Equations of Motion using graphical analysis
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/are INCORRECT for this motion?

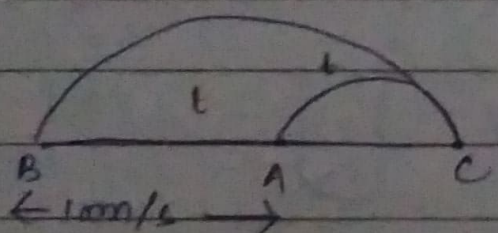
Ans- (3) The Particle changes its direction of motion.

(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- From graph, velocity of A = 10 m/s

acc^n of B = $\tan 45 = 1$

A/a,



Let AC = x (C is the meeting point)

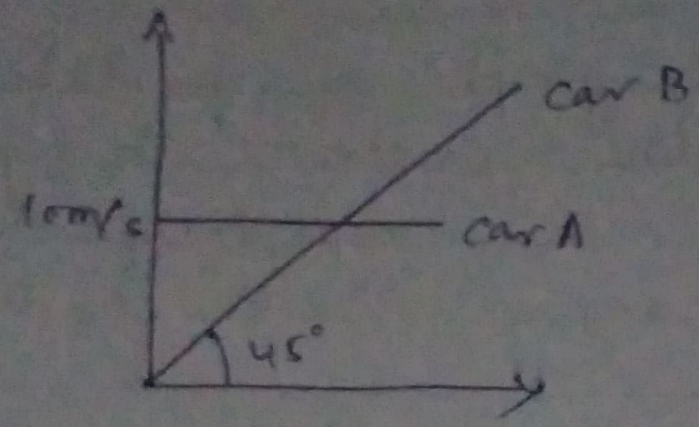
Time taken to reach C by A = Time taken by B to reach C.

For A (uniform motion)

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

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

$$x = 10t \quad \text{——— (1)}$$



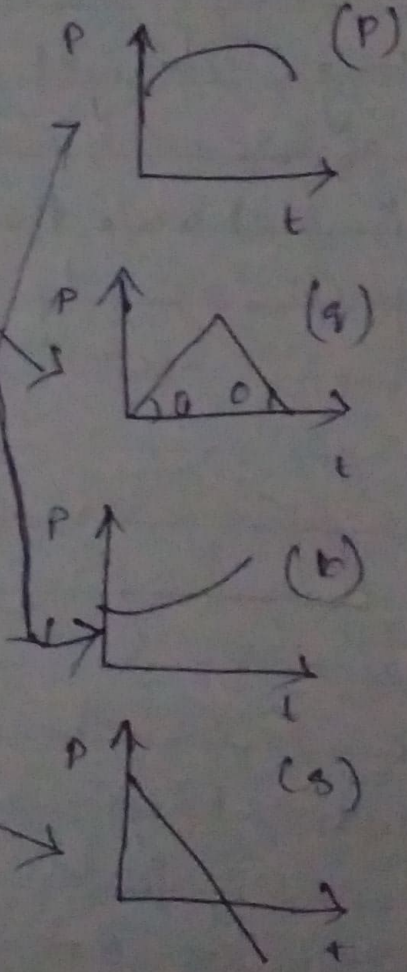
(3) Column 1

(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) a) → From A to B → Uniform Motion.

⇒ (b) From B to C : → Negatively accelerated (retarded) motion.

(b) The Part of graph where the object has zero acceleration is from A to B.

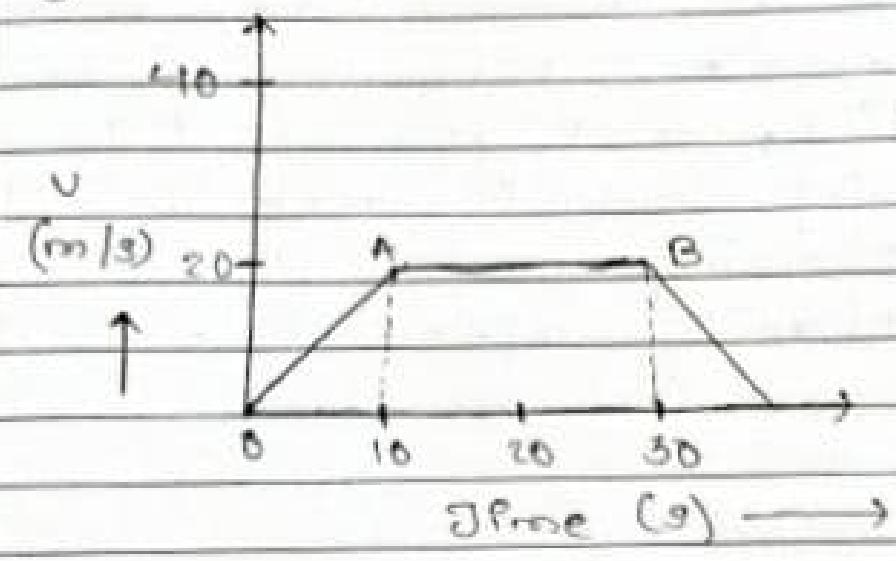
The reason is that :-
The Part A to B is parallel to time axis.
which tells that t || a = 0

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

(C) => 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 v-t graph of a body is given:-



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

→ Kind of motion by OA:

→ Kind of motion by AB: Uniform motion.

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

→ Velocity after 10s: After 10s, we can see there is a constancation of the same velocity

till 30s (A to B). Hence the velocity is 20 m/s.

Velocity at 40 m/s = The velocity decreases or retards after 30s till 40s, and reaches / forms a point on 0 according to the velocity axis, henceforth, the velocity after 40s is 0 m/s.