

HOME ASSIGNMENT

1. The velocity-time graph of a particle moving along a straight line is as shown in figure, which of the following is ~~one~~ incorrect for this motion?

(1) The motion is uniform.

Ans) correct

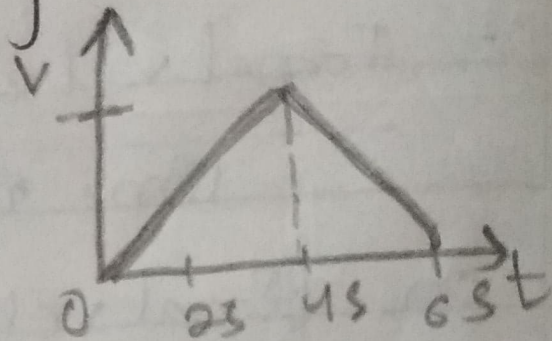
(2) The acceleration is uniform.

Ans) correct

(3) The particle changes its duration of motion.

Ans) Incorrect

(4) The displacement during the period 0-4s is equal to the area under the velocity-time graph for



this period.

Ans) Correct

2. Initially Car A is 10.5m 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.

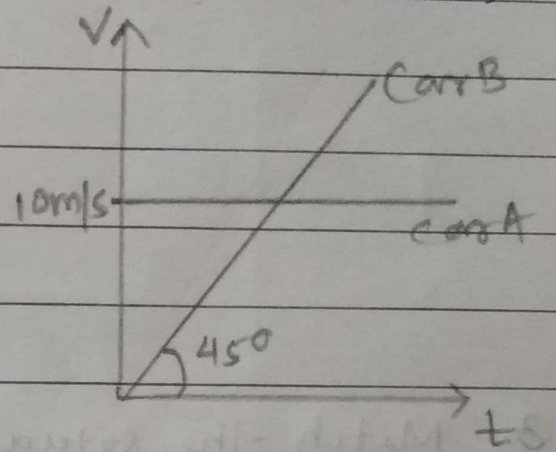
Find the time (in sec) when the car B will catch the car A.

Ans) From graph,

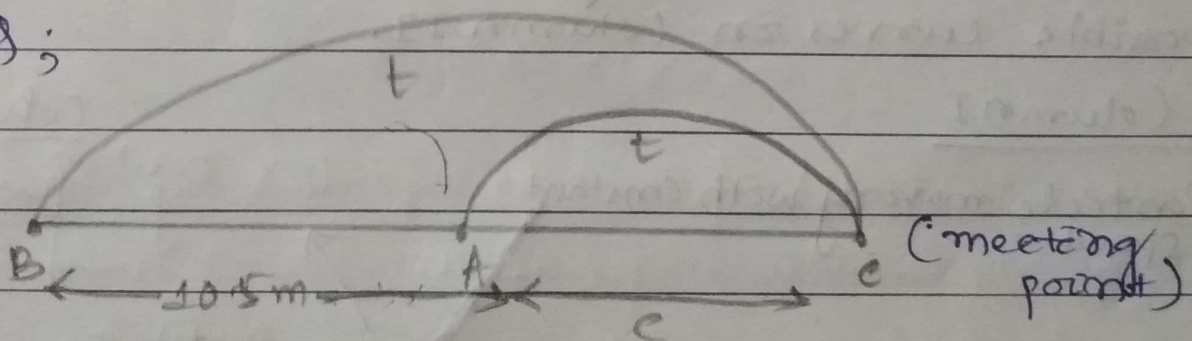
velocity of A = 10m/s

acceleration of B = slope = $\tan \theta$

$$= \tan 45 = 1$$



Ans;



Let $AC = x$ (C is the meeting point)

Time taken by A to reach C = Time taken by B to reach C.

for A
(uniform motion)

$$v = \frac{x}{t}$$

$$10 = \frac{x}{t}$$

$$x = 10t \rightarrow \textcircled{1}$$

for B

(uniformly accelerated motion)

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

$$u = 0$$

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

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

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

$\Rightarrow t = 21$ secs By solving

3. Match the situation given in Column I with the possible curves in Column II.

Column I

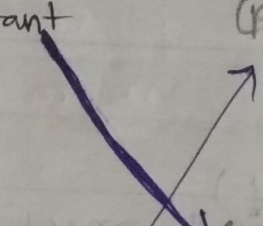
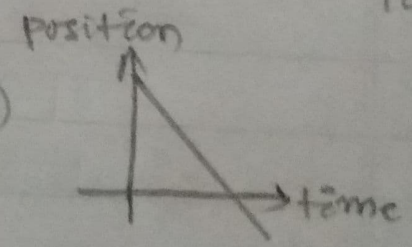
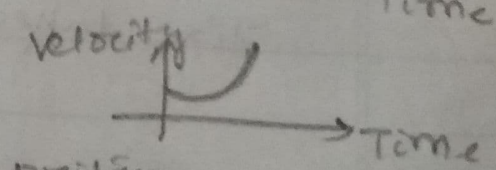
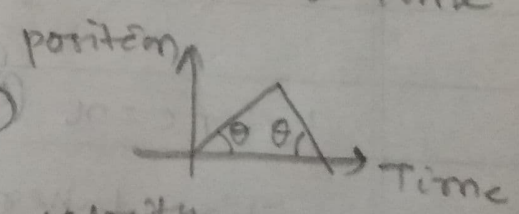
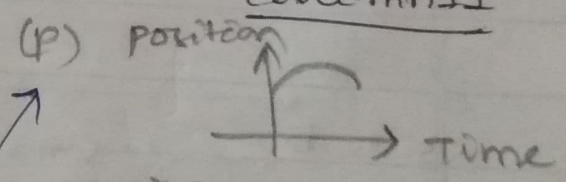
(A) Particle moving with constant speed

(B) Particle moving with increasing acceleration

(C) Particle moving with constant negative acceleration

(D) Particle moving with zero acceleration

Column II

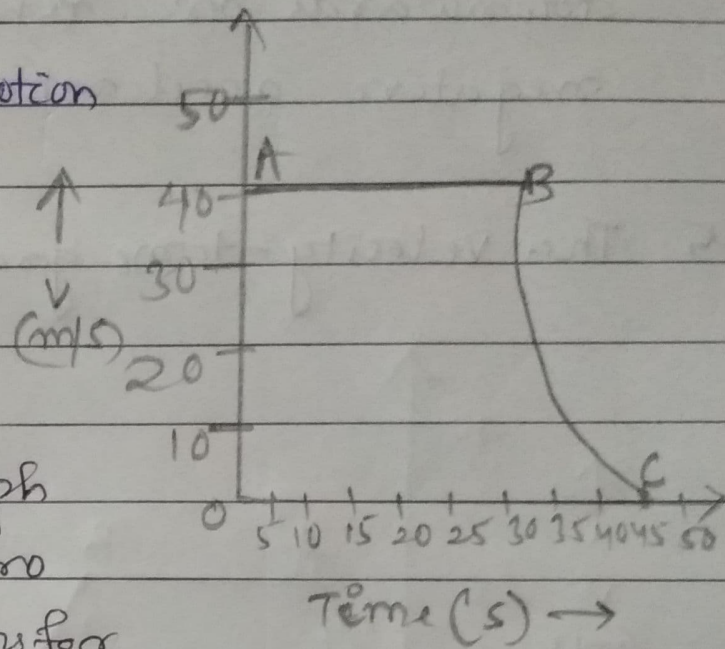


4. The velocity-time graph of an object is shown in the figure.

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

Ans) \Rightarrow From A to B:- Uniform motion

\Rightarrow From B to C:- Negatively accelerated (retarded) motion.



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

\Rightarrow The part of graph where the object has zero acceleration is from A to B.
The reason is:-

(i) The part A to B, is parallel to time axis which tells that $t \parallel a = 0$.

(ii) As the velocity is constant and is not changing, the acceleration is 0.

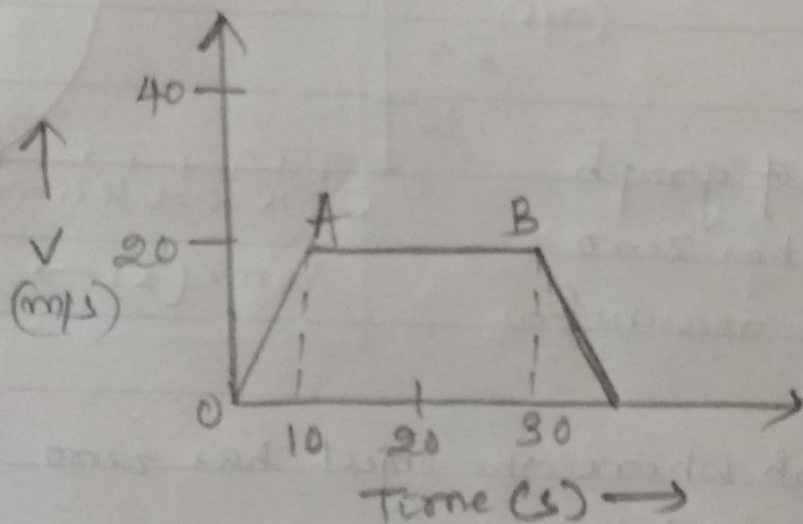
(c) Identify the part of the graph where the object has negative acceleration. Give reasons for your answer.

⇒ The part from B to C, has negative acceleration.

⇒ The reason is that:-

Because according to the graph, the slope is going downwards or retarding which means it is negative acceleration.

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



(i) State the kind of motion reported by OA, AB.

Ans) OA represents uniform acceleration motion and AB represents constant velocity i.e., uniform motion.

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

Ans) velocity of the body after 10s = 20 m/s
velocity of the body after 40s = 0 m/s = 0.

(iii) Calculate negative acceleration of the body.

Ans) ~~acceleration~~ acceleration = $\frac{v-u}{t}$

$$= \frac{20-0}{10} = 2 \text{ m/s}^2$$

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

Ans) Distance covered = Area of ABCD

$$= l \times b = 20 \times 20 = 400 \text{ m}$$