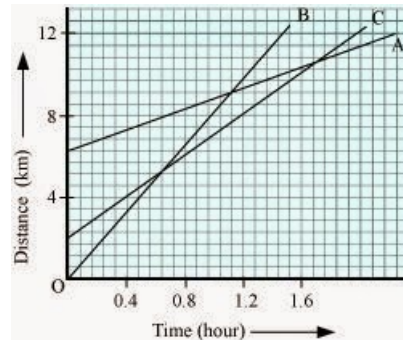




6. Fig. shows the distance-time graph of three objects A, B and C. Study the graph and answer the following questions:



- Which of the three is travelling the fastest?
- Are all three ever at the same point on the road?
- How far has C travelled when B passes A?
- How far has B travelled by the time it passes C?

Answer:

- Object B
- No
- 5.714 km
- 5.143 km

(a)  $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

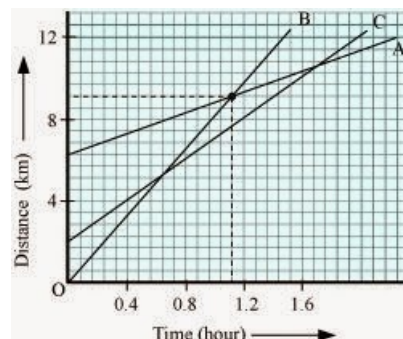
Slope of graph =  $\frac{y\text{-axis}}{x\text{-axis}} = \frac{\text{Distance}}{\text{Time}}$

Therefore, Speed = slope of the graph

Since slope of object B is greater than objects A and C, it is travelling the fastest.

(b) All three objects A, B and C never meet at a single point. Thus, they were never at the same point on road.

(c)



7 square box = 4 km

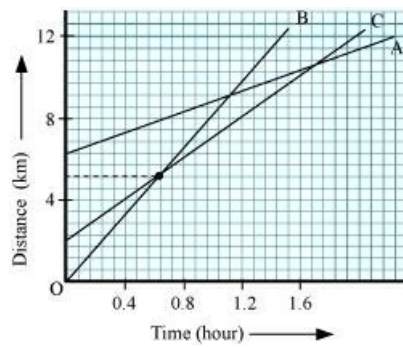
1 square box =  $\frac{4}{7}$  km

C is 4 blocks away from origin therefore initial distance of C from origin =  $\frac{16}{7}$  km

Distance of C from origin when B passes A = 8 km

Thus, Distance travelled by C when B passes A =  $8 - \frac{16}{7} = \frac{56 - 16}{7} = \frac{40}{7} = 5.714$  km

(d)



Distance travelled by B by the time it passes C = 9 square boxes  
 $9 \times 4/7 = 36/7 = 5.143 \text{ km}$

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7. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of  $10 \text{ m s}^{-2}$ , with what velocity will it strike the ground? After what time will it strike the ground?

Answer: Let us assume, the final velocity with which ball will strike the ground be 'v' and time it takes to strike the ground be 't'

Initial Velocity of ball,  $u = 0$

Distance or height of fall,  $s = 20 \text{ m}$

Downward acceleration,  $a = 10 \text{ m s}^{-2}$

As we know,  $2as = v^2 - u^2$

$$v^2 = 2as + u^2$$

$$= 2 \times 10 \times 20 + 0$$

$$= 400$$

$$\therefore \text{Final velocity of ball, } v = 20 \text{ ms}^{-1}$$

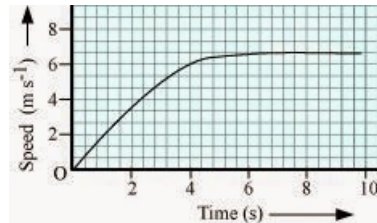
$$t = (v - u)/a$$

$$\therefore \text{Time taken by the ball to strike} = (20 - 0)/10$$

$$= 20/10$$

$$= 2 \text{ seconds}$$

8. The speed-time graph for a car is shown in Fig. 8.12.

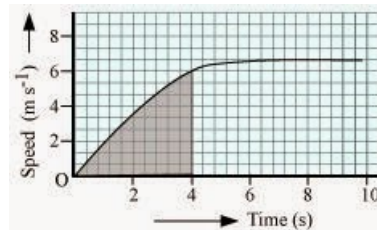


(a) Find out how far the car travels in the first 4 seconds. Shade the area on the graph that represents the distance travelled by the car during the period.

(b) Which part of the graph represents uniform motion of the car?

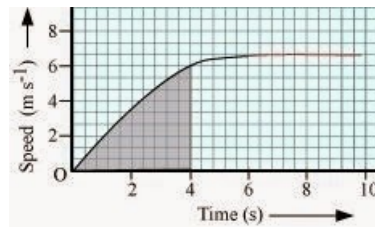
Answer:

(a)



The shaded area which is equal to  $\frac{1}{2} \times 4 \times 6 = 12 \text{ m}$  represents the distance travelled by the car in the first 4 s.

(b)



The part of the graph in red colour between time 6 s to 10 s represents uniform motion of the car.

9. State which of the following situations are possible and give an example for each of these:

- (a) an object with a constant acceleration but with zero velocity.
- (b) an object moving in a certain direction with an acceleration in the perpendicular direction.

Answer:

(a) Possible

When a ball is thrown up at maximum height, it has zero velocity, although it will have constant acceleration due to gravity, which is equal to  $9.8 \text{ m/s}^2$ .

(b) Possible

When a car is moving in a circular track, its acceleration is perpendicular to its direction.

10. An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed if it takes 24 hours to revolve around the earth.

Answer:

Radius of the circular orbit,  $r = 42250 \text{ km}$

Time taken to revolve around the earth,  $t = 24 \text{ h}$

Speed of a circular moving object,  $v = (2\pi r)/t$

$$= [2 \times (22/7) \times 42250 \times 1000] / (24 \times 60 \times 60)$$

$$= (2 \times 22 \times 42250 \times 1000) / (7 \times 24 \times 60 \times 60) \text{ m s}^{-1}$$

$$= 3073.74 \text{ m s}^{-1}$$

\*\*\*\*\* END \*\*\*\*\*