EXERCISE 17(A)

1. A train covers 51 km in 3 hours. Calculate its speed. How far does the train go in 30 minutes?
Solution:
Given
A train covers 51 km in 3 hours
So, distance = 51 km
Time = 3 hours
Hence,
Speed = 51 km/ 3 hours
We get,
= 17 km/h
Now for 30 minutes
Speed = 17 km/h
Time = 0.5 hours
Hence,
Distance = 17 × 0.5
We get,
= 8.5 km
Therefore, train covered 8.5 km in 30 minutes

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:
Given
A motorist travelled the distance 65 km in 2 hours and 10 minutes
So, distance = 65 km
Time = 2 hours 10 minutes
Hence,
Speed = 65 km / (2 hours + 10 minutes)
We know that,
1 km = 1000 m
1 hour = 60 min
= 65 (1000 m) / [2 (60 min) + 10 min]
= 65000 m/130 min
We get,
= 500 m/min
Therefore, the speed of a motorist in meter per minute is 500 m/min

3. A train travels 700 metres in 35 seconds. What is its speed in km/h?
Solution:
Given
A train travels 700 metres in 35 seconds
So, distance = 700 m
Time = 35 sec
Hence,
Speed = 700 m / 35 sec
1000 m = 1 km
1 m = 0.001 km
700 m = 0.001 × 700
= 0.7 km
3600 seconds = 1 hour
1 sec = 1 / 3600 hour
35 sec = 35 / 3600
Now,
Speed = Distance / Time
= [0.7 / (35/ 3600**)]**
We get,
= (0.7 × 3600) / 35
= 2520 / 35
= 72 km/h
Therefore, the speed of train is 72 km/h

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:
Given
A racing car covered 600 km in 3 hours and 20 minutes
So, distance = 600 km
Time = 3 hours 20 minutes
Hence,
Speed = 600 km / (3 hours + 20 minutes)
= 600 (1000m) / [3(60 min) + 20 min]
We get,
= 600000m / 200 min
= 600000m / 200 (60 sec)
We get,
= 600000 / 12000 sec

= 50 m / sec

Thus, speed in meter per second is 50 m / sec

Now, the distance covered by car in 50 sec is calculated as below

Speed = 50 m / sec

Time = 50 sec

Hence,

Distance = 50 × 50

= 2500 m

= 2.5 km

Therefore, the distance covered by car in 50 seconds is 2.5 km

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:

(i) his speed

Given

Rohit goes 350 km in 5 hours

So, distance = 350 km

Time = 5 hours

Hence,

Speed = 350 km / 5 hours

We get,

= 70 km/h

Hence, Rohit speed is 70 km/h

(ii) the distance covered by Rohit in 6.2 hours

Given

Rohit goes 350 km in 5 hours

So, distance = 350 km

Time = 5 hours

Hence,

Speed = 350 km / 5 hours

We get,

= 70 km/h

Now, the distance covered by Rohit in 6.2 hours is calculated as below

Speed = 70 km/h

Time = 6.2 hours

Hence,

Distance = 70 × 6.2
= 434 km
Therefore, Rohit covers 434 km in 6.2 hours
(iii) the time taken by him to cover 210 km
Given
Rohit goes 350 km in 5 hours
So, distance = 350 km
Time = 5 hours
Hence,
Speed = 350 km / 5 hours
We get,
= 70 km/h
Now, the time taken by Rohit to cover 210 km is calculated as below
Distance = 210 km
Speed = 70 km/h
Hence,
Time = 210 km / 70 km/h
= 3 hours
Therefore, the time taken by Rohit to cover 210 km is 3 hours

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
(i) the distance covered by him in 1 hour 20 min
Given
Speed of scooter is 45 km/h
Speed = 45 km/h
Time = 1 hours 20 minutes
Hence,
Distance = 45 × (1 + 20 / 60)
= 45 × (1 + 1 / 3)
We get,
= 45 × 4 / 3
= 15 × 4
= 60
Hence, the distance covered by a boy in 1 hour 20 minutes is 60 km
(ii) the time taken by him to cover 108 km
Given

Speed of scooter is 45 km/h
So, speed = 45 km/h
Distance = 108 km
Hence,
Time = 108 km / 45 km/h
We get,
= 12 / 5 h
= $2\frac{2}{5}$ h
This is equal to,
= 2 hours (2 / 5 × 60) min
= 2 hours (2 × 12) min
= 2 hours 24 min
Hence, the time taken by a boy to cover 108 km distance is 2 hours 24 min
(iii) the time taken to cover 900 m
Given
Speed of scooter is 45 km/h
So, speed = 45 km/h
Distance = 900 m
Hence,
Time = 900 m / 45 km/h
= (900 / 1000) × 1 / 45
We get,
= (9 / 10) × (1 / 45)
= 1 / 50 h
= (1 / 50) × 60 min
= 6 / 5 min
This can be written as,
= 1 min 1 / 5 sec
= 1 min (1 / 5 × 60) sec
We get,
= 1 min 12 sec
Hence, the time taken by a boy to cover 900 m is 1 min 12 sec

7. I travel a distance of 10 km and come back in 2 ½ hours. What is my speed?
Solution:
Given
10 km distance travelled twice in 2 ½ hours
So, distance = 10 km + 10 km

= 20 km

Time = 2 ½ hours

This can be written as,

Time = 5 / 2 hours

Hence,

Speed = [20 km / (5 / 2 hours)]

= (20 × 2) / 5

We get,

= 40 / 5

= 8 km/h

Hence, the speed of a person to cover a distance of 10 km twice is 8 km/h

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 ½ hour. What was his average speed during the whole journey?

Solution:

Given

A man walks a distance of 5 km in 2 hours

40 km distance is covered by bus in 2 hours

5 km distance is covered by autorickshaw in ½ hour

Hence,

Total distance covered by a man during whole journey is calculated as below

Total distance = 5 km + 40 km + 5 km

= 50 km

Total time taken by a man during whole journey

Total time = 2 + 2 + 1/2

= (4 + 4 + 1) / 2

We get,

= 9 / 2 hours

Hence,

Average speed = 50 km / (9 / 2) hours

= (50 × 2) / 9 km/h

= 100 / 9 km/h

= $11\dfrac{1}{9}$ km/h

Therefore, the average speed taken by a man during whole journey is $11\dfrac{1}{9}$ km/h

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:

Given

Jagan covered 240 km distance by a car at 60 km/h

He travelled 80 km distance by train at 100 km/h

He travelled 200 km distance by a bus at 50 km/h

Hence,

Total distance travelled by Jagan = 240 km + 80 km + 200 km

= 520 km

Now, total time taken by Jagan during whole journey is shown below

Time taken by car = 240 km / 60 km/h

= 4 hours

Time taken by a train = 80 km / 100 km/h

= 4 / 5 hours

Time taken by bus = 200 km / 50 km/h

= 4 hours

So, total time taken = 4 + 4 / 5 + 4

= (20 + 4 + 20) / 5

We get,

= 44 / 5 hours

Hence,

Average speed = total distance / total time

= 520 km / (44 / 5) hours

= [(520 × 5) / 44] km/h

= (130 × 5) / 11 km/h

= 650 / 11 km/h

= $59\dfrac{1}{11}$ km/h

Hence, the average speed during the whole journey is $59\dfrac{1}{11}$ km/h

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:

Given

Speed of sound in air = 330 m/sec

So, speed = 330 m/sec
Distance = 99 km
= 99 × 1000
We get,
= 99000 m
Hence,
Time = [(99000 m) / (330 m/sec)]
= 9900 / 33 sec
We get,
= 300 sec
= 5 min
Hence, the time taken by the sound to travel 99 km is 5 min