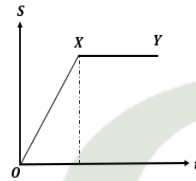
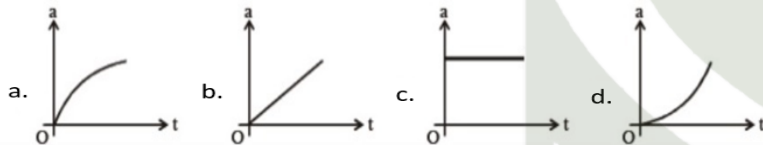


18. Figure shows the displacement-time graph of a particle moving on the x-axis.
- The particle is going continuously along x-axis.
  - The velocity increases up to point X and remains constant
  - The particle is at rest
  - The particle moves at a constant velocity up to point X and then comes to rest.



19. The velocity of a particle moving along x-axis varies with its position(x) as  $v = \alpha\sqrt{x}$  where  $\alpha$  is a constant. Which of the following graph represents the variation of acceleration with time?



20. The trajectory of projectile is given by the equation  $y = \sqrt{3}x - 7.5 \times 10^{-4}x^2$ , where  $x$  and  $y$  are in meters,
- $30^\circ$
  - $60^\circ$
  - $75^\circ$
  - $90^\circ$
21. The horizontal range and the maximum height of a projectile are equal. The angle of projection of the projectile is,
- $\theta = \tan^{-1}(\frac{1}{4})$
  - $\theta = \tan^{-1}(4)$
  - $\theta = \tan^{-1}(2)$
  - $\theta = \tan^{-1}(1)$
22. A missile is fired for maximum range with an initial velocity of  $20m/s$ . The range of missile is,
- $20m$
  - $40m$
  - $50m$
  - $60m$
23. The speed of projectile at maximum height is half of its initial speed. The angle of projectile is,
- $15^\circ$
  - $30^\circ$
  - $45^\circ$
  - $60^\circ$
24. If a particle is projected at an angle  $45^\circ$ , then relation between range and maximum height is,
- $R = 4H$
  - $4R = H$
  - $2H = R$
  - None
25. A stone is dropped from the top of tower of height  $h$ . After 1 second another stone is dropped from balcony  $20m$  below the top. Both reach the bottom simultaneously. What is the value of  $h$ ?
- $21.25m$
  - $31.25m$
  - $40m$
  - $50m$
26. A ball is thrown vertically downward with a velocity of  $20m/s$  from the top of a tower. It hits the ground after some time with a velocity of  $80m/s$ . The height of the tower is,
- $300m$
  - $320m$
  - $340m$
  - $360m$

27. If a bullet loses half of its velocity on penetrating  $3cm$  in a wooden block, then how much will it penetrate more before coming to rest?
- $1cm$
  - $2cm$
  - $3cm$
  - $4cm$
28. The distance travelled by a car along a straight line is  $x = 12t + 3t^2 - 2t^3$  where,  $x$  is in meters and  $t$  in seconds. The velocity of the car at the start will be,
- $7m/s$
  - $9m/s$
  - $12m/s$
  - $16m/s$
29. A body moving in a straight line travels  $2m/s$  for first half distance and second half distance is covered in two equal time intervals at  $4m/s$  and  $2m/s$ . What is its average velocity for entire journey?
- $2.25m/s$
  - $2.40m/s$
  - $2.50m/s$
  - $2.60m/s$
30. A boy standing at the top of a tower of  $20m$  height drops a stone. Assuming  $g = 10m/s^2$ , the velocity with which it hits the ground is
- $5m/s$
  - $10m/s$
  - $20m/s$
  - $40m/s$
31. A body moving in a straight line travels  $2m/s$  for first half time and for second half time it covers equal distance at  $4m/s$  and  $2m/s$ . What is its average velocity for entire journey?
- $7/3 m/s$
  - $8/3 m/s$
  - $3 m/s$
  - $21/4 m/s$
32. At what angle of projection, the horizontal range and the maximum height of a projectile are in the ratio of  $2:1$ ,
- $\tan^{-1}(1)$
  - $\tan^{-1}(2)$
  - $\tan^{-1}(0.5)$
  - $\tan^{-1}(1.5)$
33. The speed of a projectile is increased by  $10\%$ , without changing the angle of projection. The percentage increase in the range will be,
- $5\%$
  - $10\%$
  - $15\%$
  - $21\%$
34. A boat goes across a river with velocity  $12km/hr$ . The magnitude of its resultant speed in flowing water is  $13km/hr$ . The velocity of water flow in the river is,
- $1km/hr$
  - $5km/hr$
  - $7km/hr$
  - $9km/hr$
35. An athlete makes a long jump and follows a projectile motion. Air resistance is negligible. Which one of the following statements is true about the athlete?
- The athlete has a constant horizontal and vertical velocities.
  - The athlete has a constant horizontal velocity and constant downward acceleration.
  - The athlete has a constant upward acceleration followed by a constant downward acceleration.
  - The athlete has a constant upward velocity followed by a constant downward

