



# PHYSICS

## BOOKS - NCERT PHYSICS (HINGLISH)

### FORCE AND LAW OF MOTION

#### Force And Law Of Motion

1. Which of the following statement is not correct for an object moving along a straight path in an accelerated motion?

- A. Its speed keeps changing
- B. Its velocity always changes
- C. It always goes away from the earth
- D. A force is always acting on it

**Answer: C**



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**2. According to the third law of motion , action and reaction**

A. always act on the same body

B. always act on different bodies in  
opposite directions

C. have same magnitude and direction

D. act on either body at normal to each  
other

**Answer: B**



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3. A goalkeeper in a game of football pulls his hands backwards while holding the ball shot at the goal. This enables the goalkeeper to

A. exert larger force on the ball

B. reduce the force exerted by the ball on hands

C. decrease the rate of change on momentum

D. Both B & C

**Answer: D**



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4. The inertia of an object tends to cause the object

A. to increase its speed

B. to decrease its speed

C. to resist any change in its state of motion

D. to decelerate due to friction

**Answer: C**



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5. A passenger in a moving train tosses a coin which falls behind him. It means that motion of the train is

A. accelerated

B. uniform

C. retarded

D. along circular tracks

**Answer: A**



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6. An object of mass  $2kg$  is sliding with a constant velocity of  $4ms^{-1}$  on a frictionless horizontal table. The force required to keep the object moving with the same velocity is

A. 32N

B. 0N

C. 2N

D. 8N

**Answer: B**



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7. smoke precipitator work on the principal of :

A. mass



B. energy

C. momentum

D. velocity

**Answer: C**



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**8.** A water tanker filled up to  $\frac{2}{3}$  of its height is moving with a uniform speed. On sudden application of the brake, the water in the tank would

A. move backward

B. move forward

C. be unaffected

D. rise upwards

**Answer:**



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9. There are three solids made up of aluminum, steel and wood, of the same shape

and same volume. Which of them would have highest inertia?



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**10.** Two balls of the same size but different materials, rubber and iron are kept on the smooth floor of a moving train. The brakes are applied suddenly to stop the train. Will the balls start rolling? If so, in which direction? Will they move with the same speed? Give reasons for your answers.



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**11.** Two identical bullets are fired one by a light rifle and another by a heavy rifle with the same force. Which rifle will hurt the shoulder and why?



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**12.** A horse continues to apply a force in order to move a cart with a constant speed. Explain why?



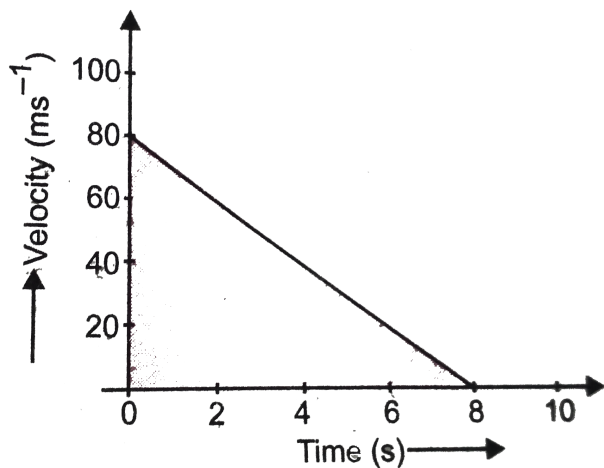
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**13.** Suppose a ball of mass  $m$  is thrown vertically upward with an initial speed  $v$ , its speed decreases continuously till it becomes zero. Thereafter, the ball begins to fall downward and attains the speed  $v$  again before striking the ground. It implies that the magnitude of initial and final momentums of the ball are same. Yet, it is not an example of conservation of momentum. Explain why?



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**14.** Velocity versus time graph of a ball of mass  $50g$  rolling on a concrete floor shown in (figure) Calculate the acceleration and frictional force of the floor on the ball.



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**15.** A truck of mass  $M$  is moved under a force  $F$ . If the truck is then loaded with an object equal to the mass of the truck and the driving force is halved, then how does the acceleration change?



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**16.** Two friends on roller-skates are standing  $5m$  apart facing each other. One of them throws a ball of  $2kg$  towards the other, who

catches it. How will this activity affect the position of the two? Explain your answer.



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**17.** Water sprinkler used for grass lawns begins to rotate as soon as the water is supplied. Explain the principle on which it works.



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**18.** Using second law of motion, derive the relation between force and acceleration. A bullet of  $10g$  strikes a sand-bag at a speed of  $10^3ms^{-1}$  and gets embedded after travelling  $5cm$ . Calculate

(i) the resistive force exerted by the sand on the bullet (ii) the time taken by the bullet to come to rest.



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**19.** Derive the unit of force using the second law of motion. A force of  $5N$  produces an acceleration of  $8ms^{-2}$  on a mass  $m_1$  and an acceleration of  $24ms^{-2}$  on a mass  $m_2$ . What acceleration would the same force provide if both the masses are tied together?



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**20.** What is momentum? Write its *SI* unit. Interpret force in term of momentum.

Represent of the following graphically

(a) momentum versus velocity when mass is fixed.

(b) momentum versus mass when velocity is constant.



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