

# BHARAT SCHOOL OF BANKING

## PROBLEMS BASED ON TRAINS

### Question 1

A train of length 150 meters can cross a bridge in 30 seconds when travelling at a speed of 40km/hr. Then what is the length of the bridge?

a)180m    b)182c)183d)185

**Answer : c)183**

Solution:

Let the length of the bridge be X.

The speed of the train = 40km/hr =  $40 \times \frac{5}{18}$  m/sec =  $\frac{100}{9}$  m/sec.

The time taken to cross the bridge = 30 seconds.

Then,  $[150 + X] / 30 = \frac{100}{9}$

$150 + X = 3000 / 9$

$X = 3000/9 - 150 = 1650/9 = 183.33$

Hence the answer is 183 m.

### Question 2

A train crosses a bridge and a bike standing on the bridge in 40 seconds, 25 seconds respectively. What is the length of the bridge if the speed of the train is 50.4km/hr?

a)180m    b)210c)183d)185

**Answer : b)210**

Solution:

Given that,

The speed of the train = 50.4km/hr =  $50.4 \times \frac{5}{18}$  m/sec = 14 m/sec

The train crosses a bike(standing object) in 25 seconds.Then,

Length of the train =  $(14 \times 25)$ m = 350 m.

Now, let the length of the bridge is X m.

the train crosses the bridge in 40 seconds.

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$$\text{Then, } (X + 350)/40 = 14$$

$$X + 350 = 14 \times 40 = 560$$

$$X = 210$$

Hence the bridge is 210m long.

### Question 3

In what time a train 120 meters long travelling at a speed of 70km/hr crosses a cyclist who is at the speed 5km/hr in the direction opposite to the train?

- a)4.76sec   b)5.76sec   c)8.92sec   d)6.14sec

**Answer : b)5.76sec**

Solution:

Given that the speed of the train and a cyclist is 70km/hr and 5km/hr respectively.

Then, the Speed of train relative to cyclist =  $(70 + 5) \text{ km/hr} = 75 \text{ km/hr} = 75 \times \frac{5}{18} = \frac{125}{6} \text{ m/sec}$ .

The time taken to cross the cyclist =  $120 / (\frac{125}{6}) = 120 \times \frac{6}{125} = 5.76 \text{ sec}$

hence the answer is 5.76 seconds.

### Question 4

A train overtakes two bikes which are travelling at the speed of 25km/hr and 30km/hr in the same direction the train is moving and crosses them in 18 and 21 seconds respectively. Then the length of the train is:

- a)170m   b)175m   c)173m   d)185m

**Answer : b)175**

Solution:

Let us convert the speed in the unit of m/sec

$$25\text{km/hr} = 25 \times \frac{5}{18} = \frac{125}{18} \text{ m/sec}$$

$$\text{and } 30\text{km/hr} = 30 \times \frac{5}{18} = \frac{150}{18} \text{ m/sec}.$$

Let the length of the train be X metres and its speed by Y m/sec

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Then the relative speed of the train and the bike with speed  $125/18$  m/sec is  $(Y - 125/18)$

And the relative speed of the train and the bike with speed  $150/18$  m/sec is  $(Y - 150/18)$ .

Then we can express the time taken to pass the bike as

$$[X / (Y - 125/18)] = 18 \text{ and } [X / (Y - 150/18)] = 21$$

By Simplifying above we get,  $X = 18Y - 125$

and  $X = 21Y - 175$

Solving the eqns we get  $Y = 50/3$  and  $X = 175$ .

Hence the length of the train is 175m.

### Question 5

A train 200 m long is moving with the speed of 50km per hour. Find the time taken to pass a tree standing near the railway track.

a)  $14 \frac{2}{5}$  seconds    b) 15 seconds    c)  $16 \frac{1}{2}$  seconds    d) 17 seconds

**Answer : a)  $14 \frac{2}{5}$  seconds**

Solution:

Speed of the train = 50km/hr =  $50 \times \frac{5}{18}$  m/sec =  $\frac{250}{18}$  m/sec

Length of the train = 200 m

Time taken to cross the tree =  $200 / (\frac{250}{18}) = 200 \times \frac{18}{250} = \frac{72}{5} = 14.4$  seconds

Hence the answer is  $14 \frac{2}{5}$  seconds.

### Question 6

A train of length 80 m. If the speed of the train is 120km/hr, then the time taken to cross a 150 m long wall is:

a) 5 seconds    b) 3 seconds    c) 7 seconds    d) 6 seconds

**Answer: c) 7 seconds**

Solution:

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speed of the train =  $120 \text{ km/hr} = 120 \times \frac{5}{18} \text{ m/sec} = 100/3 \text{ m/sec}$

Distance covered in passing the long wall =  $(80+150) = 230 \text{ m}$

Time taken to cross the wall =  $230 \times \frac{3}{100} = 6.9 \text{ sec}$

Hence the answer is 7 seconds(approximately)

### Question 7

A bike and the train are running at a speed of  $15 \text{ km/hr}$  and  $70 \text{ km/hr}$ . The length of the train is  $200 \text{ m}$ . Find the time taken by the train to cross the bike.

a) 11 seconds      b) 10 seconds      c) 9 seconds      d) 13 seconds

**Answer : d) 13 seconds**

Solution:

Speed of the train relative to bike  $(70 - 15) = 55 \text{ km/hr} = 55 \times \frac{5}{18} \text{ m/sec} = \frac{275}{18} \text{ m/sec}$

Time taken to cross the bike = time taken to cross  $200 \text{ m}$  at  $\frac{275}{18} \text{ m/sec}$

$= 200 \times \frac{18}{275} = 8 \times \frac{18}{11} = 13.09 \text{ seconds}$ .

Hence the answer is 13 seconds(approximately)

### Question 8

Find the approximate speed of a train which passes a tree in 12 seconds. Note that the length of the train is  $264 \text{ m}$ .

a)  $79 \text{ km/hr}$       b)  $80 \text{ km/hr}$       c)  $84 \text{ km/hr}$       d)  $74 \text{ km/hr}$

**Answer : a)  $79 \text{ km/hr}$**

Solution:

Length of the train =  $264 \text{ m}$ .

Time taken to pass the tree = 12 seconds.

Speed of the train =  $\frac{264}{12} \text{ m/sec} = 22 \text{ m/sec} = 22 \times \frac{18}{5} \text{ km/hr} = 79.2 \text{ km/hr}$ .

Hence the answer is  $79 \text{ km/hr}$ .(approximately).

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### Question 9

A train crosses a standing man in 3 seconds and moves at a rate of 120 km/hr. Find the length of the train.

- a) 200 m   b) 98 m   c) 260 m   d) 100 m

**Answer : d) 100 m**

Solution :

Speed of the train = 120 km/hr =  $120 \times \frac{5}{18}$  m/s.  
=  $100/3$  m/sec.

Time taken to cross the standing man is 3 seconds.

Length of the train = Speed of the train x Time taken to cross the standing man  
=  $3 \times 100/3 = 100$  m.

Hence the train is 100 m long.

### Question 10

A 480 m long train crosses a standing object in 12 seconds. Find the time taken by the train to cross a long wall of length 325 m.

- a) 20 sec   b) 15 sec   c) 19 sec   d) 21 sec

**Answer : a) 20 sec**

Solution :

Length of the train = 480 m

Time taken to cross an object = 12 seconds.

Speed of the train = Length of the train / Time taken to cross an object =  $480/12$  m/sec  
= 40 m/sec.

Length of the wall = 325 m

Time taken to cross the wall = (Length of the train + Length of the wall) / Speed of the train

=  $(480 + 325 \text{ m})/40 \text{ seconds} = 805/40 = 20.12 \text{ seconds}$

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Hence the answer is 20 seconds.

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