Chapter 1 Motion in a Straight Line

Assignment 2

Class 11

PRERNA EDUCATION

DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH   SUBJECT : PHYSICS
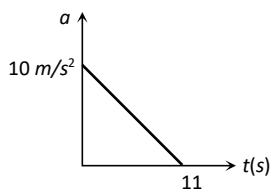DATE :   DPP NO. : 2

Topic :-MOTION IN A STRAIGHT LINE

1. If a body starts from rest and travels $120\ cm$ in the 6th second, then what is the acceleration

    a) $0.20\ m/s^2$ b) $0.027\ m/s^2$ c) $0.218 m/s^2$ d) $0.03 m/s^2$

2. 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

    a) $110\ m/s$ b) $55\ m/s$ c) $550\ m/s$ d) $660\ m/s$

3. Two bodies of different masses are dropped from heights of 16 m and 25 m respectively. The ratio of the time taken by them to reach the ground is

    a) $\dfrac{25}{16}$ b) $\dfrac{5}{4}$ c) $\dfrac{4}{5}$ d) $\dfrac{16}{25}$

4. The coordinates of a moving particle at any time t are given by $x = \alpha t^3$ and $y = \beta t^3$. The speed of the particle at time t is given by

    a) $3t\sqrt{\alpha^2 + \beta^2}$ b) $3t^2\sqrt{\alpha^2 + \beta^2}$ c) $t^2\sqrt{\alpha^2 + \beta^2}$ d) $\sqrt{\alpha^2 + \beta^2}$

5. A ball is dropped on the floor from a height of $10\ m$. It rebounds to a height of $2.5 m$. If the ball is in contact with the floor for 0.01 sec, the average acceleration during contact is

    a) $2100\ m/sec^2$ downwards   b) $2100\ m/sec^2$ upwards

    c) $1400\ m/sec^2$ d) $700 m/sec^2$

6. The time taken by a block of wood (initially at rest)to slide down a smooth inclined plane $9.8\ m$ long (angle of inclination is $30°$) is
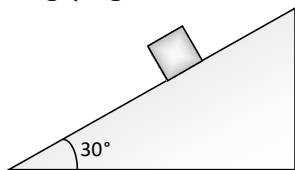
a) $\dfrac{1}{2} sec$

b) $2sec$

c) $4sec$

d) $1sec$

7. From the top of a tower, a particle is thrown vertically downwards with a velocity of $10\ m\ /sec$. The ratio of the distances, covered by it in the 3rd and 2nd seconds of the motion is (Take $g = 10\ m/s^2$)

a) $5 : 7$

b) $7 : 5$

c) $3 : 6$

d) $6 : 3$

8. A particle moves for 20 s with velocity $3\ ms^{-1}$ and then moves with velocity $4\ ms^{-1}$ for another 20 s and finally moves with velocity $5\ ms^{-1}$ for next 20 s. What is the average velocity of the particle?

a) $3\ ms^{-1}$

b) $4\ ms^{-1}$

c) $5\ ms^{-1}$

d) Zero

9. An express train is moving with a velocity v_1. Its driver finds another train is moving on the same track in the same direction with velocity v_2. To escape collision, driver applies a retardation a on the train. The minimum time of escaping collision will be

a) $t = \dfrac{v_1 - v_2}{a}$

b) $t = \dfrac{v_1^2 - v_2^2}{2}$

c) None

d) Both

10. The initial velocity of a particle is u (at $t = 0$) and the acceleration f is given by at. Which of the following relation is valid

a) $v = u + at^2$ b) $v = u + a\dfrac{t^2}{2}$ c) $v = u + at$ d) $v = u$

11. A particle travels $10m$ in first $5\ sec$ and $10m$ in next $3\ sec$. Assuming constant acceleration what is the distance travelled in next $2\ sec$

    a) $8.3\ m$ b) $9.3\ m$ c) $10.3\ m$ d) None of above

12. A bus begins to move with an acceleration of $1\ \text{ms}^{-2}$. A man who is 48 m behind the bus starts running at $10\ \text{ms}^{-1}$ to catch the bus. The man will be able to catch the bus after

    a) 6 s   b) 5 s   c) 3 s   d) 8 s

13. The acceleration of a particle is increasing linearly with time t as bt. The particle starts from the origin with an initial velocity v_0. The distance travelled by the particle in time t will be

    a) $v_0 t + \dfrac{1}{3} bt^2$ b) $v_0 t + \dfrac{1}{3} bt^3$ c) $v_0 t + \dfrac{1}{6} bt^3$ d) $v_0 t + \dfrac{1}{2} bt^2$

14. A bullet fired into a fixed wooden block loses half of its velocity after penetration 40 cm. it comes to rest after penetrating a further distance of

    a) $\dfrac{22}{3}$ cm   b) $\dfrac{40}{3}$ cm   c) $\dfrac{20}{3}$ cm   d) $\dfrac{22}{5}$ cm

15. A particle is moving on a straight line path with constant acceleration directed along the direction of instantaneous velocity. Which of the following statements are false about the motion of particle?

    a) Particle may reverse the direction of motion

    b) Distance covered is not equal to magnitude of displacement

    c) The magnitude of average velocity is less than average speed

    d) All of the above

16. A body, thrown upwards with some velocity reaches the maximum height of $50\ m$. Another body with the double the mass thrown up with double the initial velocity will reach a maximum height of

    a) $100\ m$ b) $200\ m$ c) $300\ m$ d) $400\ m$

17. A body is thrown vertically up with a velocity u. It passes three points A, B and C in its upward journey with velocities $\frac{u}{2}, \frac{u}{3}$ and $\frac{u}{4}$ respectively. The ratio of the separations between points A and B between B and C, $ie, \frac{AB}{BC}$ is

    a) 1   b) 2   c) $\dfrac{10}{7}$ d) $\dfrac{20}{7}$

18. A train started from rest from a station and accelerated at 2 ms^{-2} for 10 s. Then, it ran at constant speed for 30 s and thereafter it decelerated at 4 ms^{-2} until it stopped at the next station. The distance between two stations is

    a) 650 m   b) 700 m   c) 750 m   d) 800 m

19. A ball is dropped downwards. After 1 second another ball is dropped downwards from the same point. What is the distance between them after 3 seconds

    a) $25\ m$ b) $20\ m$ c) $50\ m$ d) $9.8\ m$

20. You drive a car at seed of $70\ km/hr$ in a straight road for $8.4\ km$, and then the car runs out of petrol. You walk for $30\ min$ to reach a petrol pump at a distance of $2\ km$. The average velocity from the beginning of your drive till you reach the petrol pump is

    a) $16.8\ km/hr$ b) $35\ km/hr$ c) $64\ km/hr$ d) $18.6\ km/hr$

Space for Rough Work