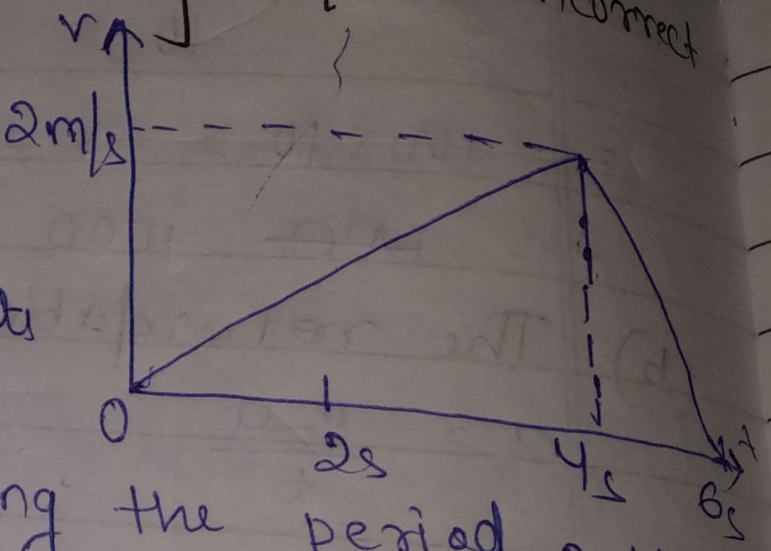
⇒ Home Assignment :-

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



Ans :- (1) The motion is uniform.

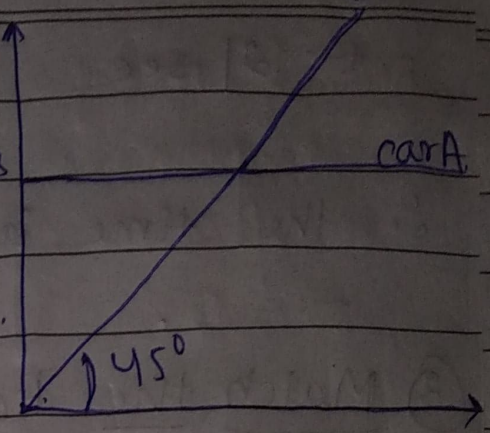
(3) The particle changes its direction of motion

(4) The displacement during the period 0-4s is equals to area under the v-T 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 v-T graph of two cars is shown in fig. Find the time (in s) when the

will catch the car A.

Ans:- Area of under v-T graphs gives distance/ displacement.



* displacement travelled by A =

$d = vt$

= car A = $10t$

* displacement / distance travelled by B :

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

~~$B = \frac{1}{2}at^2$~~

$s = ut^0 + \frac{1}{2}at^2$ (as initial velocity = 0)

$B = \frac{1}{2}at^2$ [$\tan 45^0 = 1 = a$]

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

Initially A is 10.5 m ahead of B, thus we got

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

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

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

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

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

$\therefore$ the time is 21 sec.

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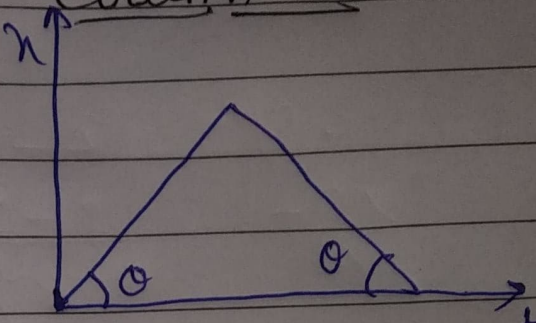
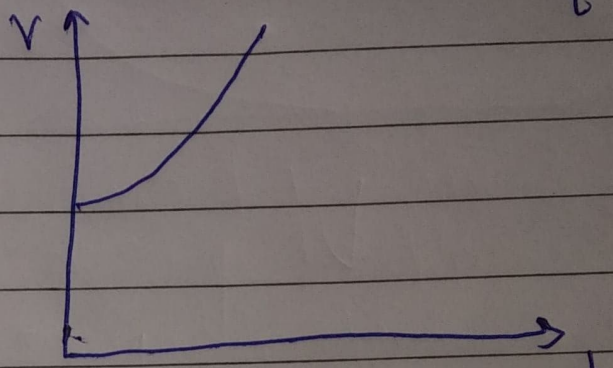
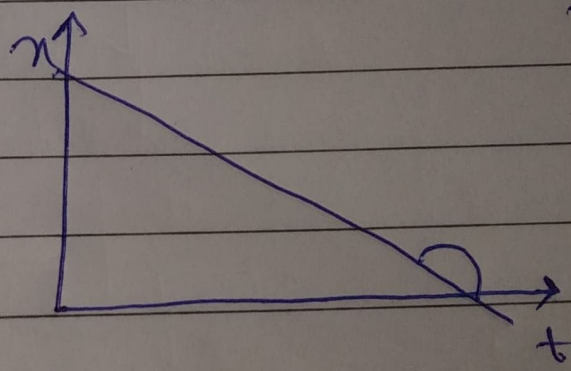
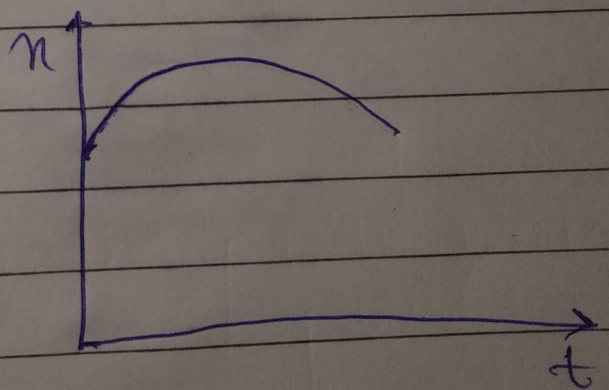
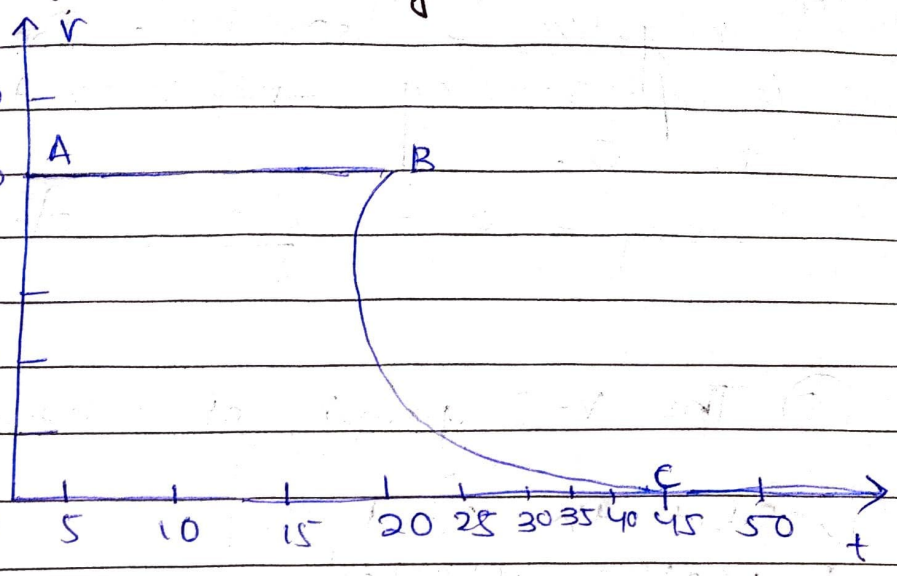
③ Match the following [Directly writing ans]

Colum I	Column II
(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 V-T graph of an object is shown in the Fig.



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

Ans:- From A to B, the body has a uniform motion ; v = Constant.
From B to C, the body has a non-uniform motion ; v = variable the velocity is decreasing w.r.t time.

(b) Indentify the part of graph where the object has zero acceleration. Give reason for your ans.

Ans:- From part A to B, the object has zero acceleration as it is uniform motion where v = Constant.
slope of V-T graphs gives accln.

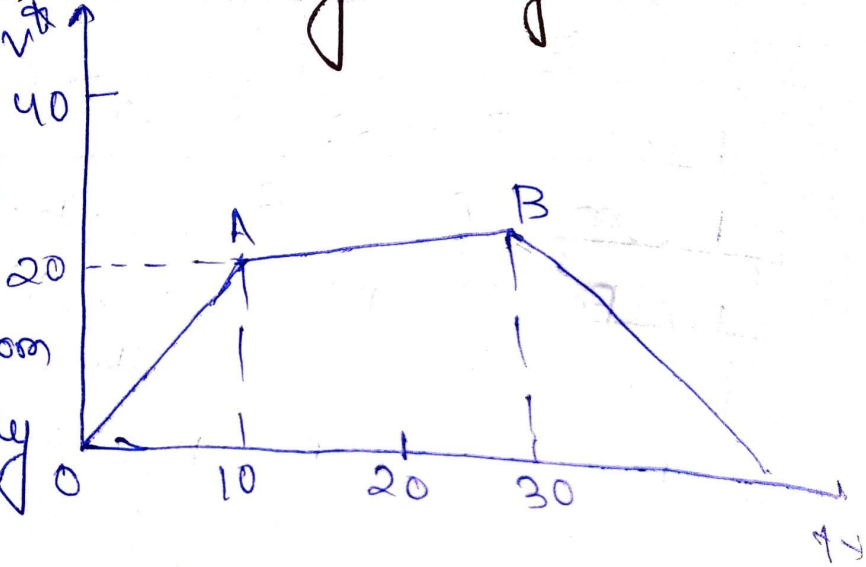
$$\text{slope} = \frac{dv}{dt} = \frac{0}{dt} = 0 = a$$

(c) Identify the part of graph where the object has negative acceleration. Give reason

Ans:- From part B to C, the object has negative acceleration. Because its slope is decreasing ~~and~~ w.r.t time and comes to 0.

$$\text{Slop} = a = \frac{dv}{dt} = \text{decreasing.}$$

(5) The v-T graph of a body is given :-



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

Ans:- the motion from O to A is uniformly accelerated motion

$$\text{Slope} = \frac{dv}{dt} = a = \text{constant}$$

the motion from O to B is 1st uniformly accelerated motion from O to A and uniform motion From A to B

$$= v = \text{constant}$$
$$a = 0$$

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

Ans:- velocity after 10 sec → 20 m/s
velocity after 40 sec → 0 m/s.

(iii) Calculate negative acceleration of the body.

Ans:- slope of v-T graph → acc^{n}.

$$\text{slop} = \frac{dv}{dt} = \frac{0-20}{40-30} = \frac{-20}{10}$$

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

(iv) Calculate the distance covered by the body bet^{w} 10th and 30th second.

Ans:- Area of under v-T graph → distance/ displacement

Area of rectangle = distance

$l \times b$

$= 20 \times 20$

$= 400 \text{ m} =$ distance.