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Solution 1
The product of mass and velocity of a body is called momentum.
Solution 2
Momentum is the measure of quantity of motion of a body
Solution 3
The SI unit of momentum is kilogram meters per second (kg.m/s)
Solution 4
Momentum is a vector quantity and is dirceted along the direction of velocity.
Solution 5
The total momentum of the bullet and the gun before firing would be zero because velocities of both of them will be zero.
Solution 6
Momentum has its SI unit as kilogram meters per second(kg.m/s)
Solution 7
Momentum of a body of mass 'm' and velocity 'v' will be
p = m x v
Solution 8
Balanced forces cannot produce motion in a body but can its shape.
Solution 9
Frictional force slows down a moving bicycle when we stop pedaling it.
Solution 10
The given statement is false.
Solution 11
Force of gravity causes this change in speed.
Solution 12
Inertia is the property of bodies to resist a change in their state of rest or motion
Solution 13
Newton's first law of motion is also known as Galileo's law of inertia.
Solution 14
Object B has more inertia. Since mass is a measure of inertia of a body and object B has greater mass, so it will have greater inertia.
Solution 15
Isaac Newton gave the laws of motion.
Solution 16
Force is a vector quantity.
Solution 17
The speed of the running bull should be multiplied with its mass to get its momentum.
Solution 18
a) Mass
b) forward
c) backward
d) inertia
e) friction; air
Solution 19
Since the speed of tennis ball and cricket ball is same, the momentum of cricket ball will be higher due to its mass being greater than mass of tennis ball. So, less force is required to stop a tennis ball than to stop a cricket ball.
Solution 20

p = m x v
This equation signifies that momentum of a body is the product of its mass and its velocity.
Here, p is momentum of the body
m is the mass of the body
v is the velocity of the body.
Solution 21
A karate player can break a pile of tiles with a single blow because he strikes the pile with his hand very fast. In doing so, the large momentum of his hand is reduced to zero in a very short time. This exerts a large force on the pile of tiles which is sufficient to break them apart.
Solution 22
Mass of the toy car,
m = 200 g = 0.2 kg
Speed, v = 5 m/s
Momentum, p = m x v
= 0.2 x 5 = 1 kg.m/s
Solution 23
Mass of car = 1500 kg
Velocity v_1 = 36 km/hr = 10 m/s
Momentum p_1 = 1500 x 10 = 15000 kg.m/s
Velocity v_2 = 72 km/hr = 20 m/s
Momentum p_2 = 1500 x 20 = 30000 kg.m/s
Change in momentum = p_2-p_1
= 30000 - 15000 = 15000 kg.m/s
Solution 24
Mass of the body, m = 25 kg
Momentum p = 125 kg.m/s
p = m x v

Mass of the body, m = 25 kg
Momentum p = 125 kg.m/s
p = m x v

$$v = \frac{P}{m} = \frac{125}{25} = 5 \text{ m/s}$$

Velocity of the body is 5 m/s

Solution 25
a) Mass of elephant = 2000kg
Velocity = 5 m/s
Momentum = 2000 x 5 = 10000 kg.m/s
b) Mass of bullet = 0.02 kg
Velocity = 400 m/s
Momentum = 0.02 x 400 = 8 kg.m/s
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Solution 26
Balanced forces can change the shape of the object. For example, when a balloon is pressed between hands, then balanced forces (equal and opposite forces) act on the balloon due to which the shape of the balloon changes.
Solution 27
Inertia of motion is the property of a body due to which it resists a change in its state of uniform motion. For eg., if there is no air resistance and no friction to oppose the motion of a moving bicycle, it will go on moving forever.
Solution 28

Newton's first law of motion states that a body at rest will remain at rest, and a body in motion will continue in motion in a straight line with a uniform speed unless it is compelled by an external force to change its state of rest or of uniform motion. For example, a book lying on a table remains on the table unless we lift it with the force of our hands. And, on a frictionless surface, a moving car continues to be in the state of motion until brakes are applied on it.

Solution 29

Inertia of a body depends on its mass. A cricket ball has more inertia than a rubber ball of the same size because it has more mass than the rubber ball.

Solution 30

When a bus starts suddenly, its passengers tend to fall backwards because due to their inertia, the passengers tend to remain in a state of rest even when the bus starts moving.

Solution 31

When a bus stops suddenly, its passengers tend to fall forward because due to their inertia, the passengers tend to remain in a state of motion even though the bus has come to rest.

Solution 32

When a hanging carpet is beaten with a stick, the carpet moves to and fro with the force of the stick while the dust particles remain in their state of rest on account of their inertia and thus dust particles separate out from the carpet.

Solution 33

When a tree is shaken, the tree moves to and fro while the fruits and leaves remain in their state of rest on account of their inertia and thus fruits and leaves separate from the tree and fall from the tree.

Solution 34

It is dangerous to jump out of a moving bus because the jumping man, who is moving with the high speed of the bus would tend to remain in state of motion due to inertia even on falling to the ground and get hurt due to resistance offered by the ground.

Solution 35

Mass of car, m = 10 kg

Momentum = m x v

a) Velocity, v = 5 m/s Momentum = 10 x 5 = 50 kg.m/s

b) Velocity, v = 20 cm/s = 0.2 m/s Momentum = 10 x 0.2 = 2 kg.m/s

c) Velocity, v = 36km/hr = 10 m/s Momentum = 10 x 10 = 100 kg.m/s

Solution 36

a) Momentum is the physical quantity which is the measure of the quantity of motion of a moving body. It depends on mass and velocity of the body.

b) Mass of body = 5 kg

Velocity v_1 = 20 m/s

Momentum p_1 = 20 x 5 = 100 kg.m/s

Velocity v_2 = 0.2 m/s

Momentum p_2 = 5 x 0.2 = 1 kg.m/s

Change in momentum = p_2- p_1= 1-100 = -99 kg.m/s (Negative sign shows that momentum decreases)

Solution 37

a) Force is an influence which tends to set a stationary body in motion or stop a moving body; or which tends to change the speed and direction of a moving body; or which tends to change the shape and size of a body.

b) Various effects of force are

i) A force can move a stationary body.

ii) A force can stop a moving body.

iii) A force can change the speed of a moving body.

iv) A force can change the direction of a moving body.

v) A force can change the shape and size of a body.

Solution 38

a) Kicking a stationary football.
b) Applying brakes to a moving bicycle.
c) Pressing an accelerator to speed up a moving car.
d) A moving cricket ball hit by a bat.
e) Flattening of dough by a rolling pin to make chapatis.

Solution 39

a) If the resultant of all the forces acting on a body is zero, the forces are called balanced forces. These forces do not change the state of rest or of uniform motion of a body but can change the shape of the body. For example, when a balloon is pressed between hands, then balanced forces (equal and opposite forces) act on the balloon due to which the shape of the balloon changes.

If the resultant of all the forces acting on a body is not zero, the forces are called unbalanced forces. These forces change the state of rest or of uniform motion of a body. For eg., if we push a toy car lying on the ground, it starts moving due to the unbalanced force exerted by our hands.

b) When we press a rubber ball between our hands, balanced forces acts on it and hence its shape changes.

Solution 40

a) When a bus takes a sharp turn, the passengers tend to fall sideways because of their inertia or their tendency to continue moving in a straight line.

b) Road accidents at high speeds are much worse than road accidents at low speeds because the momentum of vehicles at high speeds is very high and causes a lot of damage to the vehicles and injuries to the passengers during collision.

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