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Speed and Distance of Train

INTRODUCTION

In this chapter, we deal with the relative speeds of trains. This is a special case of topic "Time and Distance". Before proceeding further, we will go through important points as follows.

SOME IMPORTANT POINTS

1. When two trains are moving in opposite directions, their speeds should be added to find the relative speed.

e.g. Let two trains are moving at a speed of a km/hr and b km/hr in opposite direction, then their relative speed is given by = (a + b) km/hr.

2. When two trains are moving in same direction, the relative speed is the difference of their Speeds.

e.g. Let two trains are moving at a speed of a km/hr and b km/hr in same direction, where a > b, then the relative speed is given by = (a - b) km/hr.

3. When two trains of length l_1 and l_2 respectively, moving in opposite direction at speed a km/hr and b km/hr respectively crosses each other, then time taken by train to cross is given by

$$= \left(\frac{l_1 + l_2}{a + b} \right) \text{ hrs}$$

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

4. Similarly, when two trains of length l_1 and l_2 , moving in the same direction at speed a km/hr and b km/hr respectively, where a > b, then time taken by faster train to cross the slower train is given

$$\text{By} = \left(\frac{l_1 + l_2}{a - b} \right) \text{ hrs}$$

5. If a train of length l_1 metres crosses an object of length x metres, then distance covered by train is

Given by = $(l_1 + x)$ metres

6. To pass a fixed object (post, pole or man etc.), the distance covered by train is equal to its own Length.

Q.1. Express 30 km /h into m/s?

- a) 3/25 m/s b) 25/3 m/s
c) 36 m/s d) 24 m/s

Q.2. Express 110 / 3 m/s into km/h

- a) 134 km/h b) 150 km/h
c) 145 km/h d) 132 km / h

Q.3. A train moves with a speed of 108 kmph. Its speed in meters per second is

- a) 10.8 b) 18
c) 30 d) 38.8

Q.4. A speed of 14 meters per second is the same as?

- a) 28 kmph b) 46.6 kmph





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c) 50.4 kmph

d) 70 kmph

Q.5. A train 100 m long is running at the speed of 30 km/hr. Find the time taken by it to pass a man standing near the railway line.

A) 11 sec

b) 8 sec

c) 12 sec

d) 4.16 sec

Q.6. A train which is 200m long is running at the speed of 60 km/hr. Find the time taken to pass a man standing at the railway station?

200 ಮೀ ಉದ್ದದ ರೈಲು ಗಂಟೆಗೆ 60 ಕಿಮೀ ವೇಗದಲ್ಲಿ ಚಲಿಸುತ್ತದೆ.

a) 11 sec

b) 8 sec

c) 12 sec

d) 4.16 sec

Q.7. In what time will a train 100 meters long cross an electric pole, if its speed be 144 kmph?

a) 2.5 seconds

b) 4.25 seconds

c) 5 seconds

d) 12.5 seconds

Q.8. A train running at the speed of 60 kmph crosses a pole in 9 seconds. What is the length of the train?

A) 18 km/h

b) 12 km /h

c) 15 km/h

d) 24 km/h

Q. 9. A train 132 m long passes a telegraph pole in 6 seconds. Find the speed of the train?

a) 70 kmph

b) 72 kmph

c) 79.2 kmph

d) 80 kmph

Q.10. A train is moving at a speed of 132 kmph. If the length of the train is 110 meters, how long will take to cross a railway platform 165 meters long?

a) 7.5 sec

b) 7 sec

c) 9 sec

d) 12 sec

Q.11. How long does a train 110 meters long running at the speed of 72 kmph take to cross a bridge 132 meters in length?

a) 9.8 sec

b) 12.1 sec

c) 12.42 sec

d) 14.3 sec

Q.12. A train 360 m long is running at a speed of 45 kmph. in what time will it pass a bridge 140 m long?

a) 40 Sec

b) 42 sec

c) 45 sec

d) 48 sec

Q.13. A train 800 meters long is running at a speed of 78 kmph. If it crosses a tunnel in, 1 minute, then the length of tunnel (in meters) is :

a) 130

b) 360

c) 500

d) 540





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Q.14. A train 150m long is running with a speed of 68 kmph. In what time will it pass a man who is running at 8kmph in the same direction in which the train is going?

- a) 12 sec b) 10 sec
c) 9 sec d) 8 sec

Q.15. A train which is a length of 110 meters travelling with a speed of 60 kmph. In what time it passes the man who is running with 6 kmph in same direction?

- a) 12/3 sec b) /3 sec
c) 22/3 sec d) 18/3 sec

Q.16. A train 125 m long passes a man, running at 5 kmph in the same direction in which the train is going, in 10 seconds. The speed of the train is :

- a) 45 kmph b) 50 kmph
c) 54 kmph d) 55 kmph

Q.17. A train 220 m long is running with a speed of 59 kmph. In what time will it pass a man who is running at 7kmph in the direction opposite to that in which the train is going?

- A)12 sec b) 10 sec
c) 9 sec d) 8 sec

Q. 18. A train which is a length of 110 meters travelling with a speed of 60 kmph. In what time it passes the man who is running with 6 kmph in opposite direction?

- A)12 sec b) 10 sec
c) 9 sec d) 6 sec

Q. 19. A train 110 m long passes a man, running at 6 kmph in the direction opposite to that of the train, in 6 seconds. The speed of the train is:

- a) 54 kmph b) 60 kmph
c) 66 kmph d) 72 kmph

Q.20. Two trains with different lengths, one is 137 meters and second is 163 meters are running towards each other. The speeds are also different that is one with a speed of 42 kmph and second is 48 kmph. In what time that two trains have crossed each other.

- A)12 sec b) 10 sec
c) 9 sec d) 8 sec

Q. 21. Two goods train each 500 m long, are running in opposite direction on parallel tracks their speeds are 45 kmph and 30 kmph respectively. Find the time taken by the slower train to pass the driver of the faster are

- A)52 sec b) 48 sec
c)42 sec d) 8 sec

Q.22. Two trains with different lengths, one is 137 meters and second is 163 meters are running towards each other. The speeds are also different that is one with a speed of 42 kmph and second is 48 kmph. In what





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time that two trains have crossed each other

- A) 12.5 sec b) 13.5 sec
c) 12 sec d) 13 sec

Q.23. Two trains 100 m and 120 m long are running in the same direction with speeds of 72 kmph and 54 kmph. In how much time will the first train cross the second?

- A) 32 sec b) 40 sec
c) 42 sec d) 44 sec

Moderate Level

Q. 1. A train travelling at 80 km/hr goes through a tunnel 1500 m long. How long a passenger travelling by the train is inside the tunnel?

- a) 69.5 sec b) 67.5 sec
c) 58.5 sec d) 79.5 sec

Q.2. With a speed of 60 km/hr a train crosses a pole in 30 sec. What is the length of the train ?

- a) 500 m b) 600 m
c) 450 m d) 870 m

Q. 3. Two trains of length 450 m and 350 m respectively travel with uniform speeds in parallel lines from opposite directions. If they cross each other in 1 minute and speed of one train be 30 km/hr. Find the speed of second train?

- a) 20 km/hr b) 24 km/hr

- c) 30 km/hr d) 18 km/hr

Q. 4. Two trains starts at the same time from two stations X and Y, 900 kilometres apart and proceed towards each other at an average speed of 38 and 22 km/hr respectively. How long will it take for the two trains to meet?

- a) 10 hours b) 15 hours
c) 18 hours d) 22 hours

Q. 5. A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hr, find the length of the platform?

- a) 320 m b) 180 m
c) 240 m d) 90 m

Q. 6. A train running at 48 km/hr crosses a telegraph post in 15 seconds. Find the time it will take to cross a bridge 240 m long?

- a) 33 sec b) 26 sec
c) 40 sec d) 15 sec

Q. 7. Two trains moving in the same direction at 65 km/hr and 45 km/hr. The faster train crosses the man in slower train in 18 seconds. Find the length of the faster train?

- a) 80 m b) 150 m





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c) 100 m

d) 130 m

Q. 8. A train passes a platform 60 meters long in 20 seconds and a man standing on the platform in 12 seconds. Find the speed of the train in km/hr?

a) 19 km/hr

b) 27 km/hr

c) 24 km/hr

d) 35 km/hr

PRACTICE EXERCISE

1. A train crosses a platform 100 m long in 60 seconds at a speed of 45 km/hr. The time taken by the train to cross an electric pole is

a) 8 sec

b) 52 sec

c) 1 minute

d) 44 sec

2. A train 150 m long is running at the speed of 90 km/hr. Time taken by the train to pass through a tree is

a) 3 sec

b) 4 sec

c) 6 sec

d) 8 sec

3. A train passes over a bridge of length 200 m in 40 seconds. If the speed of the train is 81 km per hour, its length is

a) 900 m

b) 1800 m

c) 700 m

d) 600 m

4. A train 150 m long takes 20 seconds to cross a platform 50 metre long. The speed of train is

a) 36 km/hr

b) 42 km/hr

c) 76 km/hr

d) 108 km/hr

5. 150 metres long train crosses a bridge of length 250 metres in 30 seconds. The time for train to cross a platform of 130 metres is

a) 18 sec

b) 21 sec

c) 24 sec

d) 27 sec

6. A train 100 meters long is running at the speed of 65 km/hr. Time taken by the train to pass through a man walking at the rate of 5 km/hr moving in the direction of the train is

a) 8 sec

b) 6 sec

c) 4 sec

d) 2 sec

7. A train 100 meters long is running at the rate of 55 km/hr. Time taken by the train to pass through a man walking at the rate of 5 km/hr moving in opposite direction is

a) 10 sec

b) 8 sec

c) 6 sec

d) 4 sec

8. A train travelling at a speed of 90 km/hr, crosses a pole in 10 seconds. The length of the train is

a) 250 m

b) 150 m





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c) 190 m

d) 100 m

9. A train takes 18 seconds to pass completely through a station 162 m long and 15 seconds through another station 120 m long. The length of the train is

a) 70 m

b) 80 m

c) 90 m

d) 100 m

10. A train passes a 50 m long platform in 14 seconds and a man standing on the platform in 10 seconds. The speed of train is

a) 24 km/hr

b) 36 km/hr

c) 40 km/hr

d) 45 km/hr

11. An express train travelling at 80 km/hr overtake a goods trains, twice as long and going at 40 km/hr on a parallel track in 54 seconds. How long will the express train to cross a station 400 m long?

a) 36 sec

b) 45 sec

c) 27 sec

d) 32 sec

12. Two trains of length 150 m and 120 m are travelling at the rate of 75 km/hr and 45 km/hr respectively. Time taken by the trains to cross each other if they travel in the same direction is

a) 25 sec

b) 28.4 sec

c) 8.1 sec

d) 32.4 sec

13. Two trains of length 150 m and 120 m are travelling at the rate of 75 km/hr and 45 km/hr respectively. Time taken by the trains to cross each other if they travel in opposite direction is

a) 5 sec

b) 8.1 sec

c) 28.4 sec

d) 32.4 sec

14. Local trains leave from a station at an interval 15 minutes at a speed of 16 km/hr. A man moving from opposite side meets the trains at an interval of 12 minutes. The speed of the man is

a) 4 km/hr

b) 6 km/hr

c) 8 km/hr

d) 10 km/hr

15. A train running at a speed of 52 km/hr takes 15 seconds to pass a man running at 4 km/hr in the same direction. The length of the train is

a) 100 m

b) 150 m

c) 200 m

d) 250 m

16. Two trains travel in opposite direction at 36 km/hr and 45 km/hr and a man sitting in slower train passes the faster train in 8 seconds. The length of the faster train is

a) 80 m

b) 100 m

c) 120 m

d) 180 m

17. A train travelling with a constant speed crosses a 96 m long platform in 12 seconds.





and another 141 m long platform in 15 seconds. The length of the train is

- a) 80 m b) 64 m
c) 84 m d) 90 m

18. Two trains are running at 40 km/hr and 20 km/hr respectively in the same direction. Fast train completely passes a man sitting in the slow train in 5 seconds. The length of the fast train is

- a) $23\frac{2}{9}$ m b) 27 m
c) $27\frac{7}{9}$ m d) 23 m

19. A train passes by a stationary man standing on the platform in 7 seconds and passes by the platform completely in 28 seconds. If the length of the platform is 330 metres, the length of the train is

- a) 130 m b) 125 m
c) 120 m d) 110 m

20. A train is running at 120 km/hr and is 250 m long. How long will it take to pass a goods train 350 m long and running on a parallel track at 30 km/hr in the same direction?

- a) 24 sec b) 26 sec
c) 20 sec d) 18 sec

