

Bank Probationary Officer

Quantitative Aptitude

PROBLEMS ON TRAINS

In solving problems on trains, the following points should be kept in mind.

Time taken by a train to cross a pole (or Signal post or, a standing man)

$$= \frac{\text{Length of the train}}{\text{Speed of the train}}$$

Time taken by a train to cross a bridge (or tunnel or a train at rest or a platform)

$$= \frac{\text{Length of the train} + \text{Length of the bridge}}{\text{Speed of the train}}$$

Time taken by a train to cross a moving object

a) In the opposite direction = $\frac{L_1 + L_2}{V_1 + V_2}$

b) In the same direction = $\frac{L_1 + L_2}{V_1 - V_2}$

where L_1 and V_1 are the length and speed of the train and L_2 and V_2 are the length and speed of the moving object.

Solved Examples

1. A train 300 m long is running with a speed of 54 km/hr. In what time will it cross a telephone pole?

$$\text{Speed of the train} = 54 \times \frac{5}{18} \text{ m/s}$$

$$= 15 \text{ m/s}$$

∴ Time taken to cross the pole

$$= \frac{300}{15} = 20 \text{ seconds}$$

2. A train 220 m long is running with a speed

of 60 km/hr. In what time will it pass a man who is running at 6 km/hr in the direction opposite to that in which the train is going?

Ans: Time taken to pass the man

$$= \frac{220}{(60+6) \times \frac{5}{18}} = \frac{220 \times 18}{66 \times 5} = 12 \text{ seconds}$$

3. Two trains 80 metres and 120 metres long are running at the rates of 25 km/hr. and 35 km/hr. respectively on parallel rails. If they are moving in same directions, how long will they take to pass each other?

Ans: Time taken = $\frac{(80+120)}{(35-25) \times \frac{5}{18}} = \frac{200 \times 18}{10 \times 5}$
= 72 seconds

4. Two trains running in the same direction at 40 km/hr. and 22 km/hr. completely pass one another in 1 minute. If the length of the first train is 125m., find the length of the second train.

Ans: Let the length of the second train be x

Then, $\frac{125+x}{(40-22) \times \frac{5}{18}} = 60$

$$\frac{(125+x)18}{18 \times 5} = 60 \Rightarrow 125+x = 5 \times 60$$

$$\Rightarrow x = 300 - 125 = 175 \text{m}$$

5. A train 280m long is moving at a speed of 60 km/hr. The time taken by the train to cross a platform 220m long is

Ans : Time taken to cross the platform

$$= \frac{(280+220)}{60 \times \frac{5}{18}} = \frac{500 \times 18}{60 \times 5} = 30 \text{ sec}$$

PRACTICE TEST

1. How long will it take for a train 120 m long running at 40 km/hr. to cross a bridge 80 metres long?

- 1) 18 min 2) 18 sec.
3) 20 sec 4) 19 sec.

2. A train running at 50 m/s takes 30 seconds to cross a platform of 800m. long. The length of the train in metres is —

- 1) 900 2) 300
3) 550 4) 700

3. A person standing on a platform of length 200 metres observed that a train takes 10 seconds to pass him, passed completely through the platform in 30 seconds. Then the length of the train is —

- 1) 100 metres 2) 150metres
3) 80 metres 4) 105 metres

4. A train running at uniform speed takes 54 seconds to pass a platform of 324 m. long and 45 seconds to pass another platform of 240m. long. The length of the train in metres is —

- 1) 180 2) 170
3) 190 4) 100

5. A train 300 m long is running at a speed of 68 km/hr. It will cross a man coming from the opposite direction at a speed of 4km/hr. in —

- 1) 30 sec. 2) 15 sec.
3) 25 sec 4) 21.6 sec

6. A train 240 metres long, takes 24 seconds to cross a man running at 10 km/hr in the same direction as the train. The speed of the train is —

- 1) 32 km/hr 2) 46 km/hr
3) 38 km/hr 4) 24 km/hr

7. A train crosses a platform in 60 seconds travelling at a speed of 54 km/hr. If the length of the platform is 500 metres, what is the

length of the train?

- 1) 400m 2) 350m
3) 450 m 4) 500m

8. A man running at 18 km/hr crosses a bridge in 2 minutes. The length of the bridge is —

- 1) 1.2 km 2) 0.6 km
3) 1 km 4) 3.6 km

9. A railway passenger counts the telegraph posts on the line as he passes them. If they are 50 m apart from each other and the train is running at the rate of 48 km/hr. how many posts will he pass per minute?

- 1) 16 2) 17
3) 18 4) 13

10. Two trains are running at 40 km/hr. and 20 km/hr. respectively in the same direction. The faster train completely passes a man sitting in the slower train in 5 seconds. What is the length of the faster train?

- 1) $23\frac{2}{9}$ m 2) 27m
3) $27\frac{7}{9}$ m 4) 23 m

11. A train 150 m long running at a speed of 60 km/hr. takes 30 seconds to cross a bridge. The length of the bridge is

- 1) 3,500 m 2) 500 m
3) 200 m 4) 350m

12. A train moving with a uniform speed of 60 km/hr. crosses a pole in 6 seconds. The length of the train (in metres) is

- 1) 200 2) 150
3) 120 4) 100

13. The time taken by a train 180 m long, travelling at 42 km/hr. to pass a man walking in the same direction at 6 km/hr. will be

- 1) 18 seconds 2) 21 seconds
3) 24 seconds 4) 25 seconds

14. Two trains whose lengths 180 m and 220m respectively are running in directions opposite to one another with respective speeds of 40 kmph and 50 kmph. Time taken by them to cross one another will be

- 1) 16 seconds 2) 17 seconds
3) 18 seconds 4) 22 seconds

15. Two trains running in the same direction at 40 km/hr. and 22 km/hr. completely pass one another in one minute. If the length of the first train is 125 m, the length of the second train is

- 1) 125 m 2) 150m
3) 175 m 4) 200m

16. 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

- 1) 70 m 2) 80 m 3) 90 m 4) 100 m

17. A man standing on a railway platform observes that a train going in one direction takes 4 seconds to pass him. Another train of same length going in the opposite direction takes 5 seconds to pass him. The time taken by the two trains to cross each other will be

- 1) $3\frac{1}{9}$ sec 2) $4\frac{0}{9}$ sec
3) $4\frac{9}{9}$ sec 4) $5\frac{0}{9}$ sec

18. A train 120 m long is moving at a speed of 54 km/hr. The time taken to pass a bridge 180 m long is

- 1) 12 seconds 2) 18 seconds
3) 30 seconds 4) 20 seconds

19. A train crosses a pole in 15 seconds, while it crosses 100 m long platform in 25 seconds. The length of the train is

- 1) 125 m 2) 135 m
3) 150 m 4) 175 m

ANSWERS TO PRACTICE TEST

1. (2) 2. (4) 3. (1) 4. (1) 5. (2) 6. (2) 7. (1) 8.(2)
9. (2) 10. (3) 11. (4) 12. (4) 13. (1) 14. (1) 15. (3) 16.(3)
17. (2) 18. (4) 19. (3)
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