Idea of Speed, Distance and Time

EXERCISE 17(A)

Question 1.

A train covers 51 km in 3 hours. Calculate its speed. How far does the train go in 30 minutes?

Solution:

Given : Distance = 51 km

Time = 3 hours

$$\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{51}{3} = 17 \text{ km/h}$$

Now,

$$\text{Time} = 30 \text{ minutes} = \frac{30}{60}\text{h} = \frac{1}{2}\text{h}$$

Speed = 17 km/h

$$\therefore \text{Distance travelled} = \text{Speed} \times \text{Time}$$

$$= 17 \times \frac{1}{2} = 8.5 \text{ km}$$

Question 2.

A motorist travelled the distance between two towns, which is 65 km, in 2 hours and 10 minutes. Find his speed in metre per minute.

Solution:

Distance between two towns = 65 km

Time taken = 2 hr 10 min

$$= 2\frac{10}{60} = 2\frac{1}{6} = \frac{13}{6} \text{ hrs}$$

$$\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{65}{\frac{13}{6}}$$

$$= \frac{65 \times 6}{13} \text{ km/h} = 30 \text{ km/h}$$

$$\text{and speed in m/minute} = \frac{30 \times 1000}{60}$$

$$= 500 \text{ m/minute}$$

Question 3.
A train travels 700 metres in 35 seconds. What is its speed in km/h?

Solution:
Distance = 700 m
Time taken = 35 sec

$$\therefore \text{ Speed in m/sec} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{700}{35} = 20 \text{ m/sec}$$

$$\text{and Speed in km/h} = \frac{20 \times 60 \times 60}{1000}$$

$$= 72 \text{ km/h}$$

Question 4.
A racing car covered 600 km in 3 hours 20 minutes. Find its speed in metre per second. How much distance will the car cover in 50 sec?

Solution:
Distance covered = 600 km
Time taken = 3 hr 20 min

$$= 3\frac{20}{60} = 3\frac{1}{3} = \frac{10}{3} \text{ hrs}$$

$$\therefore \text{ Speed in km/h} = \frac{\text{Distance}}{\text{Time}} = \frac{600}{\frac{10}{3}}$$

$$= \frac{600 \times 3}{10} \text{ km/h} = 180 \text{ km/h}$$

$$\text{and Speed in m/sec} = \frac{180 \times 1000}{60 \times 60}$$

$$= 50 \text{ m/sec}$$

and Distance covered in 50 seconds
= Speed x Time
= 50 x 50 m = 2500 m or 2.50 km

Question 5.
Rohit goes 350 km in 5 hours. Find :
(i) his speed
(ii) the distance covered by Rohit in 6.2 hours
(iii) the time taken by him to cover 210 km.

Solution:
Distance covered = 350 km

Time taken = 5 hours

(*i*) $\therefore$ Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{350}{5}$

$= 70$ km/hr

(*ii*) Distance covered in 6·2 hours

$= 70 \times 6{\cdot}2$ km $= 434$ km

(*iii*) Time taken to cover 210 km

$= \frac{\text{Distance}}{\text{Time}} = \frac{210}{70}$ hr $= 3$ hours

Question 6.

A boy drives his scooter with a uniform speed of 45 km/h. Find :

(i) the distance covered by him in 1 hour 20 min.

(ii) the time taken by him to cover 108 km.

(iii) the time taken to cover 900 m.

Solution:

Speed of the scooter = 45 km/h

Time taken $= 1\frac{20}{60} = 1\frac{1}{3} = \frac{4}{3}$ hours

(*i*) Distance covered in 1 hour 20 minutes

$= 45 \times \frac{4}{3}$ km $= 60$ km

(*ii*) Time taken to cover 108 km $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{108}{45}$ hrs

$= \frac{12}{5} = 2\frac{2}{5}$ hours

$= 2$ hours 24 minutes

(*iii*) Time taken to cover 900 m

= Distance × Speed

$= \frac{900}{1000} \times \frac{1}{45} = \frac{1}{50}$ hr

$= \frac{60}{50} = \frac{6}{5} = 1\frac{1}{5}$ minutes

= 1 : 2 minute or 1 minutes 12 seconds

Question 7.

I travel a distance of 10 km and come back in $2\frac{1}{2}$ hours. What is my speed?

Solution:

Total distance covered = 10 km + 10 km = 20 km

$$\text{Time taken} = 2\frac{1}{2} = \frac{5}{2} \text{ hours}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{20}{\frac{5}{2}}$$

$$= \frac{20 \times 2}{5} \text{ km/h} = 8 \text{ km/hr}$$

Question 8.

A man walks a distance of 5 km in 2 hours. Then he goes in a bus to a nearby town, which is 40 km, in further 2 hours. From there, he goes to his office in an autorickshaw, a distance of 5 km, in $\frac{1}{2}$ hour. What was his average speed during the whole journey?

Solution:

Distance of 5 km travelled on foot in 2 hours

Distance of 40 km travelled by bus in 2 hours

Distance of 5 km travelled by Rickshaw in $\frac{1}{2}$ hour

Total distance covered = 5 + 40 + 5 = 50 km

$$\text{Time taken} = 2 + 2 + \frac{1}{2} = 4\frac{1}{2} = \frac{9}{2} \text{ hours}$$

$$\therefore \text{ Average speed} = \frac{\text{Distance}}{\text{Time}} = \frac{50}{\frac{9}{2}}$$

$$= \frac{50 \times 2}{9} = \frac{100}{9} \text{ km/h}$$

$$= 11\frac{1}{9} \text{ km/h}$$

Question 9.

Jagan went to another town such that he covered 240 km by a car going at 60 kmh^{-1}. Then he covered 80 km by a train, going at 100 kmh^{-1} and the rest 200 km, he covered by a bus, going at 50 kmh^{-1}. What was his average speed during the whole journey?

Solution:

Distance covered 240 km by car with speed 60 km/h

Distance covered 80 km by train with speed 100 km/h

and rest distance covered 200 km by bus with speed 50 km/h

Total distance covered = (240 + 80 + 200) km = 520 km

Now time taken by car $= \frac{240}{60} = 4$ hours

Time taken by train $= \frac{80}{100} = \frac{4}{5}$ hours

and time taken by bus $= \frac{200}{50} = 4$ hours

$\therefore$ Total time taken

$$= 4 + \frac{4}{5} + 4 = 8\frac{4}{5} = \frac{44}{5} \text{ hours}$$

$\therefore$ Average speed

$$= \frac{\text{Distance}}{\text{Time}} = \frac{520}{\frac{44}{5}} = \frac{520 \times 5}{44} \text{ km/h}$$

$$= \frac{650}{11} = 59\frac{1}{11} \text{ km/h}$$

Question 10.

The speed of sound in air is about 330 ms^{-1}. Express this speed in kmh^{-1}. How long will the sound take to travel 99 km?

Solution:

Speed of sound in air = 330 m/sec

$\therefore$ Speed in km/h $= \frac{330 \times 60 \times 60}{1000}$

$= 1118$ km/h .

Time taken by sound to cover 99 km

$= \frac{99}{1188} = \frac{1}{12}$ hours

$= \frac{1}{12} \times 60 = 5$ minutes

or $5 \times 60 = 300$ seconds