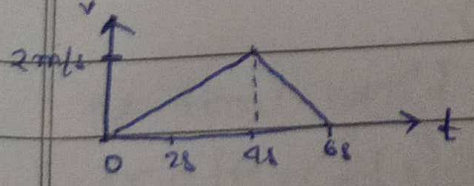
Homework.

1. The incorrect options are :-

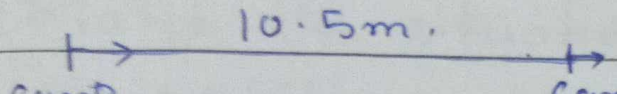


(1) the motion is uniform.

(2) The acceleration is uniform.

(3) The particle changes its direction of motion.

2.



← Situation at $t=0$

car A moves with constant velocity ($10\,ms^{-1}$) according to the given velocity-time graph.

But car B accelerates uniformly at $1\,m/s^2$.

Suppose after time 't_k' they meet

So, car A must have travelled $10t_k$ m.

and car B must have travelled $(10.5 + 10t_k)$ m.

now,

writing equations of motion. $\boxed{\text{at } t=0 \quad v_B = 0}$

$$10.5 + 10t_k = \frac{1}{2} \times 1 \times t_k^2.$$

$$10.5 + 10t_k = \frac{t_k^2}{2}. \Rightarrow 21 + 20t_k = t_k^2.$$

$$t_k^2 - 20t_k - 21 = 0.$$

$$t_k^2 - 21t_k + t_k - 21 = 0$$

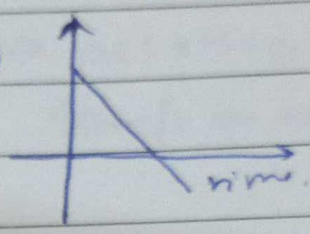
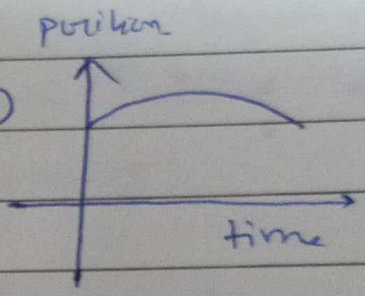
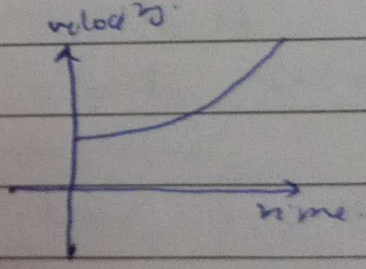
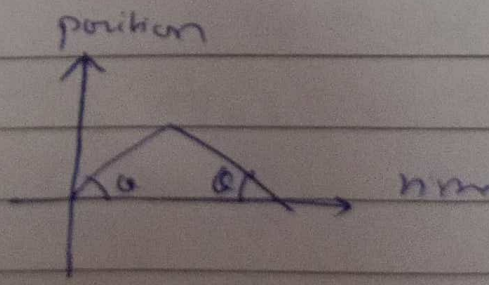
$$t_k(t_k - 21) + 1(t_k - 21) = 0$$

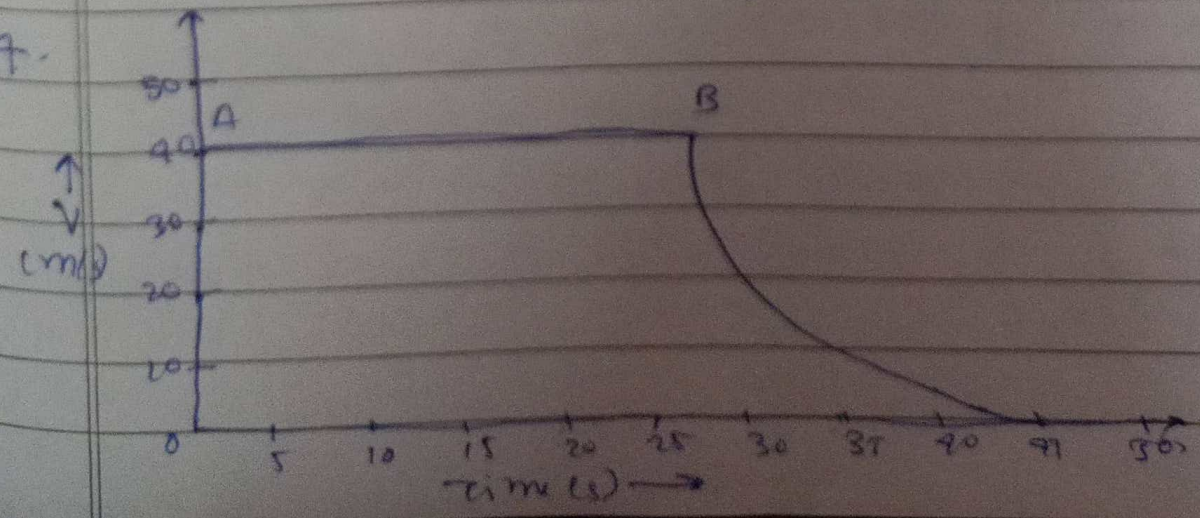
$$(t_k + 1)(t_k - 21) = 0.$$

as time can't be negative so. $t_k = 21s$

or after (21 s) car B will catch car A.

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

Column I		Column II
(D) particle moving with zero acceleration	–	(S) 
(C) particle moving with constant negative acceleration.	–	(P) 
(b) particle moving with increasing acceleration	–	(R) 
(a) particle moving with constant speed	–	

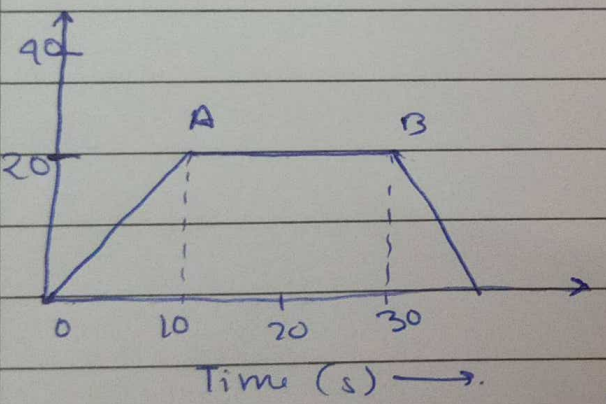
4. 

(a) from A to B the motion is uniform motion and from B to C it is non-uniform retarding motion.

(b) from A to B the object has zero acceleration because velocity is constant at 40m/s or also by graph slope is zero.

(c) from B to C object ~~has~~ is having negative acceleration because velocity is falling and slope of V-T graph is decreasing.

5.



(i) from O to A uniformly accelerated motion.

(ii) from A to B uniform motion.

(iii) negative acceleration of the body is $-\left(\frac{0-20}{40-30}\right) = -\frac{20}{10} = -2\ m/s^2$.

(iv) (i) Velocity of body after 10s is 20m/s and after 40s is 0m/s.

(ii) distance travelled from 10 s to 30 s second is area under the graph = $20s \times 20\ ms^{-1}$

= 400m