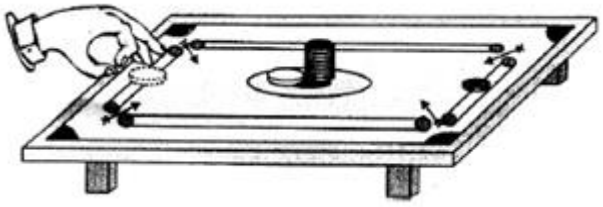
## Very Short Answer Type Question – 1 Mark

1) Name the forces (types of forces) when their resultant force acting on a body is not zero.
2) What does a bowler tend to gain during running from a long distance before he bowls from the take off line?
3) Why is it advised to tie any luggage kept on the roof of a bus with a rope?
4) A ball is moving over a horizontal smooth surface with a constant velocity. What type of forces are acting on the ball?
5) Name the factor on which the inertia of a body depends?
6) A passenger in a moving train tosses a coin which falls behind him. From this incident, what can you predict about motion of train. [NCERT Exemplar]
7) A water tanker filled up to 2/3rd of its height is moving with a uniform speed. On sudden application of the brake, in which direction the water in the tank would flow [NCERT Exemplar]
8) Which one has greater inertia: a stone of mass 1 kg or a stone of mass 5 kg?
9) Which law of motion defines the force?
10) Name the physical quantity which is determined by the rate of change of linear momentum.
11) If the mass of a body is doubled what will happen to its acceleration, if the applied force remains constant?
12) Using a horizontal force of 200 N, we intend to move a wooden cabinet across a floor at a constant velocity. What is the friction force that will be exerted on the cabinet?
13) State Newton's third law of motion.
14) Why is glass or chinaware packed with straw?
15) 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 more and why? [NCERT Exemplar]

## Very Short Answer Type Question – 2 Marks (30 Words)

1) Two ball of same size but of 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 answer. [NCERT examplar]
2) Apart from changing the magnitude of velocity of an object (or) changing the direction of motion of an object what other changes can force bring on an object?
3) No force is required to move an object with a constant velocity. Why?
4) What are the changes possible on an object at rest if we apply on it:
   a. A balanced force
   b. An unbalanced force
5) In the figure below, a pile of similar coins is hit very strongly at the bottom of the pile by a striker.



What will happen to the

a. Lowest coin
b. Rest of the coin

Why?

6) Give a simple experiment to illustrate the inertia at rest.

7) Give reasons:
   a. Why does a rider fall in forward direction when a running horse stips suddenly?
   b. Why is it easier to stop a tennis ball in comaprision to a cricket ball moving with the same speed?

8) State the source of centripetal force that our earth requires to revolve around the sun . List the factors on which this force depends.

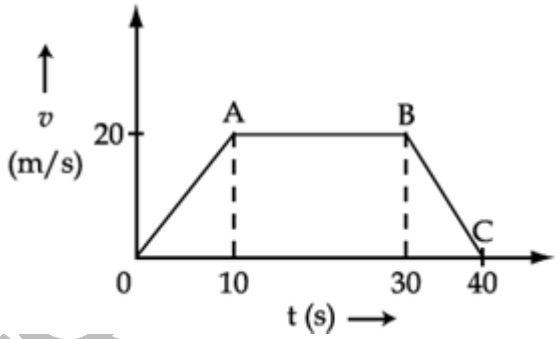
9) Define force and momentum

10) What would happen if a fielder stops the fast moving ball suddenly? Justify your answer.

11) Calculate the force required to produce an acceleration of $2ms^{-2}$ in a body of mass 10 kg.

12) Answer these:
(a) Define momentum of a body
(b) A ball is thrown vertically upward. Whta is its momentum at the highest point?

13) (a) Define force and give its SI unit.
(b) For a 2 kg mass, the v – t graph is given find the force expirence by the mass in OA, AB and BC




14) Give reason for the following :
(a) When a bus at rest starts suddenly, a standing passenger tends to fall backward.
(b) A cricketer lowers his hands while catching a ball.

15) Passengers are jerked forward when a moving bus stops suddenly. Explain why?

16) Give reasons for:
   a. when a carpet is beaten with stick, dirt comes out of it
   b. it is difficult for a fireman to hold a hose which ejects large amount of water at high velocity

17) (a) Why is it advisable to tie luggage kept on the roof of a bus with rope?
(b) A batsman hits a cricket ball which then rolls on a level ground. After covering a short distance why does the ball stop?

18) When two spring balances joined at their free ends, are pulled apart, both show the same reading Explain.

19) Firing a bullet from a gun, results in recoil of gun. Give reason.

20) When a horse pulls a cart, by Newton's III law the cart also pulls the horse with equal and opposite force, then how does the motion of horse, cart and system takes place?

21) According to the third law of motion when we push on an object, the object pushes back on us with an equal and opposite force. If the object is a massive truck parked along the roadside, it will probably not move. A student justifies this by answering that the two opposite and equal forces cancel each other. Comment on this logic and explain why the truck does not move. [NCERT]

## Short Answer Type Question – 3 Marks (50 Words)

1) When are the forces acting on a body are said to be balanced? Give example . what type of change can the balance dforce bring about in an object?

2) State any three changes that force can bring about on a body. Give one example of each.

3) State Newton's first law of motion. What is inertia? Why some of the leaves get detached from a tree if we vigorously shake its branches?

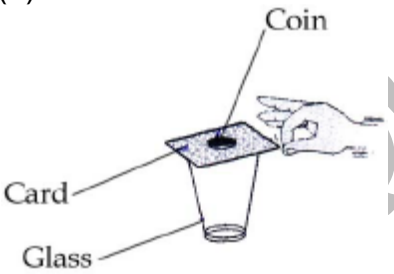
4) When a force acts on an object, it accelerates? What do you observe when two equal and opposite forces act on an object?

5) (a) Define the term 'Inertia'. Name the physical quantity which is its measure.
(b) Why do you fall in the forward direction when a moving bus brakes to a stop and fall backwards when it accelerates from rest?

6) A body at rest opposes the forces which try to move it. Name the property called, and give its one example.

7) (a) Why do we jerk wet clothes before spreading them on clothes line?
(b) The fruits fall off the branches when a strong wind blows. Give reason.

8) (a) State Newton's first law of motion




(b) In the above experimental set-up, a student gives the card a sharp, fast horizontal flick with a finger. (i) What will happen to the coin? (ii) State reason for your answer.

9) Explain the use of seat belts in car. Which out of the following has more inertia :
(a) a five rupee coin or a one rupee coin
(b) a bicycle or a truck?

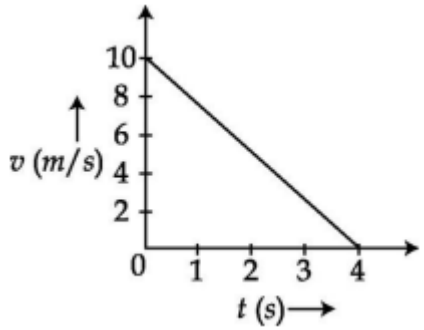
10) State the source of centripetal force that a planet requires to revolve around the sun. On what factors does this force depend? Suppose this force suddenly becomes zero, then in which direction will the planet begin to move if no other celestial body affects it? Justify your answer.

11) Mention two factors which determine momentum of a body.

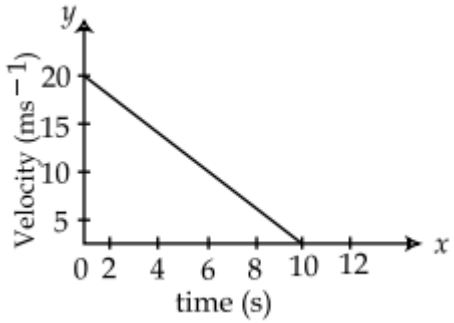
12) A man throws a ball of mass 0.5 kg vertically upward with a velocity of 25 m/s. Find:
i. the initial momentum of the ball

ii. momentum of the ball at the half way mark of the maximum height (given g = 10 $m/s^2$)

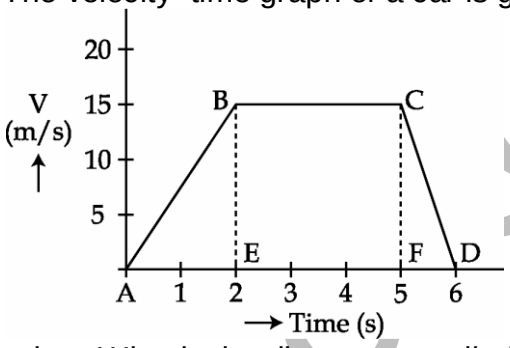
13) (a) An object of mass 200 kg is accelerated uniformly from a velocity of 10 m/s to 20 m/s in two seconds, Calculate:
   i. initial momentum
   ii. Final momentum of the object
   iii. Magnitude of the force exerted on the object
   (b) Does momentum has direction? If yes, how is it specified?
   (c) State two factors on which change of momentum depends.
14) A man pushes a box of mass 50 kg with force of 80 N. What will be the accelaration of the box due to this force? What will be the acceleration if mass were doubled?
15) A body of mass 5 kg starts from rest and accelerates uniformly to attain a velocity of 4 m/s in 10 s. Calculate :
   (i) the force needed to cause this change
   (ii) the momentum at the start
16) State newtons second law of motion. Write its mathemetical expression . How can you state first law from it?
17) How can Newton's first law of motion be obtained from the second law of motion?
18) State Newton‘s second law of motion and prove that Newton‘s first law of motion is a special case of Newton‘s second law of motion.
19) (a) State newtons second law of motion.
   (b) A ball of mass 100 g moving with velocity 10 m/s is stopped by a boy in 0.2 s.Calculate the force applied by the boy to stop the ball.
20) On what factors do the following physical quantities depend?
   (a) Inertia (b) Momentum (c) Force
21) 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?
22) Two persons manage to push a motorcar of mass 1200 kg at a uniform velocity along a level road. The same motorcar can be pushed by three persons to produce an acceleration of 0.2 $m/s^2$. With what force does each person push the motorcar? (Assume that all persons push the motorcar with the same force)
23) (a) State the law of inertia.
   (b) A body of mass 5 kg is moving with a uniform velocity of 10 m/s. It is acted uponby a force of 20N. What will be its velocity after 1s?
24) A truck starts from rest and rolls down a hill with constant acceleration. It travels a distance of 400 m in 20 seconds. Find the acceleration. Find the force acting on it if its mass is 7 metric tonne. [hint: 1 metric tonne=1000kg]
25) A stone of mass 1 kg is thrown with a velocity 20 m/s across the frozen surface of a lake and comes to rest after travelling a distance of 50 m. What is the force of friction between the stone and ice?
26) A bullet of mass 10 g traveling horizontally with a velocity of 150 m/s strikes a stationary wooden block and comes to rest in 0.03 s. Calculate the distance of penetration of the bullet into the block. Also, calculate the magnitude of the force exerted by the wooden block on the bullet. (2.25 m, - 50 N)
27) The v – t graph of a ball of mass 25 g moving on road is as given below
   (i) How much force does the road exert on the ball to bring it to rest?
   (ii) What is the direction of force exerted by the road?




28) The velocity time graph of a ball of mass 20 g moving along a straight line on a level ground is given below. How much force does the ground exert on the ball to bring it to rest?

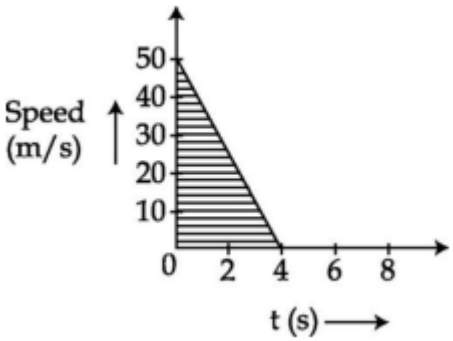



29) The velocity–time graph of a car is given below. The car weighs 1000 kg.

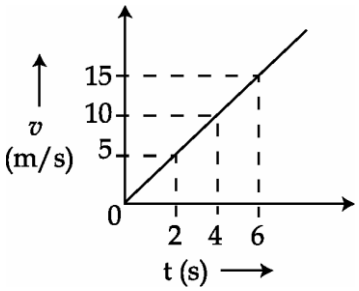



i. What is the distance travelled by the car in the first 2 seconds?
ii. What is the braking force at the end of 5 seconds to bring the car to a stop within one second?

30) The speed-time graph of a ball of mass 30 g moving along a straight line is shown in the figure below. Calculate the opposing force that brings the ball to rest.

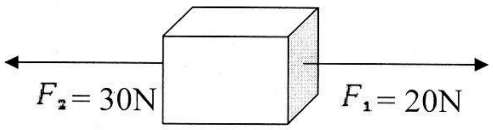



31) The motion of a body of mass 5 kg is shown in the *v*-*t* graph. Find from graph




a. its acceleration
b. the force acting on the body
c. the change in momentum of the body 2 seconds after start

32) Two forces F1 and F2 are acting on an object as shown in the figure.




(i) What is the net force acting in the object?
(ii) What is the direction of the net force acting on the object?
(iii) If the mass of body is 10 kg what will be the acceleration produced in it?

33) Define the term balanced force.
A hammer of mass 500 g moving with a velocity of 50m/sstrikes a nail. The nail stops the hammer in a very short time of 0.01 s. What is the force of the nail on the hammer?

34) State the action and reaction of the following
a. Moving rocket
b. Firing of a bullet from a gun
c. A person walking on the floor

35) Look at the diagram above and answer the following questions:


(a) When a force is applied through the free end of the spring balance A, the reading of the spring balance A is 15gwt. What will be the measure of the reading shown by spring balance B?
(b) Write reasons for your answer.
(c) Name the force which balance A exerts on balance B and the force of balance B on balance A

36) Water sprinkler used for grass lawns begin to rotate as soon as the water is supplied? State and explain the principle on which it works ?

37) "A boatman pushes the river bank with a bamboo pole to take his boat into the river." Explain his action with reason.

38) According to the third law of motion when we push on an object, the object pushes back on us with an equal and opposite force. If the object is a massive truck parked along the road side, it will probably not move. A student justifies this by answering that the two opposite and equal forces cancel each other. Comment on this logic and explain why truck does not move.

39) Explain why a horse continuously apply a force in order to move a cart with a constant velocity.

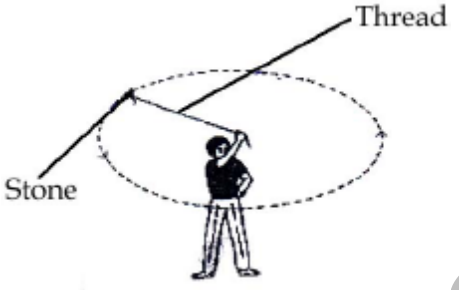
40) (a) State Newton's third law of motion.
(b) In the following table the mass and speed of two bodies are given. Which body has more momentum? Justify your answer.

| BODY | MASS (kg) | SPEED m/s |
|---|---|---|
| A | 1 | 10 |
| B | 2 | 9 |

41) State the three laws of motion.Explain how the second law gives a measure of force.

42) (a) when a motor car make a sharp turn at a high speed, we tend to get thrown to one side. Why?
(b) State Newtons 1st and 3rd law of motion
(c) A force of 5 N gives a body of mass 'm' an acceleration of $10ms^{-2}$, calculate the mass of the body in grams.

43) Look at the figure below:
i. Name the kind of motion of the stone.
ii. Is this an example of accelerated motion? Why?
iii. Name the force that keeps the stone in its path.
iv. State the direction of this force and draw it on your answer sheet.




44) (a) Why are road accidents at high speed very much worse than accidents at low speed?
(b) State the laws of motion involved in the working of a jet plane.
(c) Name the physical quantity whose unit is
(i) $kgms^{-2}$ and (ii) $kgms^{-1}$

45) (a) What is the unit of force ? define it.
(b) A stone is dropped from the edge of the roof. Find out the following.
i. how long does it take to fall 4.9m?
ii. how fast does it move at the end of that fall?
iii. How fast does it move at the end of 7.9m?
iv. What is acceleration after 1s and 2s?

46) (a) If the mass of a body is doubled, what happens to its acceleration when acted upon by the same force
(b) It is easier to stop a tennis ball than a cricket ball moving with same speed. Why?

47) (a) What happens to a person travelling in a bus when the bus takes a sharp turn? Give reason
(b) A cricketer moves his hands backwards on catching a fast moving ball. Why?

## Long Answer Type Question – 5 Marks (70 Words)

1) (a) Define inertia. There are three solid balls, made up of aluminium , steel and wood of same shape and volume. Which of them will have highest inertia? Why?
(b) Describe in berief an activity to illustrate the property of inertia at rest.

2) (a) Define momentum of a moving body.
(b) Give the SI unit of momentum. Name the physical quantity which determines its direction.
(c) How much momentum will a dumb - bell of mass 10 kg transfer to the floor if it falls from a height of 80 cm? Take its downward acceleration to be 10 $m/s^2$.

3) An object of mass 200 kg is accelerated uniformly from a velocity of 10 m/s to 20 m/s in 2 seconds. Calculate
   a. Initial momentum
   b. Final momentum of the object
   c. Magnitude of the force exerted on the object
   d. Does momentum have direction? If yes how is it specified?
   e. Name two factors on which change of momentum depends.

4) (a) In a high jump event the athletes are made to fall on a sand bed or on a cushioned bed. Why?
(b) Define momentum. State its SI unit
(c) An object of mass 10 kg is accelerated uniformly from rest to a velocity of 8 m/s in 6 s , calclate the final mometum of the object.

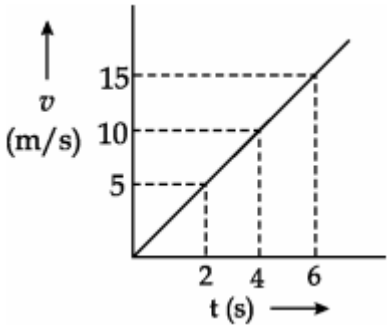
5) (a) State $2^{nd}$ law of motion. Give its mathematical expression.
(b) How will you define unit of force using this law?
(c) Calculate the mass of a body. When a frce of 525 N produce an acceleration of 3.5 $ms^{-2}$.

6) (a) Using Newton's law of motion, derive the relation between force and acceleration.
(b) Define one newton.
(c) Which would require a greater force to accelerate a 0.5 kg mass at 5 $m/s^2$ or a 4 kg mass at 2 $m/s^2$? Give reason.

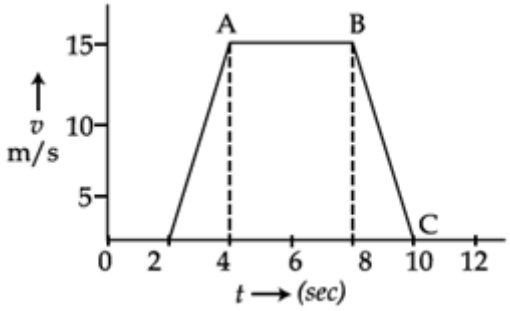
7) (a) State Newton's second law of motion. Express it mathematically for a body of mass m moving with initial velocity u and when acted upon by a force F, its velocity becomes v.
Define unit of force using this expression.
(b) Calculate the mass of a body, if a force of 525 N produces in it an acceleration of 3.5 $m/s^2$.

8) (a) State newtons $1^{st}$ law of motion and also deduce it using $2^{nd}$ law.
(b) A steam engine of mass 3 X $10^4$ kg pulls two wagons each of mass 2 X $10^4$ kg with an acceleration of 0.2 $ms^{-2}$. Neglecting frictionall forces, calculate the:
   i. Force exerted by the engine
   ii. Force expierienced by each wagon

9) (a) Define force. Write its S.I. unit.
(b) The motion of a body of mass 10 kg is shown in the v – tgraph. Find:
(i) its acceleration
(ii) the force acting on the body
(iii) the change in its momentum in 10 seconds from start.




10) (a) Define force
(b) The velocity – time graph of a car of 1000 kg mass is given below:




j. When is the maximum force acting on the car
ii. What is the retarding force?
iii. For how long is there no force acting?

9) (a) Define inertia. Name the physical quantity that measures it.
(b) It is necessary to run along with the moving busin the same direction of bus while alighting from bus. Give reason?
(c) Calculate the magnitutde of force required to produce an acceleration of 2 $m/s^2$ in a body of mass 12.5 kg.

10) (a) State newtons second law of motion and establish the realtion F = ma.
(b) Give reasons:
i. if a boy jumps out of the boat, the boat moves backwards
ii. the passengers sitting in the bus fall backwards when the bus starts suddenly

11) (a) Give reasons for the following:
i. An athlete pushes the earth backward with his hands and feet, just before the start of the race.
ii. On pulling the string of a bow, the arrows goes forward.
(b) A cricket ball of mass 100 g moving at 25 $ms^{-1}$ is stopped by a player who catches the ball by moving his hands backward in 0.04 s. Calculate the
i. change in momentum of the ball,
ii. force exerted by the player on the ball to stop it.

12) (a) State Newton $1^{st}$ and $3^{rd}$ law of motion.
(b) A car of mass 1800 kg moving with a speed of 10 m/s is bought to rest after a covering a distance of 50 m. Calculate the force acting on the car.

13) (a) When a motor car make a sharp turn at a high speed, we tend to get thrown toone side. Why?
(b) State Newton's 1st and $3^{rd}$ law of motion.

(c) A force of 5N gives a body of mass 'm' an acceleration of 10m/s?, Calculate themass of the body in grams.

14) What is momentum? Write its SI unit. Interpret force in terms of momentum. Represent the following graphically
(a) momentum versus velocity when mass is fixed.
(b) momentum versus mass when velocity is constant. [NCERT Exemplar]

15) (a) How much momentum will an object of mass 10 kg transfer to the floor, if it falls from a height of 0.8m? (g=10$m/s^2$)
(b) Explain why is it difficut for a fireman to hold a hose, which ejects large amount of water at a high velocity.

16) Give reason for the following questions
(a) It is difficult to balance our body when we accidentally step on a peel of banana.
(b) A glass pane of a window is shattered when a pebble hits it.
(c) It is easier to stop a tennis ball than a cricket ball moving at the same speed.
(d) Why is it difficult to walk on sand?
(e) When a car takes a sharp turn at a high speed, passengers tends to get thrown to one side.