MARGSHREE CLASSES PVT. LTD.

IIT-JEE / NEET / FOUNDATION (IX &X)

Time: 2 hours | Phy | NEET | Marks: 50

(Motion in a Straight line)

NAME OF THE STUDENT:-____________________________ DATE:-

INSTRUCTION – ATTEMPT ALL QUESTIONS

Q.1. If the displacement of a particle varies with time as $\sqrt{x}$ = t + 7, the;

(A) Velocity of the particle is inversely proportional to t

(B) Velocity of the particle is proportional to t

(C) Velocity of the particle is proportional to $\sqrt{t}$

(D) The particle moves with a constant acceleration.

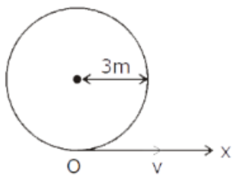
Q.2. The velocity of a particle moving in the positive direction of X-axis varies as v = a $\sqrt{x}$, where a is positive constant. Assuming that at the moment t = 0, the particle was located at x=0, the value of time dependence of the velocity and the acceleration of the particle are:

(a) $\frac{t}{2a^2}, \frac{1}{2a^2}$ (b) $\frac{a^2t}{2}, \frac{a^2t}{2}$ (c) $\frac{2t}{a^2}, \frac{2}{a^2}$ (d) None of these

Q.3. The retardation of a motor boat after its engine is switched off, is given by dv/dt = $-kv_0^3$, where k is constant and v_0 is its velocity at the time of shutting off of the engine. The velocity of the motor boat after time t will be:

(a) $\frac{v_0}{\sqrt{2v_0^2kt+1}}$ (b) v_0e^{-kt} (c) $V_0/2$ (d) v_0

Q.4. A particle travels with constant speed on a circle of radius 3 m and completes one revolution in 20 s. Starting from origin O, find the magnitude and direction of displacement vector 5 s later.



(a) 4.2 m at angle of 45° with X-axis. (b) 5.54 m at an angle of 67.5° with X-axis

(c) 6m at an angle of 90° with X-axis (d) 5 m at an angle of 60° with X-axis

Q.5. A stone is dropped into a well in which the level of water is h below the top of the well. If v is velocity of sound, the time T after which the splash is heard is given by :

(a) T= 2h/v (b) T= $\sqrt{\frac{2h}{g}}+\frac{h}{v}$ (c) T= $\sqrt{\frac{2h}{g}}+\frac{h}{2v}$ (d) T= $\sqrt{\frac{h}{2g}}+\frac{2h}{v}$

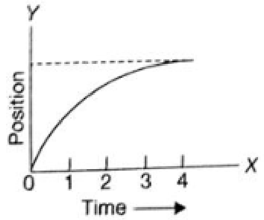
Q.6. A body thrown vertically up from ground passes the height of 25 m twice in an interval of 4 s. The initial velocity of body is :

(a) 30 m/s (b) 20 m/s (c) 50 m/s (d) 40 m/s

Q.7. A particle is thrown upwards from ground. It experiences a constant resistance force due to air, which can produce retardation $2 m/s^2$. The ratio of time of ascent to the time of descent is : ($g = 10 m/s^2$)

(a) 1:1 (b) $\sqrt{\frac{2}{3}}$ (c) $\frac{2}{3}$ (d) $\sqrt{\frac{10}{12}}$

Q.8. The displacement of a particle as a function of time is show in figure. The figure indicates that :



(a) The particle starts with a certain velocity, but the motion is retarded and finally the particle stops.
(b) The velocity of particle is constant throughout.
(c) The acceleration of the particles is constant throughout
(d) The particle starts with a constant velocity, the motion is accelerated and family the particle moves with another constant velocity.

Q.9. A body starting from rest and has uniform acceleration $8 m/s^2$. The distance travelled by it I 5^{th} second will be :

(a) 36m (b) 40 m (c) 100m (d) 200 m

Q.10. A Body starting from rest and has uniform acceleration $8 m/s^2$. The distance travelled by it in 5^{th} second will be:

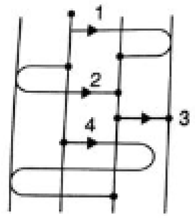
(a) $x=\frac{t^2}{2}\left(\frac{\alpha\beta}{\alpha-\beta}\right)$ (b) $x=t^2\left(\frac{\alpha\beta}{\alpha+\beta}\right)$

(c) $x=t^2\left(\frac{\alpha+\beta}{\alpha-\beta}\right)$ (d) $x=\frac{t^2}{2}\left(\frac{\alpha\beta}{\alpha+\beta}\right)$

Q.11. A body covers half the distance with a velocity 10 m/s and remaining half with a velocity 15 m/s along a straight line. The average velocity will be :

(a) 12 m/s (b) 10 m/s (c) 5 m/s (d) 1 m/s

Q.12. Figure shows four paths along which objects move from a starting point to a final point, all in the same time interval. The paths pass over a grid of equally spaced straight lines. Rank the paths according to the average velocity of the objects.



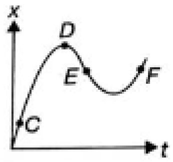
(a) $v_1 = v_2 = v_3 = v_4$ (b) $v_1 = v_2 > v_3 < v_4$

(c) $v_4 > v_2 = v_1 = v_3$ (d) none of these

Q.13. The position of a particle is expressed as $\vec{r} = (4t^2\,\hat{\imath} + 2t\hat{\jmath})$ m, where t is time in second. Find the velocity of the particle at t = 3s

(a) 24.08 m/s (b) 20.04 m/s (c) 27.06 m/s (d) 32 m/s

Q.14. The displacement –time graph of a moving particle is shown below. The instantaneous velocity of the particle is negative at the point:



(a)C (b) D (c) E (d) F

Q.15. A car accelerates from rest at a constant rate α for some time after which it decelerates at a constant rate β to come to rest. The maximum velocity v reached if total time taken t seconds is given by:

(s) $v = t\frac{\alpha\beta}{\alpha-\beta}$ (b) $v = t\left(\frac{\beta^2}{\alpha-\beta}\right)$ (c) $v = t\left(\frac{\alpha^2}{\alpha+\beta}\right)$ (d) $v = t\left(\frac{\alpha\beta}{\alpha+\beta}\right)$