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Subject - PHYSICS

CLASS - VIII

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CHAPTER - 3 (LAWS OF MOTION)

3(B) NEWTON'S FIRST LAW OF MOTION AND INERTIA

Q1: State Newton's first law of motion?

Ans: It states that, if a body is in a state of rest, it will remain in state of rest and if it is ⁱⁿ the state of motion, it will remain moving in the same direction with same speed unless acted upon by an external force.

Q2: Define Inertia according to Newton's first law of motion.

Ans: Inertia is defined as the property of a body due to which it tends to retain its state of rest or of a motion. It is the inherent property of a body.

Q3: Define Force according to Newton's first law of motion.

Ans: Force is that external cause which tends to change the state of rest or the state of motion of a body.

Q4: Give two examples of force.

Ans (a) A Book lying on a table gets displaced from its place when it is pushed; so here pushing is a force applied

(b) A moving Bicycle stops when a retarding force applied by brakes on its wheels. Here retarding force acts on Bicycle

Q5: Give two examples to show that greater the mass, greater will be the inertia of a body.

Ans:- (a) Large force is required to set a loaded trolley in motion than an unloaded trolley because ^a loaded trolley has more mass than unloaded trolley $\therefore$ loaded trolley has more inertia.

(b) A Cricket ball is more massive than a tennis ball. If both the balls are moving with the same velocity, it is more difficult to stop the cricket ball ~~than~~ in comparison to the tennis ball, because cricket ball being ^{more} massive has large inertia than a tennis ball.

Q6:- Name two kinds of Inertia.

Ans:- (1) Inertia of rest (2) Inertia of direction

Q7:- Give one example of each of the following.

(a) Inertia of rest (b) Inertia of motion

Ans (a) Inertia of rest :- $\rightarrow$ When a hanging carpet is beaten with a stick, dust particles start falling out of it because of ~~in~~ inertia of rest.

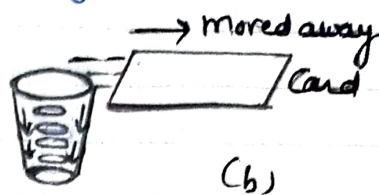
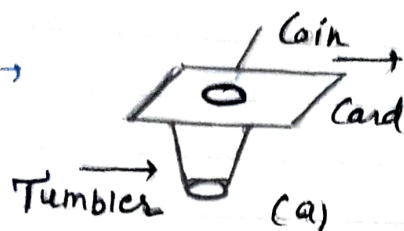
(b) Inertia of motion :- $\rightarrow$ When a passenger jumps out of a moving train, he falls down because of inertia of motion.

Q8:- Why does a person fall when he jumps out from a moving train?

Ans Inside the train, whole body of a person is in the state of motion with train. On jumping out of the train, the lower part of his body comes to rest but upper part of body still remains in motion due to inertia of motion. So, he falls in the direction of motion of train and gets hurt.

Q9 :→ Why does a coin placed on a card, drop in to the tumbler when the card is rapidly flicked with the finger?

Ans :→



When the card is flicked; force acts on the card for a moment and it moves away. But the coin kept on it does not move forward remains at its place due to inertia of rest and further it falls down in to the tumbler due to force of gravity.

Q10 :→ Why does a Ball thrown vertically upwards in a moving train, come back to the thrower's hand?

Ans10 :→ When the ball was thrown, it was in motion along with the person and train. ^{The} Ball remains in the forward motion during the time it is in air. The person, air inside the train and ball all move ahead by same distance due to inertia of motion. So, the ball falls back to the thrower's hand.

Q11 :→ People often shake Branches of a tree for getting down its fruits why?

Ans :→ When the stem of the tree are shaken, they come in motion while the fruits due to inertia of rest remains in the state of rest. Therefore massive and weakly attached fruits get detached from the branches and fall down due to gravity force.

Q12 :→ Explain the following :→

(a) When a train suddenly moves forward, the passenger standing in the compartment tends to fall backwards. Why is it so?

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Ans (a) The lower part of the passenger's body is in close contact with train. So as the train starts moving, this lower part comes in motion at once but upper part due to inertia of rest does not come in motion simultaneously. Therefore it tends to remain at same place. So, lower part of body moves ahead but upper part is left behind. ^{hence} passenger tends to fall backwards.

Q(13) → Explain why it is advantageous to run before taking a long jump.

Ans :→ Before taking a long jump, person does running because by doing so, he brings his entire body in the state of motion. So when body comes in motion, it becomes easier for him to take a long jump.

Q14 :→ Explain why dust particles are removed from a carpet by beating it?

Ans 14 :→ The part of the carpet, where the stick strikes, comes in motion at once while the dust particles get settled on its fur and remain in rest position due to inertia of rest. Thus part of the carpet moves ahead with stick, leaving behind the dust particles which fall down due to earth's force of gravity.

Q15 :→ What is the need of force according to Newton's first law of motion?

Ans 1 → Force is required to accelerate or decelerate a body.

Q16 :→ Write S.I and C.G.S units of force.

Ans :— S.I unit of force is Newton (N)
C.G.S " " " is dyne