



Time: 2 hours

Physics

Marks: 50

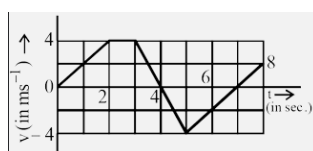
(Kinematics 1d 2d vector)

NAME OF THE STUDENT:- _____

DATE:- _____

INSTRUCTION – ATTEMPT ALL QUESTIONS

- Q.1. A particle starts moving rectilinearly at time $t=0$ such that its velocity v changes with time t according to the equation $v = t^2 - t$ where t is in seconds and v is in m/s. Find the time interval for which the particle retards
- (a) $\frac{1}{2} < t < 1$ (b) $\frac{1}{2} > t > 1$ (c) $\frac{1}{4} < t < 1$ (d) $\frac{1}{2} < t < \frac{3}{4}$
- Q.2. The co-ordinates of a moving particle at any time 't' are given by $x = at^3$ and $y = bt^3$. The speed of the particle at time t is given by
- (a) $3t\sqrt{a^2 + b^2}$ (b) $3t^2\sqrt{a^2 + b^2}$ (c) $t^2\sqrt{a^2 + b^2}$ (d) $\sqrt{a^2 + b^2}$
- Q.3. If a car covers $\frac{2}{5}$ th of the total distance with v_1 speed and $\frac{3}{5}$ th distance with v_2 then average speed is
- (a) $\frac{1}{2}\sqrt{v_1 v_2}$ (b) $\frac{v_1 + v_2}{2}$ (c) $\frac{2v_1 v_2}{v_1 + v_2}$ (d) $\frac{5v_1 v_2}{3v_1 + 2v_2}$
- Q.4. Choose the correct statement from the following
- (a) The magnitude of instantaneous velocity of a particle is equal to its instantaneous speed
(b) The magnitude of the average velocity in an interval is equal to its average speed in that interval
(c) It is possible to have a situation in which the speed of the particle is never zero but the average speed in an interval is zero
(d) It is possible to have a situation in which the speed of particle is zero but the average speed is not zero.
- Q.5. A particle located at $x = 0$ at time $t = 0$ starts moving along with the positive x-direction with a velocity 'v' that varies as $v = \alpha\sqrt{x}$. The displacement of the particle varies with time as
- (a) t^2 (b) t (c) $t^{1/2}$ (d) t^3
- Q.6. Figure here given the speed-time graph for a body. The displacement travelled between $t = 1.0$ second and $t = 7.0$ second is nearest to
- (a) 15m (b) 2m (c) 3m (d) 4m



- Q.7. A particle is moving in a straight line with initial velocity and uniform acceleration a . If the sum of the distance travelled in t^{th} and $(t + 1)^{\text{th}}$ seconds is 100cm, then its velocity after t seconds in cm/s is
- (a) 80 (b) 50 (c) 20 (d) 30
- Q.8. A thief running away on a straight road on a jeep moving with a speed of 9 m/s. A police man chase him on a motor cycle moving at a speed of 10m/s. If the instantaneous separation of jeep from the motor cycle is 100m, how long will it take for the police man to catch the thief?
- (a) 1 second (b) 19 second (c) 90 second (d) 100 second
- Q.9. The displacement x of a particle varies with time according to the relation $x = \frac{a}{b} (1 - e^{-bt})$ then select the false alternative.
- (a) At $t = \frac{1}{b}$, the displacement of the particle is nearly $\frac{2}{3} \left(\frac{a}{b}\right)$
(b) The velocity and acceleration of the particle at $t = 0$ are a and $-ab$ respectively
(c) The particle cannot go beyond $x = \frac{a}{b}$
(d) The particle will not come back to its starting point at $t \rightarrow \infty$
- Q.10. From the top of a building 40 m tall, a boy projects a stone vertically upwards with an initial velocity 10 m/s such that it eventually falls to the ground. After how long will the stone strike the ground? take $g = 10 \text{ m/s}^2$
- (a) 1s (b) 2s (c) 3s (d) 4s