

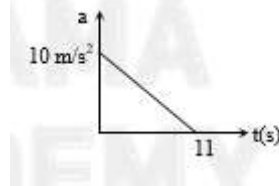
31. Three different objects of masses m_1, m_2 and m_3 are allowed to fall from rest and from the same point 'O' along three different frictionless paths. The speeds of the three objects, on reaching the ground, will be in the ratio of

- (1) $m_1 : m_2 : m_3$ (2) $m_1 : 2m_2 : 3m_3$ (3) $1 : 1 : 1$ (4) $\frac{1}{m_1} : \frac{1}{m_2} : \frac{1}{m_3}$

32. From a building two balls A and B are thrown such that A is thrown upwards and B downwards (both vertically) with same speed; If v_A and v_B are their respective velocities on reaching the ground, then

- (1) $v_B > v_A$ (2) $v_A = v_B$ (3) $v_A > v_B$
(4) their velocities depend on their masses.

33. A particle starts from rest. Its acceleration (a) versus time (t) is as shown in the figure. The maximum speed of the particle will be

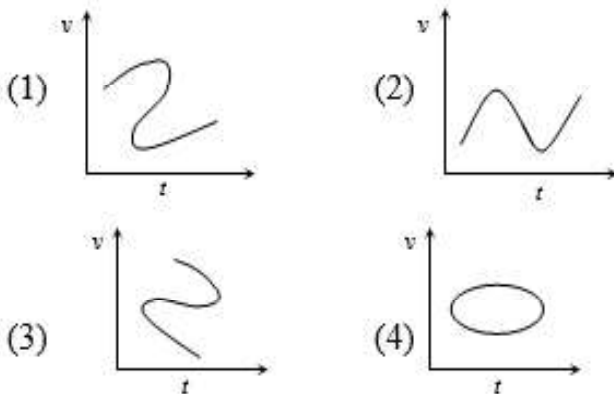


- (1) 110 m/s (2) 55 m/s (3) 550 m/s (4) 660 m/s

34. A small block slides without friction down an inclined plane starting from rest. Let S_n be the distance travelled from time $t = n - 1$ to $t = n$. Then $\frac{S_n}{S_{n+1}}$ is

- (1) $\frac{2n-1}{2n}$ (2) $\frac{2n+1}{2n-1}$ (3) $\frac{2n-1}{2n+1}$ (4) $\frac{2n}{2n+1}$

35. Which of the following velocity-time graphs shows a realistic situation for a body in motion?



SECTION-B

36. A stone falls freely under gravity. It covers distances h_1, h_2 and h_3 in the first 5 seconds, the next 5 seconds and the next 5 seconds respectively. The relation between h_1, h_2 and h_3 is

- (1) $h_1 = \frac{h_2}{3} = \frac{h_3}{5}$ (2) $h_2 = 3h_1$ and $h_3 = 3h_2$ (3) $h_1 = h_2 = h_3$ (4) $h_1 = 2h_2 = 3h_3$

37. The correct statement from the following is
- (1) A body having zero velocity will not necessarily have zero acceleration
 - (2) A body having zero velocity will necessarily have zero acceleration
 - (3) A body having uniform speed can have only uniform acceleration
 - (4) A body having non-uniform velocity will have zero acceleration
38. A body is thrown vertically upwards and takes 5 seconds to reach maximum height. The distance travelled by the body will be same in
- (1) 1st and 10th second
 - (2) 2nd and 8th second
 - (3) 4th and 6th second
 - (4) both (2) & (3)
39. The position of a particle moving along the x-axis at certain times is given below

| | | | | |
|------|----|---|---|----|
| t(s) | 0 | 1 | 2 | 3 |
| x(m) | -2 | 0 | 6 | 16 |

Which of the following describes the motion correctly?

- (1) Uniform, accelerated
 - (2) Uniform, decelerated
 - (3) Non-uniform, accelerated
 - (4) There is not enough data for generalization
40. A particle starts from rest, accelerates at 2 m/s^2 for 10s and then goes for constant speed for 30s and then decelerates at 4 m/s^2 till it stops. What is the distance travelled by it?
- (1) 750 m
 - (2) 800 m
 - (3) 700 m
 - (4) 850 m