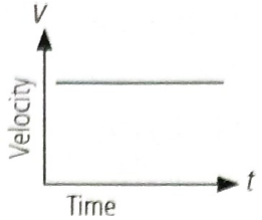
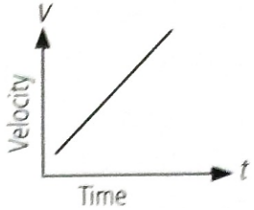
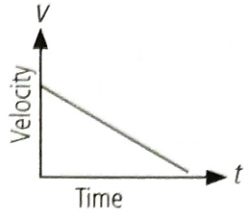
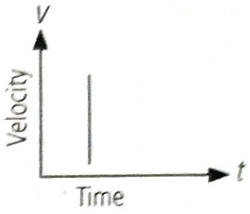
1. Identify the correct statement(s).
   (i) To accelerate the motion of an object, a balanced force is required.
   (ii) Balanced forces do not change the state of rest or of motion of an object.
   (iii) Balanced forces do not produce any acceleration, they can change the shape or size of the body.
   (a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iii) (d) None of these
2. An unbalanced force acts on a body. The body
   (a) must remain in same state (b) must move with uniform velocity
   (c) must be accelerated (d) must remain at rest.
3. A number of forces acting on a body changes velocity of the body. The forces cannot be
   (a) paralleled (c) balanced (b) unbalanced (d) inclined.
4. A body is accelerating in a straight line. The unbalanced force acts
   (a) in the direction of motion of the body.
   (b) in a direction opposite to the direction of motion.
   (c) in a direction perpendicular to the direction of motion of the body.
   (d) none of these
5. Choose the wrong statement.
   (a) Unit of force is newton. (b) Force changes the shape of a body.
   (c) Force is always conserved. (d) Force tends to change the speed of a body.
6. A force of 100N acts on a ball moving on a surface. The force of friction that must act between the surface of the ball and the surface so that the ball keeps on moving with constant velocity over the surface must be
   (a) zero (b) 100N (c) 200N (d) 300N.
7. Two cars of unequal masses use similar tyres. If they are moving with same initial speed, the minimum stopping distance
   (a) is smaller for the heavier car (b) is smaller for the lighter car
   (c) is same for both the cars (d) depends on the volume of the car,
8. A bicycle is being pedalled on a horizontal road. The forces of friction between the road and the front and rear wheels are F_1 and F_2 respectively. Then
   (a) both F_1 and F_2 act in the forward direction
   (b) both F_1 and F_2 act in the backward direction
   (c) F_1 acts in the forward direction, F_2 acts in the backward direction
   (d) F_1 acts in the backward direction, F_2 acts in the forward direction.
9. A hockey player pushes the ball on the ground. It comes after travelling certain distance because
   (a) the player stops pushing the ball. (b) balanced force acts on the ball.
   (c) the opposing force acts on the ball. (d) none of these
10. Which is velocity-time graph of a moving particle on Which net external force is zero?

(a) 

(b) 



(c)



(d)

11. If A and B are two objects with masses 6kg and 34kg respectively, then
(a) A has more inertia than B (b) B has more inertia than A
(c) A and B have same inertia (d) none of the two has inertia.

12. Inertia is that property of body by virtue of which the body is unable to change by itself
(a) the state of rest only (b) the state of motion only
(c) the direction of motion only (d) the state of rest and of uniform motion.

13. A football has lesser inertia than a stone of the same size because
(a) football has more air inside than the stone
(b) football has less air inside than the stone
(c) football has less mass than the stone
(d) football has more mass than the stone.

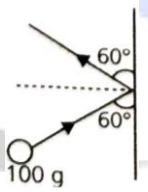
14. SI unit of momentum is
(a) kgm/s^2 (b) kgm/s (c) newton (d) joule.

15. The rate of change of momentum of a body is a measure of acting on the body.
(a) pressure (b) force (c) mass (d) inertia

16. Newton's second law of motion gives us a measure of
(a) force (b) inertia (c) mass (d) acceleration.

17. How much momentum will a dumb-bell of mass $10kg$ transfer to the floor if it falls from a height of $80cm$? Take its downward acceleration to be $10ms^{-2}$.
(a) $10kgms^{-1}$ (b) $20kgms^{-1}$ (c) $35kgms^{-1}$ (d) $40kgms^{-1}$

18. A mass of $100g$ strikes the wall with speed $5ms^{-1}$ at an angle as shown in figure and it rebounds with the same speed. If the contact time is $2\times10^{-3}s$, what is the force applied by the wall?



(a) $250\sqrt{3}N$ to right (b) $250N$ to right (c) $250\sqrt{3}N$ to left (d) $250N$ to left

19. In a rocket, fuel burns at the rate of $1kgs^{-1}$. This fuel is ejected from the rocket with a velocity of $60kms^{-1}$. Thie exerts a force on the rocket equal to
(a) $6000N$ (b) $60000N$ (c) $60N$ (d) $600N$.

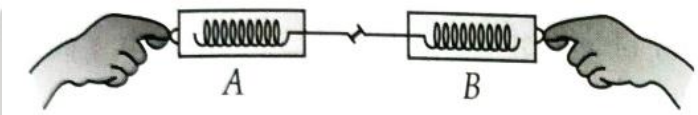
20. A particle of mass $0.3kg$ is subjected to a force $F=kx$ with $k=15N/m$ and x being its distance from the origin. What will be its initial acceleration if it is released from a point $20cm$ away from the origin?
(a) $5ms^{-2}$ (b) $10ms^{-2}$ (c) $3ms^{-2}$ (d) $15ms^{-2}$

21. A man is standing on a boat in still water. If he walks towards the shore the boat will
(a) move away from the shore (b) remain stationary
(c) move towards the shore (d) sink.

22. A cannon after firing recoils due to
(a) conservation of energy (b) Newton's third low of motion
(c) Newton's first law of motion (d) none of these

23. Choose the correct statement(s).
(a) Action and reaction forces act on same object.
(b) Action and reaction forces act on different objects.
(c) Both (a) and (b) are possible.
(d) Neither (a) nor (b) is correct.

24. Consider two spring balances hooked as shown in the figure. We pull them in opposite direction. If the reading shown by A is 1.5N, then the reading shown by B will be



(a) 1.5N (b) 2.5N (c) 3.0N (d) zero.

25. 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 directions
(d) act on either body at normal to each other.

26. A goalkeeper in a game of football pulls his hands backwards after holding the ball shot at the goal. This enables the goal keeper to
(a) exert larger force on the ball
(b) reduce the force exerted by the ball on hands
(c) increase the rate of change of momentum
(d) decrease the rate of change of momentum.

27. 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.

28. A water tanker filled up to $\frac{2}{3}$ of its height is moving wit 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.

Assertion-Reason Codes:

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true and Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.

29. Assertion: If the net external force on the body is zero, then its acceleration is zero.
Reason: Acceleration does not depend on force.

30. Assertion: The slope of momentum versus time curve give us the acceleration.
Reason: Acceleration is given by the rate of change of momentum.

31. Assertion: A player lowers his hands while catching a cricket ball.
Reason: The time of catch increases when a player lowers his hand while catching a ball.

32. Assertion: A bullet is fired from a rifle. If the rifle recoils freely, the kinetic energy of rifle is more than that of the bullet.
Reason: In the case of rifle-bullet system the law of conservation of momentum is violated.

33. Assertion: An object can accelerate in the absence of external force.
Reason: Newton's second law is not applicable on object.

34. Assertion: From Newton's second law of motion, impulse is equal to change in momentum.
Reason: Impulse and momentum have different SI units.

35. Assertion: A large number of concurrent forces acting at the same point of the object, then the object will be in equilibrium, if sum of all the forces is equal to zero.
Reason: Equilibrium of a particle in mechanics refers to the situation when the net external force on the particle is non-zero.