DPP
DAILY PRACTICE PROBLEMS

CLASS : XITH **SUBJECT : PHYSICS**
DATE : **DPP NO. : 7**

Topic :-MOTION IN A STRAIGHT LINE

1. A bullet moving with a velocity of 200 cm/s penetrates a wooden block and comes to rest after traversing $4cm$ inside it. What velocity is needed for travelling distance of $9cm$ in same block
   a) 100 cm/s b) $136.2cm/s$ c) $300cm/s$ d) 250 cm/s

2. The velocity of a particle is $v = v_0 + gt + ft^2$. If its position is $x = 0$ at $t = 0$, then its displacement after unit time $(t = 1)is$
   a) $v_0 = 2g + 3f$ b) $v_0 + g/2 + f/3$ c) $v_0 + g + f$ d) $v_0 + g/2 + f$

3. A car accelerates from rest at a constant rate α for some time, after which it decelerates at a constant rate β and comes to rest. If the total time elapsed is t, then the maximum velocity acquired by the car is
   a) $\left(\frac{\alpha t + \beta^2}{\alpha\beta}\right)t$ b) $\left(\frac{\alpha^2 - \beta^2}{\alpha\beta}\right)t$ c) $\frac{(\alpha+\beta)t}{\alpha\beta}$ d) $\frac{\alpha\beta t}{\alpha+\beta}$

4. The x and y coordinates of a particles at any time t are given by $x = 7t + 4t^2$ and $y = 5t$, where x and y are in metre and t in second. The acceleration of particle at $t = 5$s is
   a) Zero b) 8ms^{-2} c) 20 ms^{-2} d) 40 ms^{-2}

5. A car moves from X to Y with a uniform speed v_u and returns to Y with a uniform speed v_d. The average speed for this round trip is
   a) $\frac{2v_dv_u}{v_d+v_u}$ b) $\sqrt{v_uv_d}$ c) $\frac{v_dv_u}{v_d+v_u}$ d) $\frac{v_u+v_d}{2}$

6. An automobile in travelling at 50 kmh^{-1}, can be stopped at a distance of 40 m by applying brakes. If the same automobile is travelling at 90 kmh^{-1}, all other conditions remaining same and assuming no skidding, the minimum stopping distance in metre is
   a) 72 b) 92.5 c) 102.6 d) 129.6

7. A particle starts its motion from rest under the action of a constant force. If the distance covered in first 10 $seconds$ is S_1 and that covered in the first 20 $seconds$ is S_2, then

a) $S_2 = 2S_1$ b) $S_2 = 3S_1$ c) $S_2 = 4S_1$ d) $S_2 = S_1$

8. An object moving with a speed of 6.25 m/s, is decelerated at a rate given by $\frac{dv}{dt} = 2.5\sqrt{v}$ where v is the instantaneous speed. The time taken by the object, to come to rest would be
a) $1s$ b) $2s$ c) $4s$ d) $8s$

9. A body A moves with a uniform acceleration a and zero initial velocity. Another body B, starts from the same point moves in the same direction with a constant velocity v. The two bodies meet after a time t. The value of t is
a) $\frac{2v}{a}$ b) $\frac{v}{a}$ c) $\frac{v}{2a}$ d) $\sqrt{\frac{v}{2a}}$

10. Two spheres of same size, one of mas 2 kg and another of mass 4 kg, are dropped simultaneously from the top of Qutub Minar (height $= 72m$). When they are 1 m above the ground, the two spheres have the same
a) Momentum b) Kinetic energy c) Potential energy d) Acceleration

11. A body of mass 10 kg is moving with a constant velocity of 10 ms^{-1}. When a constant force acts for 4 s on it, it moves with velocity 2 ms^{-1} in the opposite direction. The acceleration produced in it is
a) 3 ms^{-2} b) -3 ms^{-2} c) 0.3 ms^{-2} d) -0.3 ms^{-2}

12. The velocity of a body depends on time according to the equation $v = 20 + 0.1t^2$. The body is undergoing
a) Uniform acceleration b) Uniform retardation
c) Non-uniform acceleration d) Zero acceleration

13. Two balls of same size but the density of one is greater than that of the other are dropped from the same height, then which ball will reach the earth first (air resistance is negligible)
a) Heavy ball b) Light ball
c) Both simultaneously d) Will depend upon the density of the balls

14. A body thrown vertically upwards with an initial velocity u reaches maximum height in 6 seconds. The ratio of the distances travelled by the body in the first second and the seventh second is
a) 1 :1 b) 11 :1 c) 1 :2 d) 1 :11

15. The motion of a particle is described by the equation $x = a + bt^2$ where $a = 15$ cm and $b = 3$ cm/s^2.Its instantaneous velocity at time 3 sec will be
a) 36 cm/sec b) 18 cm/sec c) 16 cm/sec d) 32 cm/sec

16. A man throws a ball vertically upward and it rises through 20 m and returns to his hands. What was the initial velocity (u) of the ball and for how much time (T) it remained in the air $[g = 10m/s^2]$

a) $u = 10m/s, T = 2s$ b) $u = 10m/s, T = 4s$ c) $u = 20m/s, T = 2s$ d) $u = 20m/s, T = 4s$

17. A stone dropped from a building of height h and it reaches after t seconds on earth. From the same building if two stones are thrown (one upwards and other downwards) with the same velocity u and they reach the earth surface after t_1 and t_2 seconds respectively, then

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

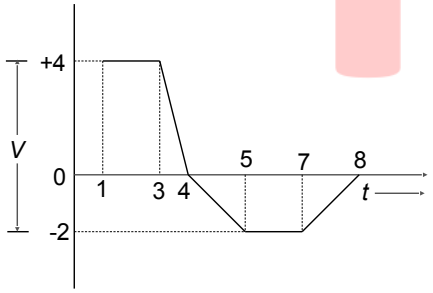
18. The relation $3t = \sqrt{3x} + 6$ describes the displacement of a particle in one direction where x is in $metres$ and t in sec. The displacement, when velocity is zero, is

a) 24 $metres$ b) 12 $metres$ c) 5 $metres$ d) Zero

19. A body of mass m moving along a straight line covers half the distance with a speed of $2 ms^{-1}$. The remaining half of distance is covered in two equal time intervals with a speed of 3 ms^{-1} and 5 ms^{-1} respectively. The average speed of the particle for the entire journey is

a) $\frac{3}{8} ms^{-1}$ b) $\frac{8}{3} ms^{-1}$ c) $\frac{4}{3} ms^{-1}$ d) $\frac{16}{3} ms^{-1}$

20. The velocity-time graph of a particle in linear motion is shown. Both v and t are in SI units. What is the displacement of the particle from the origin after 8 s?



a) 6m b) 8m c) 16m d) 18m