

YAKEEN NEET 2.0

2026

Motion in a Straight Line

Physics

Assignment Solution 05

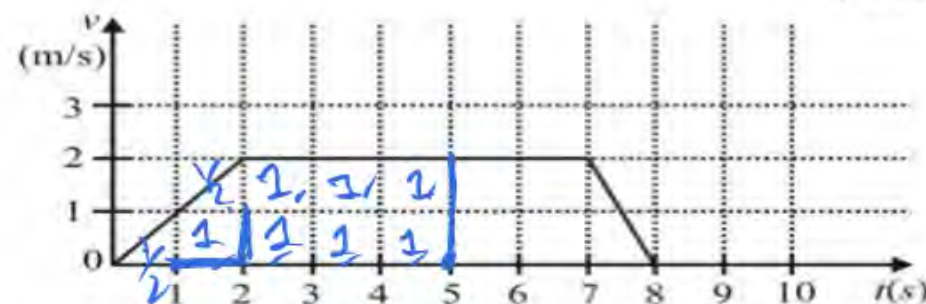
By- Manish Raj (MR Sir)



Motion in a Str

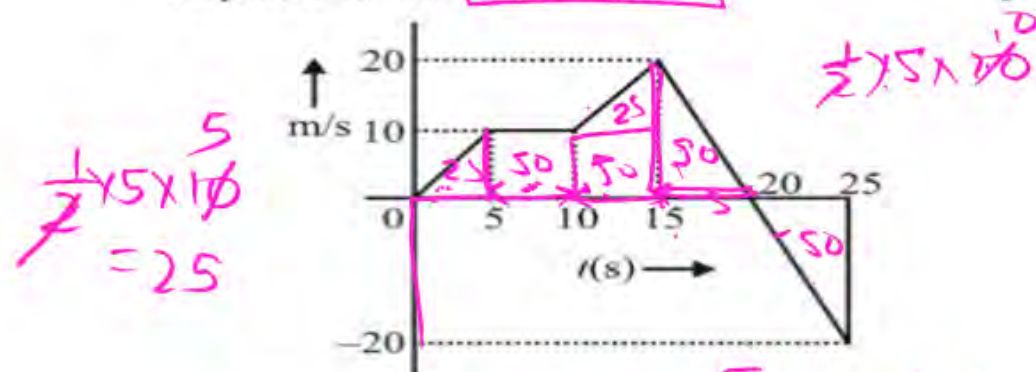
1. A particle starts from the origin at time $t = 0$ and moves along the positive x -axis. The graph of velocity with respect to time is shown in figure. What is the position of the particle at time $t = 5$ s?

[2019]



- (1) 10 m
(2) 6 m
(3) 3 m
(4) ~~7 m~~ 8

2. From the v - t graph shown, the ratio of distance to displacement in 25s of motion [2023]



- (1) $\frac{3}{5}$
(2) $\frac{1}{2}$
(3) $\frac{5}{3}$
(4) 1

Ans

$$200 + 50 = \frac{250}{3} = \text{displacement}$$

$$\text{displacement} = \frac{250}{3}$$

$$\text{displacement} = x_f - x_i$$

5 Given below are two statements:

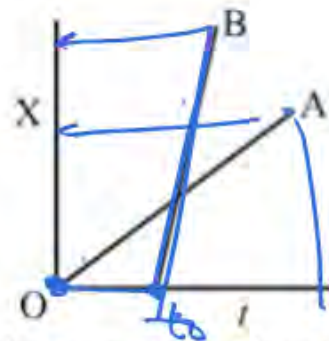
~~X~~ **Statement-I:** Area of the velocity-time graph gives the distance travelled by the body in a given time.

Statement-II: Area under acceleration-time graph is equal to the change in velocity in the given time.

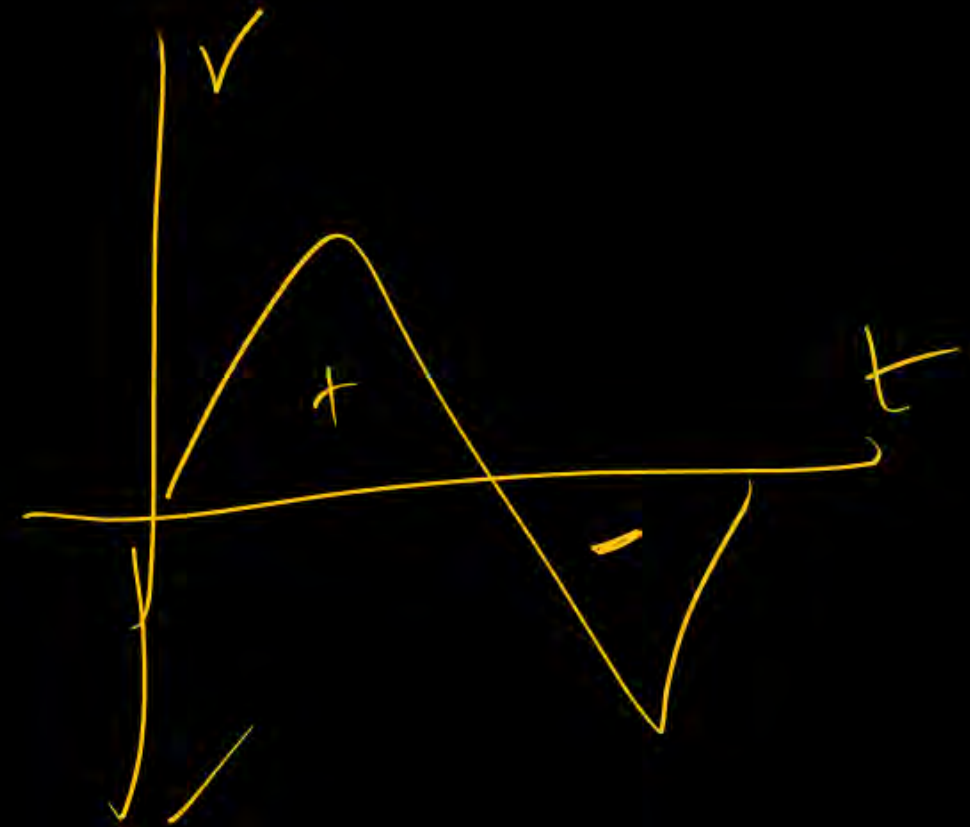
[1997]

- (1) Both Statement I and Statement II are true.
- (2) Statement I is true but Statement II is false.
- ~~(3)~~ Statement I is false but Statement II is true.
- (4) Both Statement I and Statement II are False.

4. The position-time graphs for two students A and B returning from the school to their homes are shown in figure. [2023]

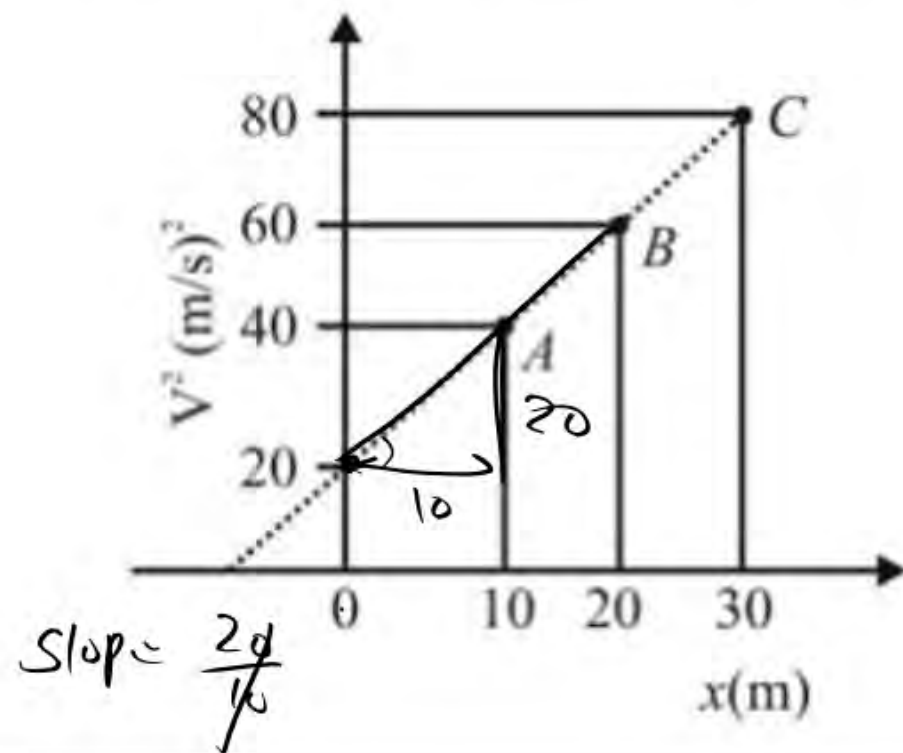


- ~~(A)~~ A lives closer to the school
 - ~~(B)~~ B lives closer to the school
 - ~~(C)~~ A takes lesser time to reach home
 - ~~(D)~~ A travels faster than B
 - ~~(E)~~ B travels faster than A
- ~~(1)~~ (A) and (E) only
 - (2) (B) and (E) only
 - (3) (A), (C) and (E) only
 - (4) (A), (C) and (D) only



5. A particle is moving with constant acceleration 'a'. Following graph shows v^2 versus x (displacement) plot. The acceleration of the particle is _____ m/s^2 .

[2021]



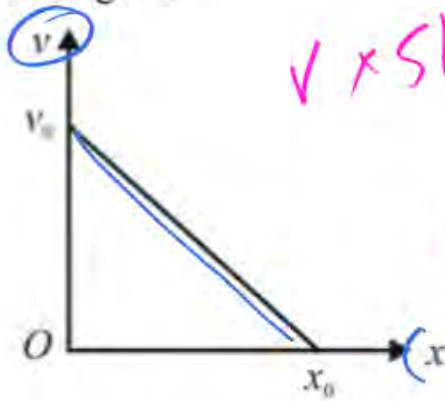
$$\text{Slope} = \frac{dv^2}{dx} = 2v \frac{dv}{dx}$$

$$\text{Slope} = 2 \times a \times x$$

$$a = \frac{\text{Slope}}{2} = \frac{20}{2} = 10 \text{ m/s}^2$$

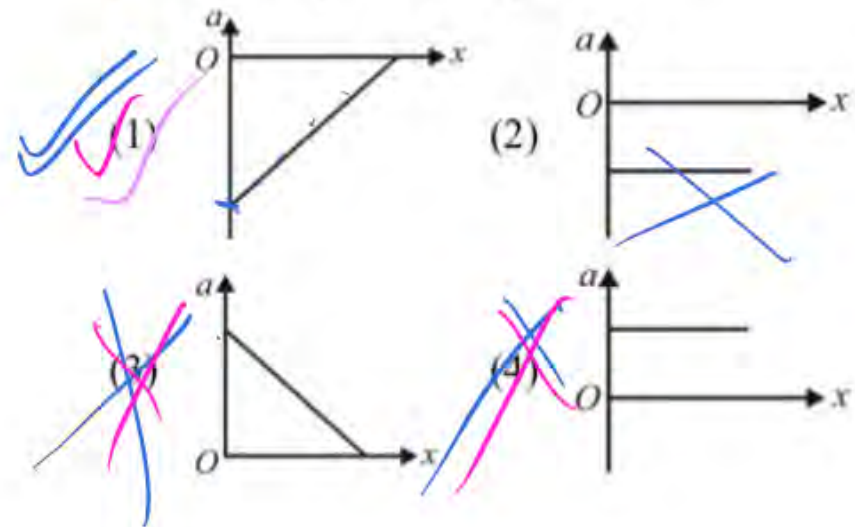


6. The velocity-displacement graph of a particle is shown in the figure. 8.

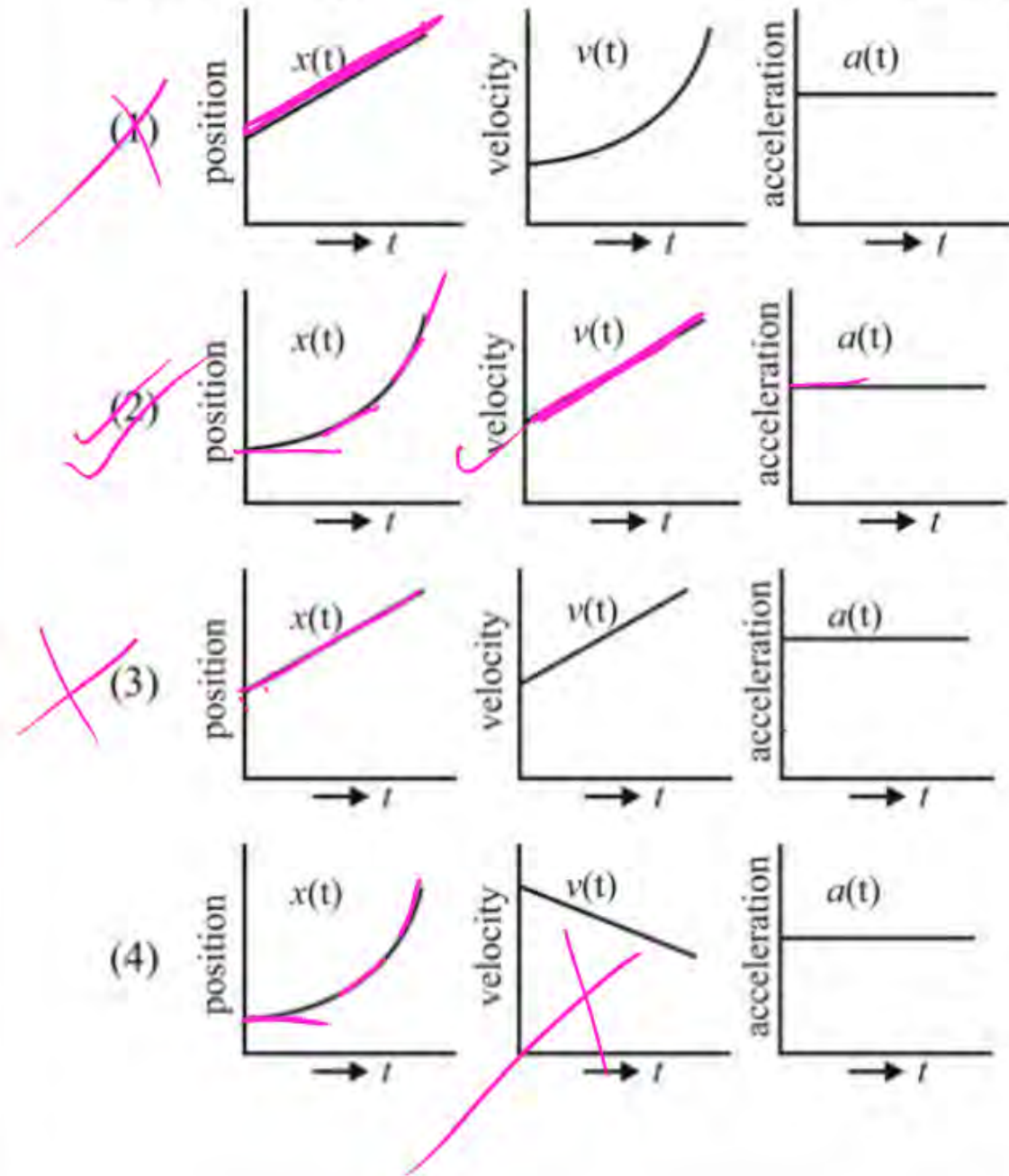


$v \times \text{slope} = \frac{dv}{dx} \times v$
 $a = -v \times \text{slope}$

The acceleration-displacement graph of the same particle is represented by: [2021]



7. The position, velocity and acceleration of a particle moving with a constant acceleration can be represented by [2021]



(3)

(4)

9. The
stra
 S is
the
 $v(t)$

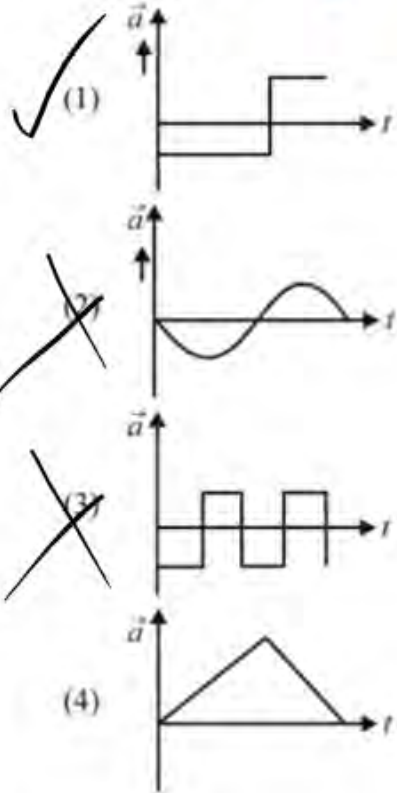
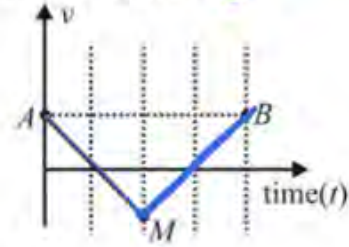
(1)

(2)

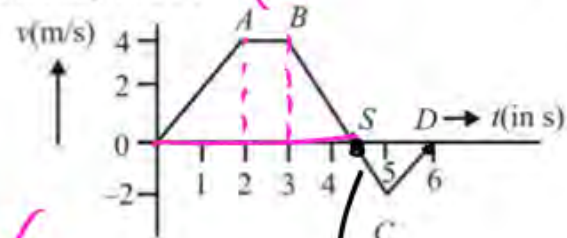
(3)

(4)

8. If the velocity-time graph has the shape AMB , what would be the shape of the corresponding acceleration-time graph? [2021]



9. The velocity (v) and time (t) graph of a body in a straight line motion is shown in the figure. The point S is at 4.333 second. The total distance covered by the body in 6 s is [2020]



(1) $\frac{37}{3}$ m

(2) 11 m

(3) 12 m

(4) $\frac{49}{4}$ m

$t = 4.33$



$$\frac{1}{2} \times (4.33 + 1) \times 2$$

$$5.33 \times 2$$

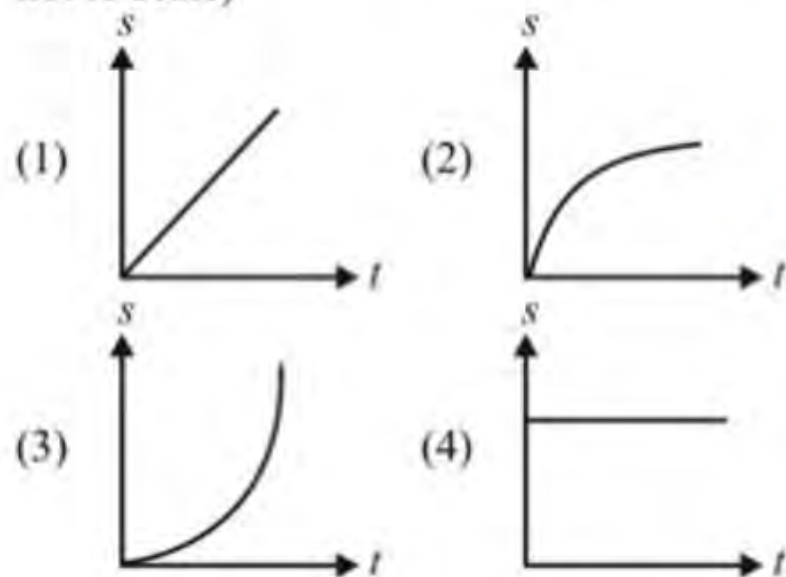
$$S = 10.66$$

$$S_1 = 10.66 + 1.66 = 12.32$$

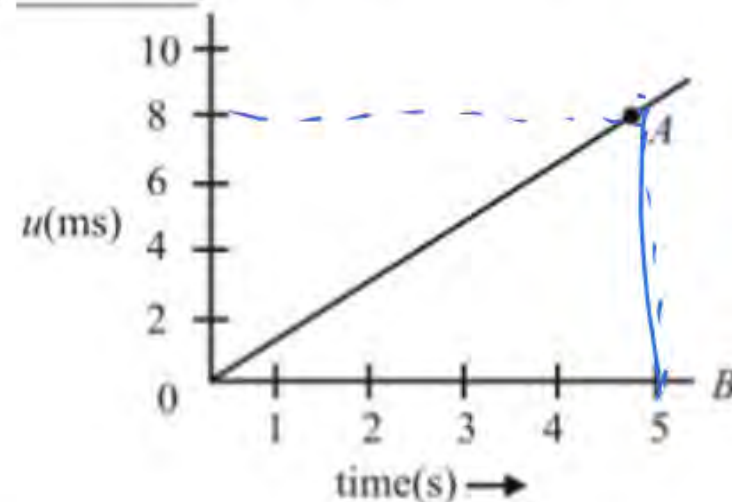
$$6 - 4.33 = 1.66$$

$$\frac{1}{2} \times 1.66 \times 2$$

10. A particle is moving unidirectionally on a horizontal plane under the action of a constant power supplying energy source. The displacement (s) – time (t) graph that describes the motion of the particle is (graphs are drawn schematically and are not to scale) [2020]



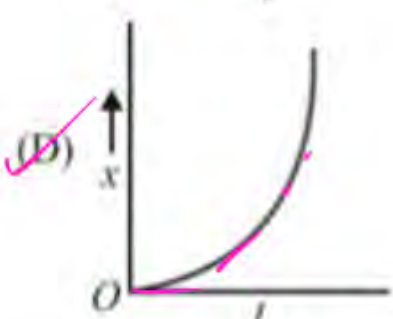
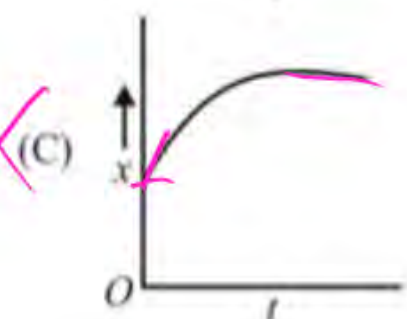
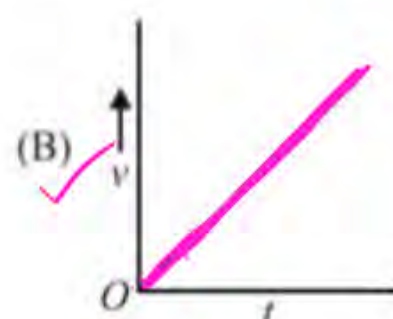
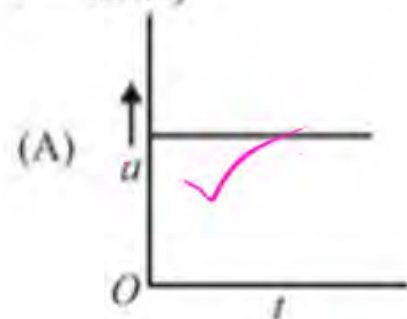
11. The speed versus time graph for a particle is shown in the figure. The distance travelled (in m) by the particle during the time interval $t = 0$ to $t = 5$ s will be [2020]



$\frac{1}{2} \times 5 \times 8$
 $= 20\text{m}$

12. A particle starts from origin O from rest and moves with a uniform acceleration along the positive x -axis. Identify the figure that is not correctly representing the motion qualitatively.

(a = acceleration, v = velocity, x = displacement, t = time) [2019]



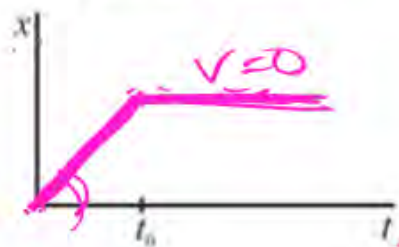
(1) (A), (B), (C)

(2) (A)

~~(3) (C)~~

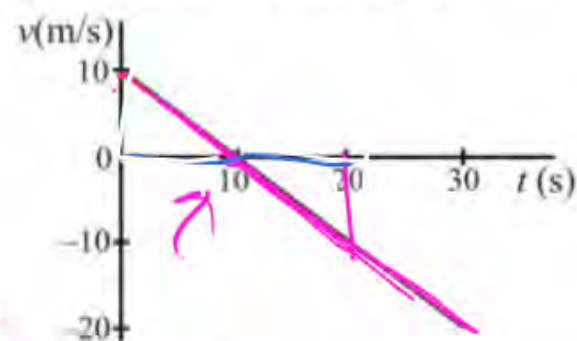
(4) (B), (C)

13. Figure shows the displacement-time graph of a particle moving on the x -axis.



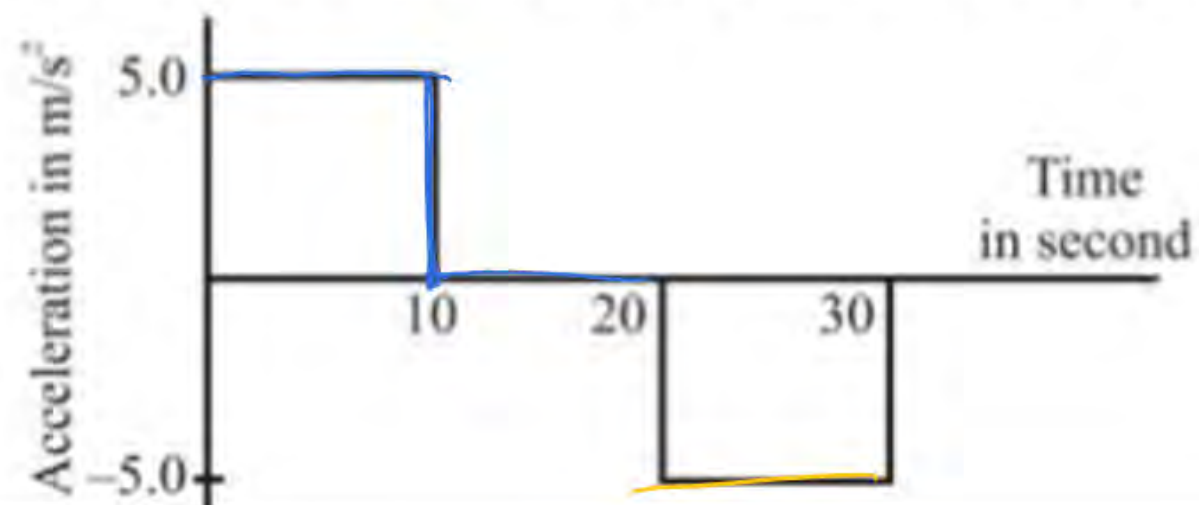
- ☒ (1) the particle is continuously going in positive x -direction
- ☒ (2) the particle is at rest
- ☒ (3) the velocity increases up to a time t_0 , and then becomes constant
- ☒ (4) the particle moves at a constant velocity up to a time t_0 , and then stops.

14. The velocity-time plot for a particle moving on a straight line is shown in the figure.

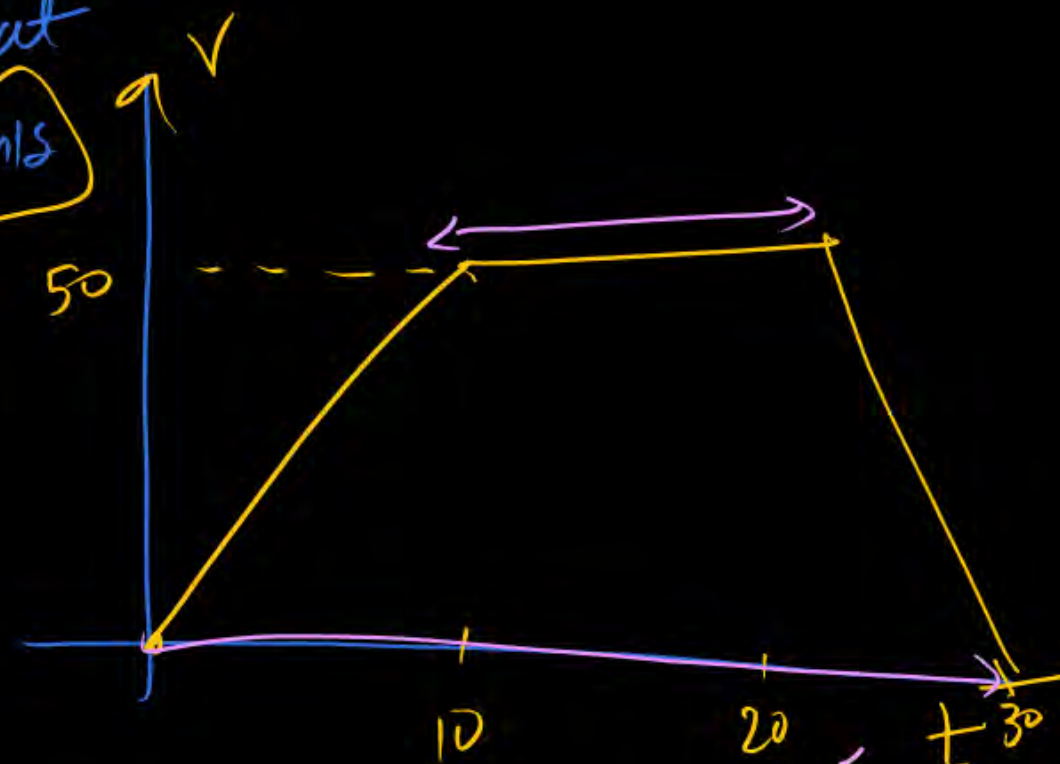


- ☒ (1) The particle has a constant acceleration.
- ☒ (2) The particle has never turned around.
- ☒ (3) The particle has zero displacement.
- ☒ (4) The average speed in the interval 0 to 10 s is the same as the average speed in the interval 10 s to 20 s.
- ☒ (5) Both (1) and (4)

15. The acceleration of a cart started at $t = 0$, varies with time as shown in figure. Find the distance travelled in 30 seconds and draw the position -time graph.



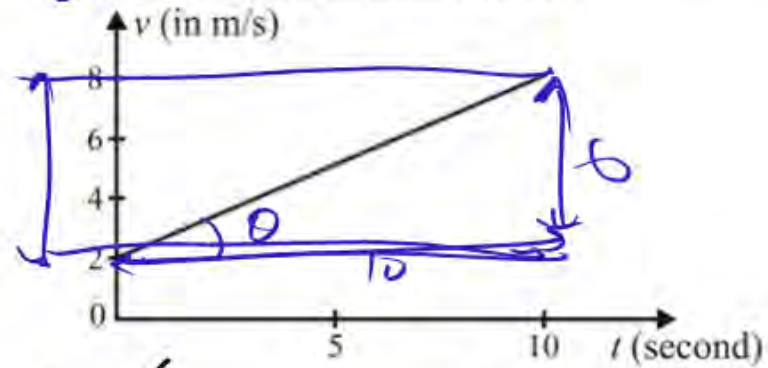
$u = 0$
 $a = 5 \text{ m/s}^2$
 $t = 10 \text{ sec}$
 $v = u + at$
 $v = 50 \text{ m/s}$



$\frac{1}{2} \times (30+10) \times \frac{50}{2}$
 $\boxed{40 \times 25}$
 $= 1000 \text{ m}$

16. Figure shows the graph of velocity versus time for a particle going along the x -axis. Find

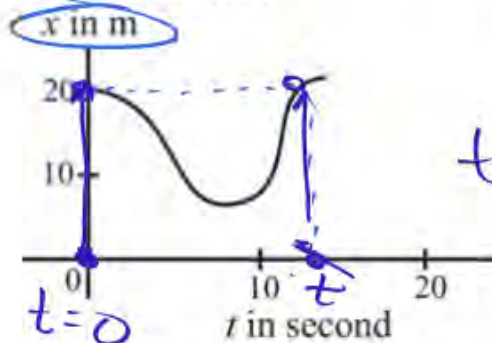
- (a) the acceleration,
- (b) the distance travelled in 0 to 10 s and
- (c) the displacement in 0 to 10s.



$$\tan \theta = \frac{6}{10} = 0.6$$

$$\frac{1}{2} \times 10 \times 6 = 30 \text{ m}$$

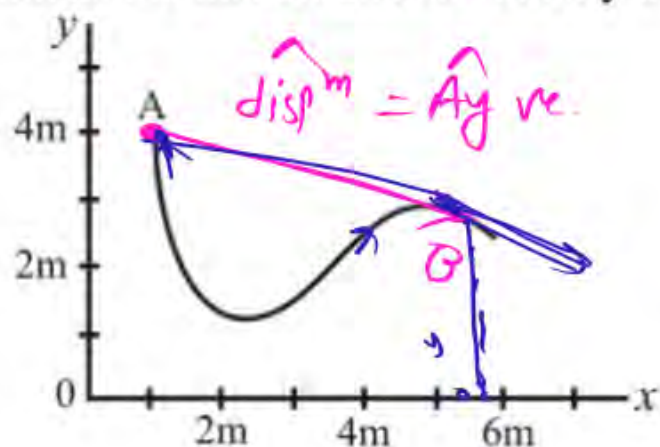
18. Figure shows x - t graph of a particle. Find the time t such that the average velocity of the particle during the period 0 to t is zero. [1997]



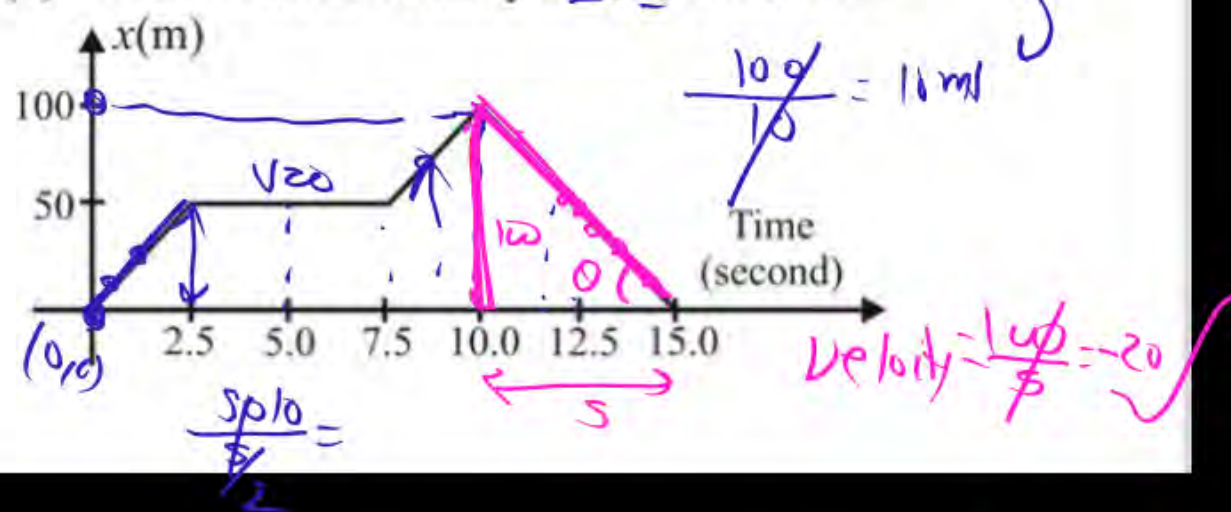
time b/w 10 to 20 sec

$$t = 12 \text{ sec}$$

19. A particle starts from a point A and travels along the solid curve shown in figure. Find approximately the position B of the particle such that the average velocity between the positions A and B has the same direction as the instantaneous velocity at B.



17. Figure shows the graph of x -coordinate of a particle going along the x -axis as a function of time. Find
 (a) the average velocity during 0 to 10s,
 (b) instantaneous velocity at 2, 5, 8 and 12s.



dirⁿ of Avg velocity along displacement

THANK
YOU