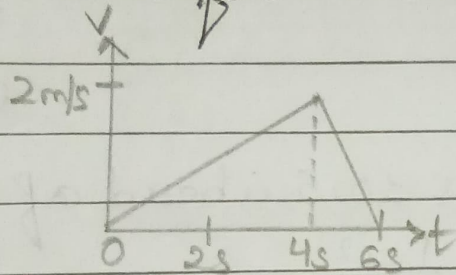


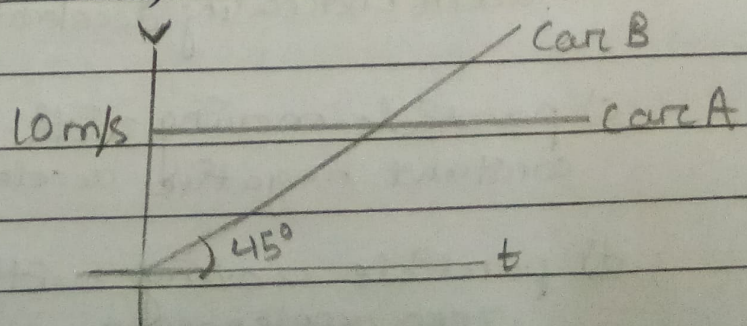
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1.6.21

① The velocity-time graph of a particle moving along a straight line is shown in figure. Which of the following is/are incorrect for this motion?



- i) The motion is uniform.
- ii) The acceleration is uniform.
- iii) The particle changes its direction of motion.  
**Incorrect**
- iv) The displacement during the period 0-4 s is equal to the area under the velocity-time graph for this period.

② Initially car A is 10.5 m ahead of car B. Both start moving at time  $t=0$  in the same direction along a straight line. The velocity-time graph of two cars is shown in figure. Find the time (in sec) when the car B will catch the car A.



Ans. The distance travelled by A is calculated as  $s_A = 10t$  (velocity is given as  $10 \text{ m/s}$ ) and that of B is calculated as  $s_B = \frac{1}{2}at^2$

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

(As  $a = \tan 45^\circ = 1$ )

Initially A is 10.5 ahead of B, thus

$$s_A + 10.5 = \frac{1}{2}t^2$$

So, the equation:-

$$10.5 + 10t = \frac{1}{2}at^2$$

$$t^2 - 20t - 21 = 0$$

$$t = \frac{20 \pm \sqrt{400 + 84}}{2}$$

$$t = 21 \text{ sec.}$$

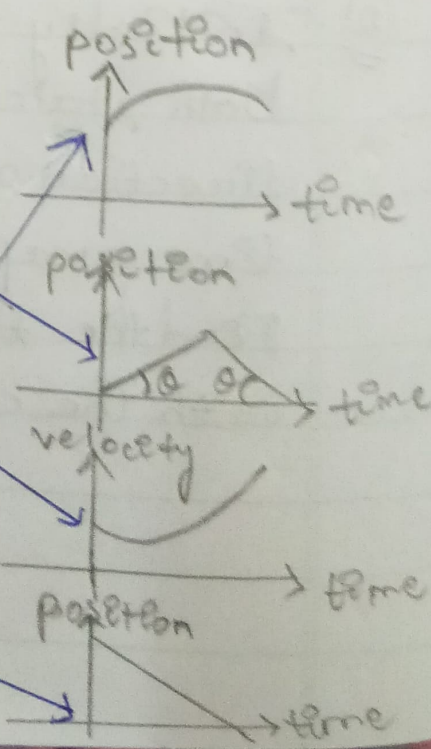
③ Match the following:-

a) particle moving with constant speed.

b) particle moving with increasing acceleration.

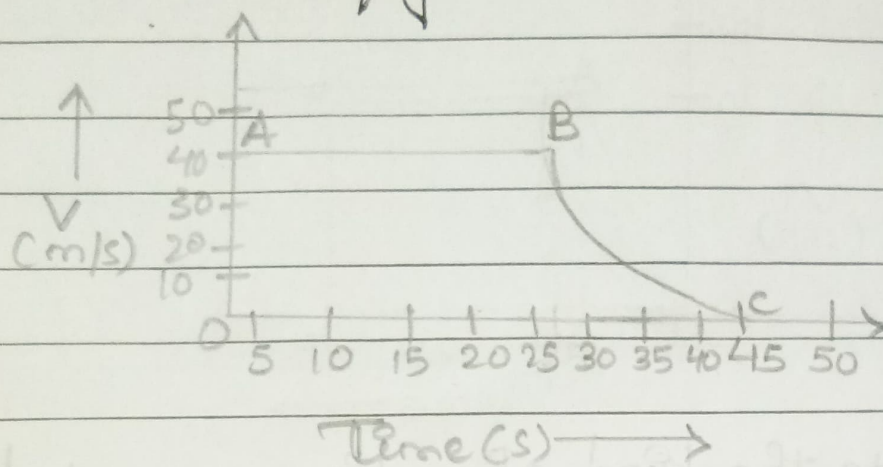
c) particle moving with constant negative acceleration.

d) particle moving with zero acceleration





- ④ The velocity-time graph of an object is shown in the figure.



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

Ans: Uniform motion from A to B and non-uniform motion from B to C.

- b) Identify the part of graph where the object has zero acceleration. Give reason for your answer.

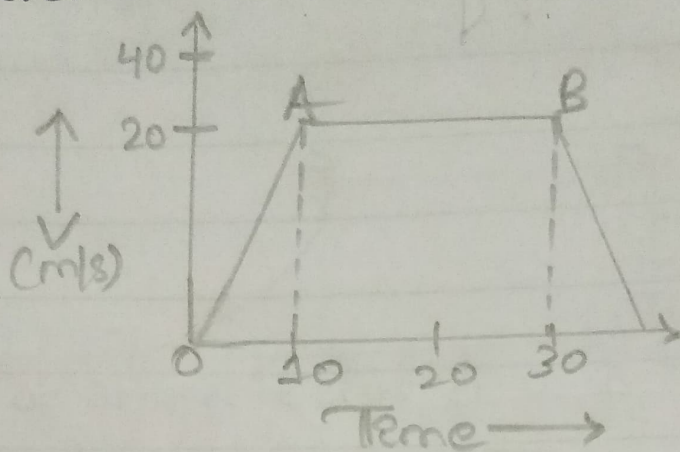
Ans: AB because velocity remains constant from A to B.

- c) Identify the part of the graph where the object has negative acceleration. Give reason to support your answer.

Ans: BC because velocity decreases from B to C.



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



i) State the kind of motion represented by OA, AB.  
 Ans: The motion represented by OA is constant acceleration and from A to B there is no increase in velocity with increase in time. So, AB shows uniform velocity.

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

Ans: The velocity after 10 seconds = 20 m/s  
 The velocity after 40 seconds = 0 m/s

iii) Calculate the retardation of the body.

Ans: Retardation =  $\frac{v-u}{t}$   
 $= \frac{20-0}{10} = \frac{20}{10} = \frac{2}{1} = 2 \text{ m/s}^2$

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

Ans: Distance covered = area under velocity-time graph that is area of rectangle  
 $= 20 \times 20 = 400 \text{ m}$