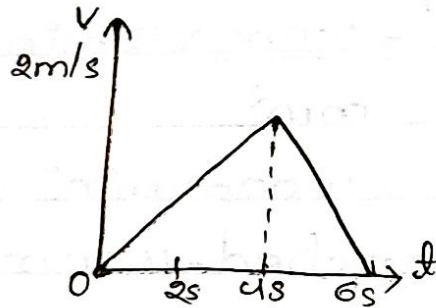1. The velocity-time graph of a particle moving along a straight line is as shown in figure. which of the following is/are incorrect for this motion?

1) The motion is uniform.

2) The accel^n is uniform.

3) The particle changes its direction of motion.

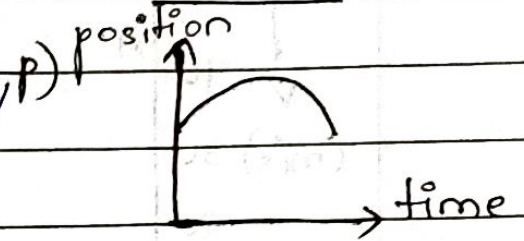4) The displacement during the period 0-4s is equal to the area under the velocity-time graph for this period.

Ans⟹ option (3) is incorrect.

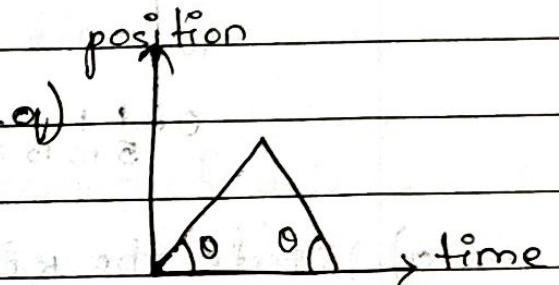3. Match the situation given in column 1 with the possible curves in column 2.
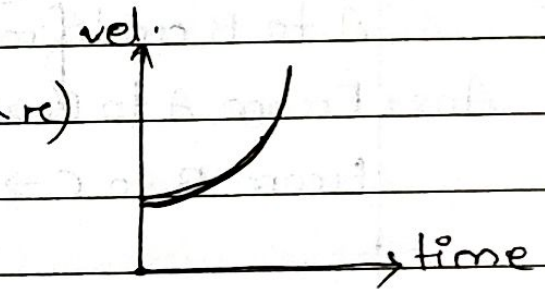
Column 1

A) Particle moving with constant speed

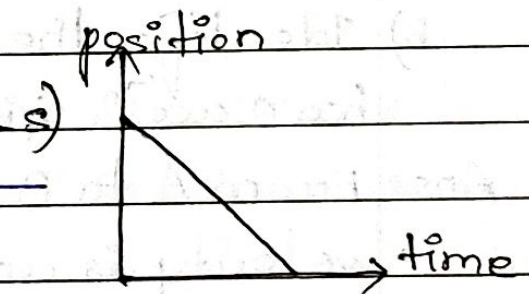B) Particle moving with increasing accel^n

C) Particle moving with constant negative accel^n.

D) Particle moving with zero accel^n

Column 2

p)

position vs time

q)

position vs time

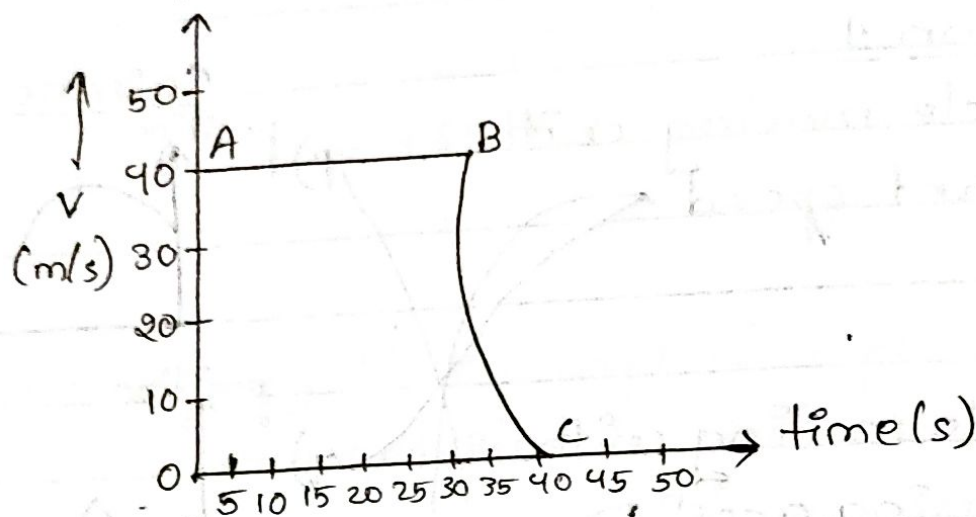r)

vel^n vs time

s)

position vs time

a) q, s
B) r
c) p
D) s

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→ From A to B → constant velocity = uniform motion

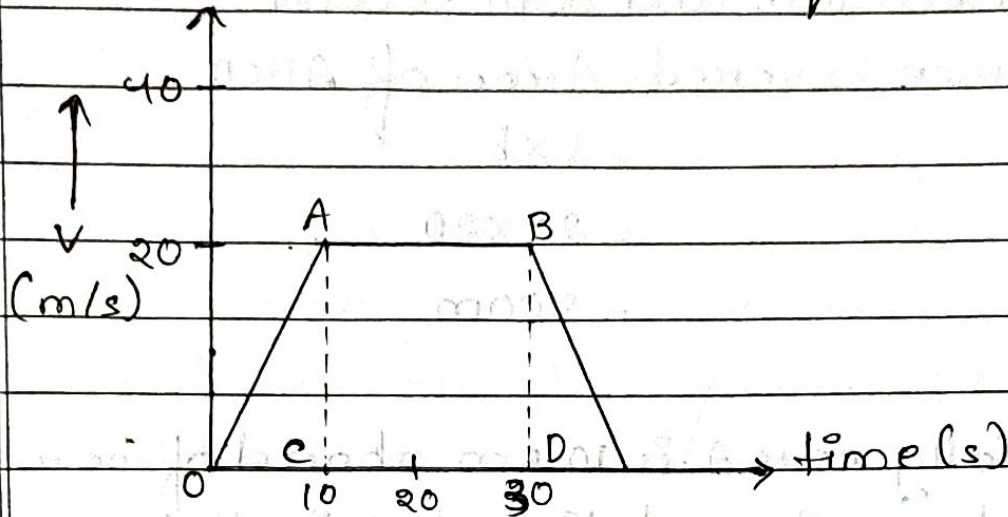From B to C → negative accel^n (retardation)

b) Identify the part of graph where the object has 0 accel^n. Give reason.

Ans→ From A to B object has zero accel^n because velocity is uniform.

c) Identify the part of graph where the object has negative accel^n. Give reason.

Ans→ From B to C, object has negative accel^n because the velocity is decreasing.

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

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

Ans→ OA represents uniform accelerated 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 = 20m/s
Velocity of the body after 40s = 0m/s = 0

iii) Calculate negative acceleration of the body.

Ans→ $Accel^n = \dfrac{v-u}{t}$

$= \dfrac{20-0}{10}$

$= 2m/s^2$

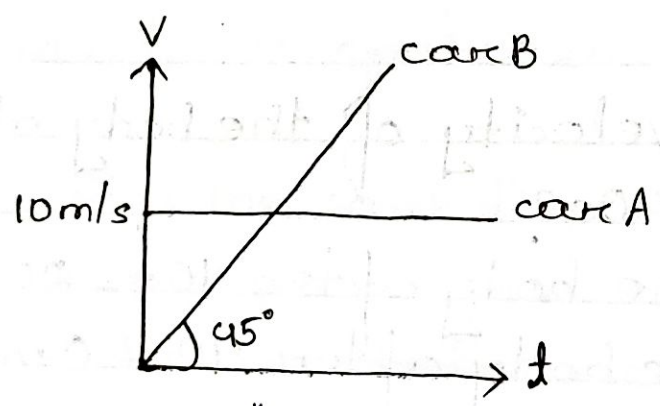iv) calculate the distance covered by the body between 10th and 30th second.

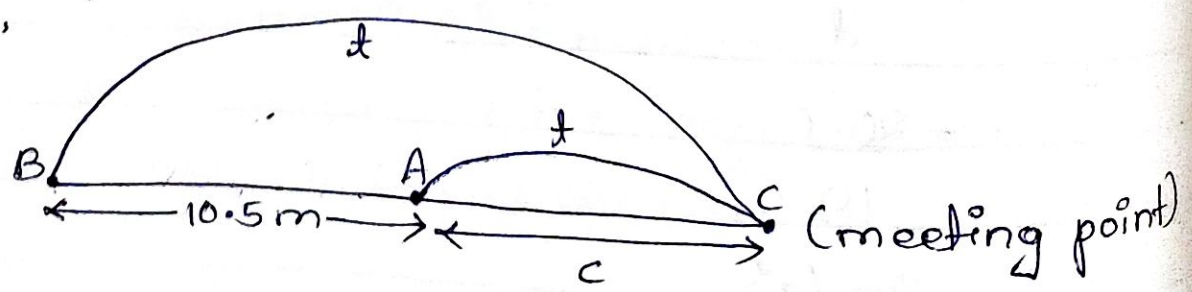Ans→ Distance covered = Area of ABCD

$$= l \times b$$

$$= 20 \times 20$$

$$= 400m$$

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 2 cars is shown in figure. Find the time (in sec) when the car B will catch the car A.

Ans→ From graph,

velocity of $A = 10m/s$

accel^n of B = slope = $\tan 45 = 1$

ATQ,

let AC = x

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

For A
(uniform motion)

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

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

$x = 10t$ ---- ①

For B
(uniformly accelerated motion).

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

$a = 0$

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

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

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

$t = 21 \, secs.$