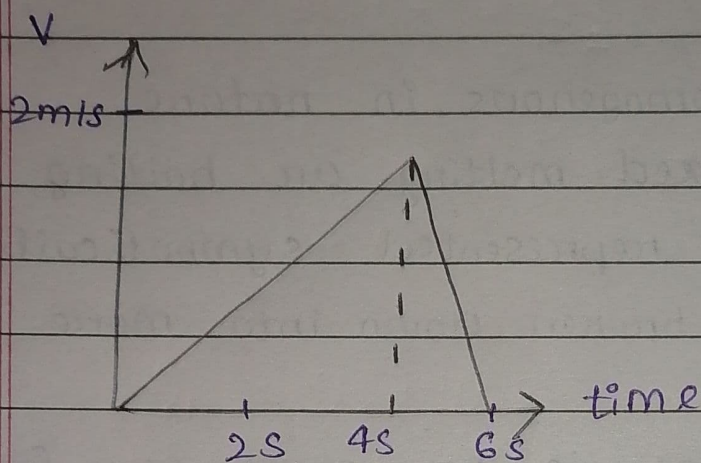


Home Assignment

- 1) The v-t graph of a particle moving along a straight line is shown. Which of the following is/are incorrect.



Ans)

- 1) motion is uniform
- 2) The acceleration is uniform.

- 2) Initially car A is 10.5 m ahead of car B. Both start moving at $t=0$ in same direction on a straight line. The velocity time graph of two cars is given. Find time when car B will reach A.

Let distance travelled by CAR B when it would catch car B be = x m.

Distance by which car A is ahead of car B
= 10.5 m.

So, distance travelled by CAR A when car B will catch it be = $(x - 10.5 \text{ m})$

Let time taken by both cars from O to meet each other be = t seconds.

Initial velocity of both cars = 0 m/s .

From (ii) equation of motion :-

Distance travelled by CAR B

$$= S_1 = ut + \frac{1}{2}at^2$$

$$= \frac{1 \times a \times t^2}{2}$$

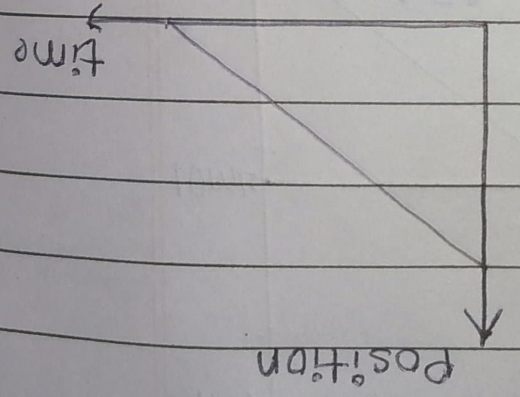
Acceleration of car B = slope = $\tan \theta = \tan 45^\circ$
 $= 1 \text{ m/s}^2$

$$\text{So, } S_2 = \frac{1 \times 1 \times t^2}{2} = \frac{t^2}{2}$$

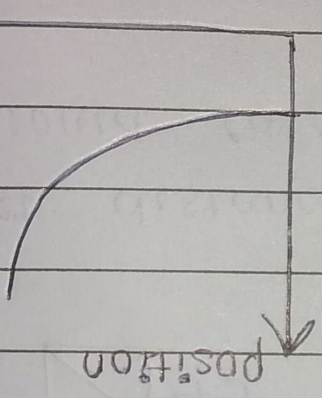
3) Match the situation given in column I with possible curves in column II

Column I

a) Particle moving with - s) constant speed -



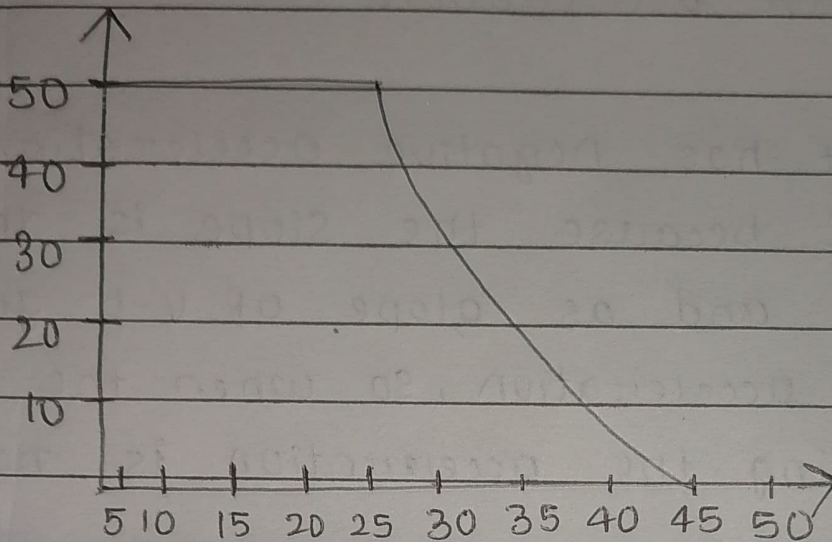
b) Particle moving with - r) increasing acceleration



c) Particle moving with constant negative acceleration - NO match.

a) Particle with zero acceleration - NO match.

4) The $v-t$ graph of an object is shown,



a) State kind of motion the object has from A-B and B-C.

The object have uniform motion or non-accelerated motion from A-B and a ~~non-uniform~~ retarded motion from B-C. [negative acceleration]

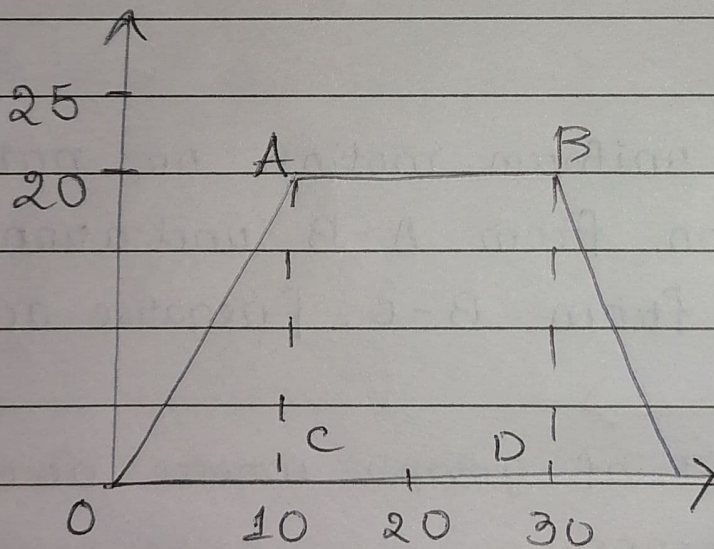
b) Identify the part of graph where acceleration is zero. Give reason.

The object have zero acceleration from A-B
The slope of a graph gives acceleration
But here the graph is parallel to time axis which means slope is zero. Hence the acceleration of the object is zero.

c) Identify the part of graph where object has negative acceleration

The object has negative acceleration from B-C because the slope is decreasing with time and as slope of v-t graph represents acceleration, so when the slope is decreasing the acceleration is negative.

5i) The velocity-time graph of a body is given



i) State kind of motion reported by OA, AB?

The kind of motion reported in OA is uniformly accelerated motion.

The kind of motion reported in AB is uniformly retarded motion.

ii) What is velocity of body after 10s and 40s?

The velocity of body after 10s is 20m/s and 40s is 0 m/s, means the body is not moving.

ii) What is velocity of body after 10s and 40s?

The velocity of body after 10s is 20m/s and after 40s is 0m/s, means the body is not moving.

iii) Calculate negative acceleration of the body.

Initial velocity when body started retarding
= 20 m/s

Final velocity when body stopped = 0 m/s.

Time taken by body to stop after retarding
= 10s

So, negative acceleration of body

$$= a = \frac{v - u}{t}, \quad a = \frac{0 - 20}{10}$$

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

Hence negative acceleration of body is 20 m/s^2 .

iv) Calculate distance covered by body between 10th and 30th second.

Distance covered by body between 10th and 30th second

= Area under graph

= Area under ABCD

= $AB \times AC$

= $20 \times 20 = 400 \text{ m.}$

So, distance covered by body between 10th and 30th second is 400 m.