DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH   **SUBJECT : PHYSICS**
DATE :   **DPP NO. : 5**

Topic :-MOTION IN A STRAIGHT LINE

1. A train is moving slowly on a straight track with a constant speed of $2\ ms^{-1}$. A passenger in that train starts walking at a steady aped of a $2\ ms^{-1}$ to the back of the train in the opposite direction of the motion of the train. So to an observer standing on the platform directly in front of that passenger. The velocity of the passenger appears to be
   a) $4\ ms^{-1}$ b) $2\ ms^{-1}$
   c) $2\ ms^{-1}$ in the opposite direction of the train   d) Zero

2. A body starting from rest moves with constant acceleration. The ratio of distance covered by the body during the $5^{th}\ sec$ to that covered in $5\ sec$ is
   a) 9/15   b) 3/5   c) 25/9   d) 1/25

3. An object start sliding on a frictionless inclined plane and from same height another object start falling freely
   a) Both will reach with same speed   b) Both will reach with the same acceleration
   c) Both will reach in same time   d) None of above

4. A car moving with speed of $40\ km/h$ can be stopped by applying brakes after atleast $2\ m$. If the same car is moving with a speed of $80\ km/h$, what is the minimum stopping distance
   a) $8\ m$ b) $2\ m$ c) $4\ m$ d) $6\ m$

5. The position x of a particle varies with time t as $x = at^2 - bt^3$. The acceleration of the particle will be zero at time t equal to
   a) $\dfrac{a}{b}$ b) $\dfrac{2a}{3b}$ c) $\dfrac{a}{3b}$ d) Zero

6. A particle moves along a straight line OX. At a time t (in seconds) the distance x (in metres) of the particle from O is given by $x = 40 + 12t - t^3$
   How long would the particle travel before coming to rest
   a) $24\ m$ b) $40\ m$ c) $56\ m$ d) $16\ m$

7. A stone dropped from a balloon which is at a height h, reaches the ground after t second. From the same balloon, if two stones are thrown, one upwards and the other downwards, with the same velocity u and they reach the ground after t_1 and t_2 second respectively, then

    a) $t = t_1 - t_2$
    b) $t = \dfrac{t_1 + t_2}{2}$
    c) $t = \sqrt{t_1 t_2}$
    d) $t = \sqrt{t_1^2 - t_2^2}$

8. The acceleration of a particle increases linearly with time t as $6t$. If the initial velocity of the particle is zero and the particle starts from the origin, then the distance travelled by the particle in time t will be
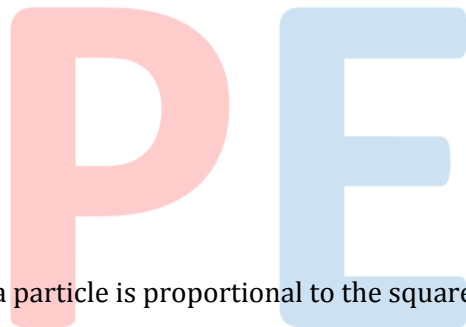
    a) t
    b) t^2
    c) t^3
    d) t^4

9. The graph between the displacement x and t for a particle moving in a straight line is shown in figure. During the interval OA, AB, BC and CD, the acceleration of the particle is
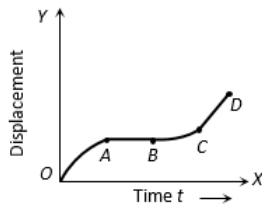
    OA, AB, BC, CD
    a) +   0   +   +
    b) -   0   +   0
    c) +   0   -   +
    d) -   0   -   0

10. The distance travelled by a particle is proportional to the square of time, then the particle travels with
    a) Uniform acceleration
    b) Uniform velocity
    c) Increasing acceleration
    d) Decreasing velocity

11. Two balls A and B of same masses are thrown from the top of the building. A, thrown upward with velocity V and B, thrown downward with velocity V, then
    a) Velocity of A is more than B at the ground
    b) Velocity of B is more than A at the ground
    c) Both A & B strike the ground with same velocity
   d) None of these

12. A man drops a ball downside from the roof of a tower of height $400\ m$. At the same time another ball is thrown upside with a velocity $50\ m/s$. From the surface of the tower, then they will meet at which height from the surface of the tower
    a) $100\ m$
    b) $320\ m$
    c) $80\ m$
    d) $240\ m$

13. If the velocity of particle is given by $v = (180 - 16x)^{1/2}\ m/s$, then its acceleration will be
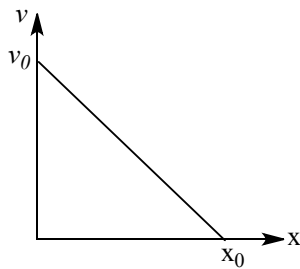   a) Zero
    b) $8\ m/s^2$
    c) $-8\ m/s^2$
    d) $4\ m/s^2$

14. The displacement-time graphs of two moving particles make angles of 30° and 45° with the $x-$ axis. The ratio of their velocities is
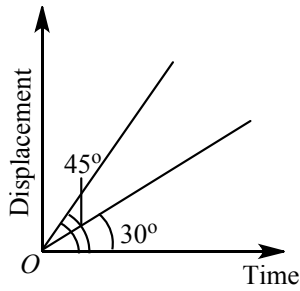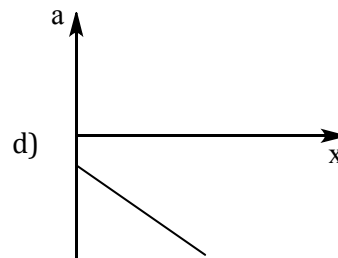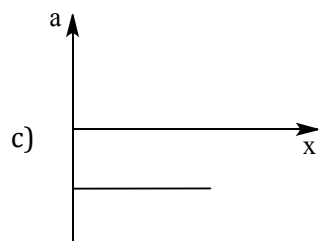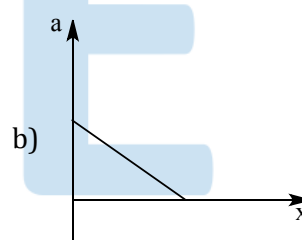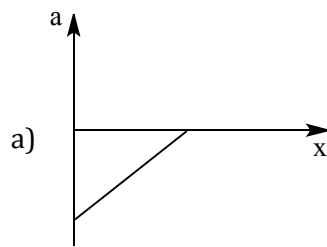

a) $1 : \sqrt{3}$ b) $1 : 2$ c) $1 : 1$ d) $\sqrt{3} : 2$

15. The given graph shows the variation of velocity with displacement. Which one of the graph given below correctly represents the variation of acceleration with displacement?

a)

b)

c)

d)

16. A balloon starts rising from the ground with an acceleration of $1.25 \ m/s^2$ after 8s, a stone is released from the balloon. The stone will $(g - 10 \ m/s^2)$
a) Reach the ground in 4 second
b) Begin to move down after being released
c) Have a displacement of $50 \ m$
d) Cover a distance of $40 \ m$ in reaching the ground

17. In a race for 100m dash, the first and the second runners have a gap of one metre at the mid way stage. Assuming the first runner goes steady, by what percentage should the second runner increases his speed just to win the race.
   a) 2%   b) 4%   c) More than 4%   d) Less than 4%

18. The driver of a car moving with a speed of 10ms^{-1} sees a red light ahead, applies breaks and stops after covering 10m distance. If the same car were moving with a speed of 20 ms^{-2}, the same driver would have stopped the car after covering 30 m distance. Within what distance the car can be stopped if travelling with a velocity of 15ms^{-1}? Assume the same reaction time and the same deceleration in each case.
   a) 18.75 m   b) 20.75 m   c) 22.75 m   d) 25 m

19. A particle has an initial velocity $3\hat{\mathbf{i}} + 4\hat{\mathbf{j}}$ and an acceleration of $0.4\hat{\mathbf{i}} + 0.3\hat{\mathbf{j}}$. Its speed after 10 s is
   a) 10 unit   b) 7 unit   c) $7\sqrt{2}$unit   d) 8.5 unit

20. A particle moving in a straight line covers half the distance with speed of $3 \ m/s$. The other half of the distance is covered in two equal time intervals with speed of $4.5 \ m/s$ and $7.5 \ m/s$ respectively. The average speed of the particle during the motion is
   a) $4.0 \ m/s$ b) $5.0 \ m/s$ c) $5.5 \ m/s$ d) $4.8 \ m/s$