



Time: 2 hours

Physics

Marks: 50

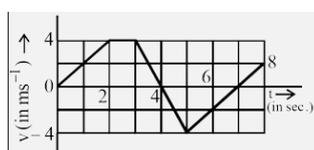
(Kinematics 1d 2d vector)

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