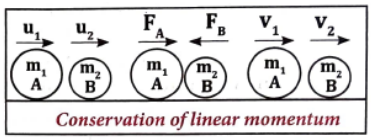
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Answers Key:

Long Answers

1. Law states that "There is no change in the linear momentum of a system of bodies as long as no net external force acts on them"
   Proof:



   Let two bodies A and B having masses m1 and m_2 move with initial velocity u_1 and u_2 in a straight line
   Let the velocity of the first body be higher
   than that of the second body. i.e., $u_1 > u_2$
   During an interval of time t second, they tend to have a collision. After the impact, both of them move along the same straight line with a velocity v_1 and v_2 respectively.
   Force on body B due to A,
   $F_A = m_2 (v_2 - u_2)/t$
   Force on body A due to B,
   $F_B = m_1 (v_1 - u_1)/t$
   By Newton's III law of motion
   Action force = Reaction force
   $F_B = -F_A$

$$\frac{m_1 (v_1 - u_1)}{/} = \frac{-m_2 (v_2 - u_2)}{/}$$

$$m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2 - \cdots - (A)$$

   The above equation confirms in the absence of an external force, the algebraic sum of the momentum after collision is numerically equal to sum of the momentum before collision. Hence the law of conservation of linear momentum is proved.

Short Answer

2. Mass ratio of two bodies is 3:4
   So let's assume
   Mass of smaller body = m_1 =3 kg
   Mass of bigger body = m_2=4 kg
   Acceleration due to force applied by bigger body =a_2 = 12 ms^{-2}
   To find: Acceleration due to the same force on the smaller body= a1 =?
   According to Newton's second law of motion.

$$F = m \times a$$
$$F_1 = m_1 a_1$$
$$F_1 = 3a_1$$
$$F_2 = m_2 a_2$$
$$F_2 = 4 \times 12 = 48 \text{ N}$$

   As the force is the equal

$$F_1 = -F_2$$
$$3a_1 = -48$$
$$\therefore \quad a_1 = -\frac{48}{3} = -16 \text{ ms}^{-2}$$

   So acceleration due to the same force on the
   smaller body a_1 = 16 ms^{-2}

Very Short Answer

3. The inherent property of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force, is known as 'inertia.
   (i) Inertia of rest
   (ii) Inertia of motion
   (iii) Inertial of direction

4.

No	Mass	Weight
(i)	It is the quantity of matter contained in the body.	It is the gravitational force exerted on' a body due to the gravity.
(ii)	It is a scalar quantity	is a vector quantity.
(iii)	SI unit is kg (kilogram)	SI unit is N (newton)
(iv)	Mass of a body remains the same at any point on the Earth	Weight of a body varies from one place to another place on the Earth.
(v)	Measured using a physical balance	Measured using a spring balance.

5. (i) When a number of like or unlike parallel forces act on a rigid body and the body is in equilibrium then the algebraic sum of moments in clockwise direction is equals to the algebraic sum of moments in anticlockwise direction.
(ii) Moment in clockwise direction = Moment in anticlockwise direction
$F_1 \times d_1 = F_1 \times d_1$
6. (i) According to Newton's second law, "the force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force"
(ii) F= m xa (Force = mass x acceleration)

Choose the correct answer

7. (c) change of momentum
8. (c) both a & b
9. (c) cycling
10. (c) 98×10^4 dyne
11. (d) M
12. (d) both a and c

Match the following

13.

	Column I	-	Column II
(a)	Newton's I law	-	Stable equilibrium of a body
(b)	Newton's II law	-	Law of force
(c)	Newton's III law	-	Flying nature of bird
(d)	Law of conservation of linear momentum	-	propulsion of a rocket

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