SUBJECT- **PHYSICS**
Straight Line of Motion (DPP-4)

Objective questions:-

1. A body along one quarter of a circle, the ration of distance to displacement is

   a) $\dfrac{\pi}{2\sqrt{2}}$
   b) $\dfrac{2\sqrt{2}}{\pi}$
   c) $\dfrac{\pi}{\sqrt{2}}$
   d) $\dfrac{\sqrt{2}}{\pi}$

2. A car covers 1/3 part of total distance with a speed of 20 kmh^{-1} and second 1/3 part with a speed of 30kmh^{-1} and the last 1/3 part with a speed of 60 kmh^{-1} the average speed of the car is

   a) 55 km/h
   b) 30 km/h
   c) 45 km/h
   d) 37.3 km/h

3. A particle is moving, such that its position coordinates (x, y) are (2m, 3m) at time t=0, (6m, 7m) at time t = 2s and (13m, 14m) at time t = 5 s.
   Average velocity vector (v_{av}) from t=0 tot=5 s is

   a) $\dfrac{1}{5}(13\hat{\imath} + 14\hat{\jmath})$
   b) $\dfrac{7}{3}(\hat{\imath} + \hat{\jmath})$
   c) $2(\hat{\imath} + \hat{\jmath})$
   d) $\dfrac{11}{5}(\hat{\imath} + \hat{\jmath})$

4. Two particles A and B are moving in xy-plane. Their positions vary with time t according to relation $x_A(t)=3t$. $x_B(t)=-6$ and $y_A,(t)=t$. $y_B,(t)=2+3t^2$. The distance between these particles at t = 1 s is

   a) 5 m
   b) 3 m
   c) 4 m
   d) $\sqrt{12\,m}$

5. A runner completes one round of a circular path of radius r in 40 s. His displacement after 2 min 20 s will be

   a) Zero
   b) $2\pi r$
   c) $2r$
   d) $7\pi r$

6. A motor car is going due north at a speed of 50 km/h, it makes a 90^0 left turn without changing the speed. The change in velocity of the car is about

   a) 50km/h
   b) $50\sqrt{2}$ km towards south –west
   c) 70km/h towards north-west
   d) None of these

7. A particle moves on a straight line. The product of its acceleration and velocity is constant. The distance moved by the particle in time t is proportional to
   a) t
   b) $\sqrt{t}$
   c) t3/2
   d) t2

8. A 150 m long train is moving with a uniform velocity of 45 km/h. The time taken by the train cross a bridge of length 850 m is

   a) 56 s   b) 68 s   c) 80 s   d) 92 s

9. A particle its motion is projected vertically upwards. It travels equal distance during 5th and 6th second Find of its motion. Find projection speed (Take, $g = 9.8$ m/s²)

   a) 50 m/s   b) 30 m/s   c) 49 m/s   d) 29.4 m/s

10. A particle moves with constant acceleration for 6 s after starting from rest. The distance travelled during the consecutive 2 s interval are in the ratio

    a) 1:1:1   b) 1:2:3   c) 1:3:5   d) 1:5:9

11. A particle is moving in a straight line with initial velocity u and uniform acceleration a . if the sum of the distances travelled in t th and (t+1) th s is 100 cm, then its velocity after t s (in cm/s) is

    a) 20   b) 30   c) 50   d) 80

12. A ball is thrown upwards from the ground. It crosses a point at the height of 25 m twice at an interval of 4 s. The ball was thrown with the velocity of

    a) 20 m/s   b) 25 m/s   c) 30 m/s   d) 35 m/s

13. A particle is projected vertically upward with initial velocity 25m/s for its motion during third second, which of the following statement is correct?

    a) Displacement of the particle is 10 m.
    b) Distance covered by the particle is 10 m.
    c) Distance covered by the particle is 2.5 m.
    d) None of these

14. A stone thrown upwards with speed u attains maximum height h. another stone thrown upwards from the same point with speed 2u attains maximum height H. what is the relation between h and H?

    a) 2h=H   b) 3h=H   c) 4h=H   d) 5h=H

15. A body starting from rest covers a distance of 9 m in the fifth second. The constant acceleration of the body is

    a) 2 m/s^2 b) 0.2 m/s^2 c) 1.8 m/s^2 d) 4 m/s^2

16. Whit 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 ? (take $g = 10$ m/s^2)

    a) 58.8 m/s   b) 49 m/s   c) 65 m/s   d) 19.6 m/s

17. A body falling from height h takes t_1 time to reach the ground. The time taken to cover the first half of the height is

a) $t_2 = t_1/\sqrt{2}$ b) $t_1 = t_2/\sqrt{2}$ c) $t_2 = \sqrt{3}t_1$ d) $t_1 = \sqrt{3}t_2$

18. One particle is dropped while another particle is thrown downwards with initial velocity of 2 m/s, simultaneously. Both these particles are at a separation of 18 m after time t is

    a) 4.5 s   b) 9 s   c) 9.8 s   d) 18 s

19. A body is dropped under gravity. The ratio of distance covered by the body in 1st and 6th second of motion is

    a) 1:11   b) 1:6   c) 1:5   d) 5:12

20. A body moving with a uniform acceleration crosses a distance of 65 m in the 5th second and 105 m in 9th second. How for will it go in 20 s ?

    a) 2040 m   b) 240m   c) 2400 m   d) 2004 m

21. A window is 50 cm long. A stone is falling from a height of 40 cm above the window. It crosses the window in

    a) $\frac{3}{7}$ s   b) $\frac{2}{7}$ s   c) $\frac{1}{7}$ s   d) $\frac{4}{7}$ s

22. If a ball is thrown vertically upward with speed u, the distance covered during the last t second of its ascent is

a) $\frac{1}{2}gt^2$ b) $ut - \frac{1}{2}gt^2$ c) $(u - gt)t$ d) ut

23. **Assertion:** Time to reach maximum height is same as time to fall for a ball thrown in air.
   Reason: Motion in gravitational field with air resistance is asymmetrical.

    a) Both A and R are correct and R explains A.   b) Both A and R are correct and R does not explains A
    c) A is correct R is incorrect.   (d) A is incorrect R is correct.

24. For a moving bus, if its displacement-time relation is given as s-t-27t +4. Then, find its acceleration when its velocity is zero

    a) 15 m/s^2 b) 18 m/s^2 c) 20 m/s^2 d) 24 m/s^2

25. The acceleration of a particle starting from rest varies with time according to relation a-at+ The velocity of the particle after a time t will be

    a) $\frac{\alpha t2}{2} + \beta$ b) $\frac{\alpha t2}{2} + \beta t$ c) $\alpha t^2 + \frac{1}{2}\beta t$ d) $\frac{(\alpha t2 + \beta)}{2}$

26. For motion of an object along the x- axis, the velocity v depends on the displacement x as $v = 3x^2 - 2x$, then what is the acceleration at x = 2m?

    a) 48 m/s^2 b) 80 m/s^2 c) 18 m/s^2 d) 10 m/s^2

27. The displacement of a particle moving along x axis depends on time as $\sqrt{x}=t+1$. Velocity of particle

    a) Increases with time   b) decreases with time
   c) is independent of time   c) None of these

28. . The coordinates of a particle moving in xy- plane vary time as $x=4t^2$, $y=2t$ the path of the particle is

    a) a straight line   b) a circle   c) a parabola   d) an ellipse

29. Stating from rest, acceleration of a particle is a =2(t-1). The velocity of the particle at t = 5 s is
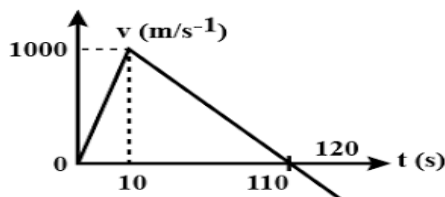
    a) 15 m/s   b) 25 m/s   c) 5 m/s   d) 0

30. Acceleration – velocity graph of a moving particle s shown in figure . the particle is
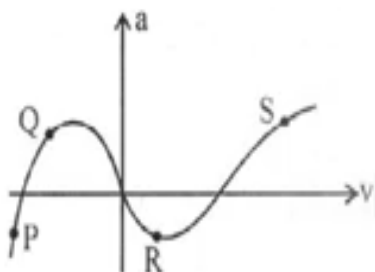

    a) Speeding up at P   b) speeding up at Q   c) speeding down at S   d) speeding up at R

31. The graph shows the variation of velocity of a rocket with time. Then the maximum height attained by the rocket is


    a) 1.1 km   b) 5 km   c) 55 km   d) none of these

32. The diagram shows the displacement-time graph for a particle moving n a straight line. The distance covered by the particle in the time interval t =0 to t = 5 s is
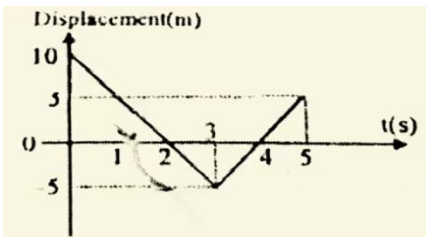
    a) 12.5 m   b) 17.5 m   c) 22.5 m   d) 25.5 m

33. Each of the three graphs represents acceleration versus time for an object that already has a positive velocity at time t_1. Which graphs show an object whose speed is increasing for the entire time interval between t_1 and t_2 ?
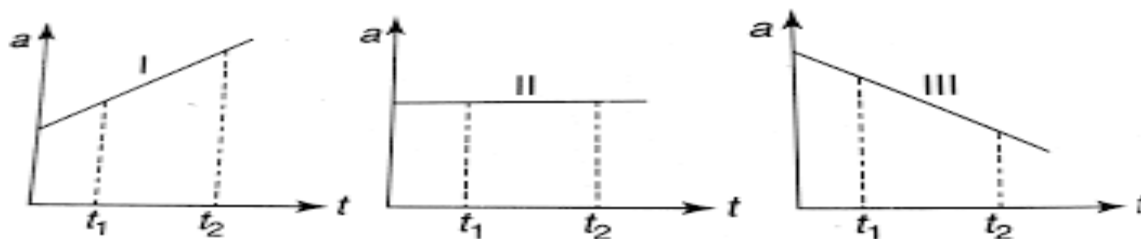
   a) Graph I only   b) Graphs I and II only   c) Graphs I and III only   d) Graphs I, II and III only

34. Figure shows two displacement –time graphs of A and B. the relative velocity of particles

   a) is zero   b) is (non – zero) constant   c) continuously increases   b) continuously decreases

35. A boy can swim in still water at I m/s. He swims across a river flowing at 0.6 m/s which is 336 m wide. If he travels in shortest possible time. Then what time he takes to cross the river?

   a) 250 s   b) 420 s   c) 340 s   d) 336 s

36. Car A moves due north at a speed of 40 km/h. while another car B moves due east at a speed of 30 km/h. Find velocity of car B relatives to car A (both in magnitude and direction).

   a) 40 km/h/ at an angle $\tan^{-1}(\frac{3}{5})$ south of east
   b) 50 km/h/ at an angle $\tan^{-1}(\frac{3}{5})$ south of east
   c) 40 km/h/ at an angle $\tan^{-1}(\frac{3}{4})$ south of east
   d) 50 km/h/ at an angle $\tan^{-1}(\frac{3}{4})$ south of east

37. The ratio of the distances travelled by a freely falling body in the 1st , 2nd , 3rd and 4th second

   a) 1: 4:9:16   b) 1: 3:5:7   c) 1:1:1:1   d) 1:2:3:4
   b)

38. A car starts from rest and accelerates at 5 m/s^2. At t = 4 s, a ball is dropped out of a window by a person sitting in the car. What is the velocity and acceleration of the ball at t = 6 s ? (Take g = 10 m/s^2)

   a) 20 m/s, 5 m/s^2 b) 20 m/s, 0   c) 20 $\sqrt{2}$ m/s, 0   d) 20$\sqrt{2}$ m/s, 10 m/s^2

39. Preeti reached the metro station and found that the escalator was not working. she walked up the stationary escalator in time t_1. on other days if she remains stationary on the moving escalator, then the escalator takes her up in time t_2. The time taken by her to walk up on the moving escalator will be

a) $\frac{t_1+t_2}{2}$

b) $\frac{t_1t_2}{t_1-t_2}$

c) $\frac{t_1t_2}{t_2+t_1}$

d) $t_1 - t_2$

40. If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1 s and 2 s is

a) $3A + 7B$

b) $\frac{3}{2}A + \frac{7}{3}B$

C) $\frac{A}{2} + \frac{B}{3}$

d) $\frac{3}{2}A + 4B3$

41. Two car P and Q start from a point at the same time in a straight line and their positions are represented by X_p (t) = at + bt^2 and X_Q (t) = ft - t^2. At what time do the cars have the same velocity?

a) $\frac{a-f}{1+b}$

b) $\frac{a+f}{2(b-1)}$

c) $\frac{a+f}{2(1+b)}$

d) $\frac{f-a}{2(1+b)}$

42. The motion of a particle along a straight is line is described by equation $x = 8+12t-t^3$ where, x is in metre and t in s. The retardation of the particle, when its velocity becomes zero is

a) 24 ms^{-2}

b) zero

c) 6 ms^{-2}

d) 12 ms^{-2}

43. A body standing at the top of a tower of 20 m height drops a stone. Assuming, $g = 10$ ms^{-2}, the velocity with which it hits the ground is

a) 20 m/s

b) 40 m/s

c) 5 m/s

d) 10 m/s

44. A ball is dropped from a high rise platform at t = 0 starting from rest. After 6 s, another ball is thrown downwards from the same platform with a speed v. the two balls meet at 1 = 48 s. what is the value of v ? (take $g = 10$ ms^{-2})

a) 74 ms^{-2}

b) 55 ms^{-2}

c) 40 ms^{-2}

d) 60 ms^{-2}