Physics [DPP]
One Dimension Motion
DPP - 5

1. A particle experiences a constant acceleration for 20 sec after starting from rest. If it travels a distance S_1 in the first 10 sec and a distance S_2 in the next 10 sec, then :
(A) $S_1 = S_2$ (B) $S_1 = S_2 / 3$
(C) $S_1 = S_2 / 2$ (D) $S_1 = S_2 / 4$

2. The initial velocity of the particle is 10 m/sec and its retardation is $2m/sec^2$. The distance moved by the particle in 5th second of its motion is :
(A) 1 m (B) 19 m
(C) 50 m (D) 75 m

3. A body starts from rest. What is the ratio of the distance travelled by the body during the 4th and 3rd second :
(A) 7/5 (B) 5/7
(C) 7/3 (D) 3/7

4. A student is standing at a distance of 50 metres from the bus. As soon as the bus begins its motion with an acceleration of $1ms^{-2}$, the student starts running towards the bus with a uniform velocity u. Assuming the motion to be along a straight road, the minimum value of u, so that the student is able to catch the bus is :
(A) 5 ms^{-1} (B) 8 ms^{-1}
(C) 10 ms^{-1} (D) 12 ms^{-1}

5. A car starts from rest and moves with uniform acceleration 'a' on a straight road from time t = 0 to t = T. After that, a constant deceleration brings it to rest. In this process the average speed of the car is:
(A) $\frac{aT}{4}$ (B) $\frac{3aT}{2}$
(C) $\frac{aT}{2}$ (D) aT

6. A body A is projected upwards with a velocity of 98 m/s. The second body B is projected upwards with the same initial velocity but after 4 sec. Both the bodies will meet after :
(A) 6 sec (B) 8 sec
(C) 10 sec (D) 12 sec

7. A body falls freely from rest. It covers as much distance in the last second of its motion as covered in the first three seconds. The body has fallen for a time of :
(A) 3 s (B) 5 s
(C) 7 s (D) 9 s

8. A body is slipping from an inclined plane of height h and length *l*. If the angle of inclination is θ, the time taken by the body to come from the top to the bottom of this inclined plane is :
(A) $\sqrt{\frac{2h}{g}}$ (B) $\sqrt{\frac{2l}{g}}$
(C) $\frac{1}{\sin\theta}\sqrt{\frac{2h}{g}}$ (D) $\sin\theta\sqrt{\frac{2h}{g}}$

9. A stone thrown upward with a speed u from the top of the tower reaches the ground with a velocity 3u. The height of the tower is :
(A) $3u^2 / g$ (B) $4u^2 / g$
(C) $6u^2 / g$ (D) $9u^2 / g$

10. A man in a balloon rising vertically with an acceleration of 4.9 m/sec^2 releases a ball 2 sec after the balloon is let go from the ground. The greatest height above the ground reaches by the ball is ($g = 9.8 m/sec^2$)
(A) 14.7 m (B) 19.6 m
(C) 9.8 m (D) 24.5 m

11. A rocket is fired upward from the earth's surface such that it creates an acceleration of 19.6 m/sec^2. If after 5 sec its engine is switched off, the maximum height of the rocket from earth's surface would be:
(A) 245 m (B) 490 m
(C) 980 m (D) 735 m

12. P, Q and R are three balloons ascending with velocities U, 4U and 8U respectively. If stones of the same mass be dropped from each, when they are at the same height, then :
(A) They reach the ground at the same time
(B) Stone from P reaches the ground first
(C) Stone from R reaches the ground first
(D) Stone from Q reaches the ground first

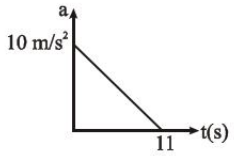
13. With what velocity a ball be projected vertically so that the distance covered by it in 5th second is twice the distance it covers in its 6th second ($g = 10\ m/s^2$)
(A) 58.8 m/s (B) 49 m/s
(C) 65 m/s (D) 19.6 m/s

14. A body thrown vertically upwards with an initial velocity u reaches maximum height in 6 seconds. The ratio of the distance 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. A particle when thrown, moves such that it passes from same height at 2 and 10 s, the height is :
(A) g (B) 2g
(C) 5g (D) 10 g

16. A body falling from a high Minaret travels 40 meters in the last 2 seconds of its fall to ground. Height of Minaret in meters is ($g = 10\ m/s^2$)
(A) 60 (B) 45
(C) 80 (D) 50

17. 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

18. A particle moves along a semicircle of radius 10m in 5 seconds. The average velocity of the particle is:
(A) $2\pi\ ms^{-1}$ (B) $4\pi\ ms^{-1}$
(C) $2\ ms^{-1}$ (D) $4\ ms^{-1}$

19. A motor car moving with a uniform speed of 20 m/sec comes to stop on the application of brakes after travelling a distance of 10 m. Its acceleration is :
(A) 20 m / sec^2 (B) –20 m / sec^2
(C) –40 m / sec^2 (D) + 2m / sec^2

20. The velocity of a body moving with a uniform acceleration of 2m / sec^2 is 10 m/sec. Its velocity after an interval of 4 sec is :
(A) 12 m / sec (B) 14 m / sec
(C) 16 m / sec (D) 18 m / sec

21. A particle moving with a uniform acceleration travels 24 m and 64 m in the first two consecutive intervals of 4 sec each. Its initial velocity is :
(A) 1 m/sec (B) 10 m/sec
(C) 5 m/sec (D) 2 m/sec

22. A body of mass 10 kg is moving with a constant velocity of 10 m/s. When a constant force acts for 4 seconds on it, it moves with a velocity 2 m/sec in the opposite direction. The acceleration produced in it is :
(A) 3 m/sec^2 (B) –3 m/sec^2
(C) 0.3 m/sec^2 (D) –0.3 m/sec^2

23. A car moving with a velocity of 10 m/s can be stopped by the application of a constant force F in a distance of 20 m. If the velocity of the car is 30 m/s, it can be stopped by this force in :
(A) $\frac{20}{3}$ m (B) 20 m
(C) 60 m (D) 180 m

24. A particle moves along a straight line such that its displacement at any time t is given by $S = t^3 - 6t^2 + 3t + 4$ metres. The velocity when the acceleration is zero is :
(A) $3\ ms^{-1}$ (B) $-12\ ms^{-1}$
(C) $42\ ms^{-1}$ (D) $-9\ ms^{-1}$

25. The displacement of a particle starting from rest (at t = 0) is given by $s = 6t^2 - t^3$. The time in seconds at which the particle will attain zero velocity again, is :
(A) 2 (B) 4
(C) 6 (D) 8

ANSWER KEY

1.	C	2.	A	3.	C	4.	C	5.	C	6.	D	7.	B
8.	A	9.	B	10.	A	11.	D	12.	B	13.	C	14.	B
15.	D	16.	B	17.	B	18.	D	19.	B	20.	D	21.	A
22.	B	23.	D	24.	D	25.	B						