BHARAT SCHOOL OF BANKING
PROBLEMS BASED ON TRAIN

1. A goods train and a passenger train are running on the parallel tracks in the same direction. The driver of the goods train observes that the passenger train coming from behind, overtakes and crosses his train completely in 1 min whereas a passenger on the passenger train marks that he crosses the goods train in 1/3 min. If the speeds of the trains is in the ratio of 1 : 2, then find the ratio of their lengths.

(a) 4 : 1
(b) 3 : 1
(c) 1 : 5
(d) 1 : 2
(e) None of these

Soln. 1.

(d) Let the speeds of the two trains be x and 2 x and length be L_1 and L_2, respectively.

Case I: When driver of goods train observes that passenger train crosses his train

$\frac{L_1 + L_2}{2x - x} = 1\,\text{min} = 60s$ ..... (i)

Case II: When a passenger on passenger train observes that he crosses the goods train

$\frac{L_1}{2x-x} = \frac{2}{3}\,\text{min} = \frac{1}{3} \times 60 = 20s$ ..... (ii)

.....{1/3, conversions into seconds not reuired}

On dividing Eq. (i) by Eq. (ii), we have

$$\frac{L_1 + L_2}{L_1} = \frac{60}{20}$$

$$\Rightarrow \frac{L_1}{L_2} = \frac{1}{2}$$

2. A train running at the speed of 36 km/h goes past a pole in 15 s. What is the length of the train?

(a) 150 m
(b) 200 m
(c) 250 m
(d) 300 m
(e) 350 m

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Soln. 2.

(a) Speed of train $= \frac{\text{Length of train}}{\text{Time taken to cross the pole}}$

$\therefore$ Length of train = Speed of train $\times$ Time taken to cross the pole

$$= \frac{36 \times 5 \times 15}{18} = 150 \text{ m}$$

3. A train crosses a platform in 30 s travelling with a speed of 48 km/h. If the length of the train be 200 m, then the length of the platform is
(a) 420 m
(b) 500 m
(c) 300 m
(d) 250 m
(e) None of these

Soln. 3.

(e) Speed of train = 48 km/h

$= 48 \times \frac{5}{18}$ m/s $= \frac{40}{3}$ m/s

Let length of the platform be x m.

According to the question,

$200 + x = \frac{40}{3} \times 30$
$\Rightarrow 200 + x = 400$
$\therefore x = 200$ m

4. A train travelling with uniform speed crosses two bridges of lengths 240 m and 300 m in 18 s and 21 s, respectively. Find the speed of the train.
(a) 72 km/h
(b) 80 km/h
(c) 45 km/h
(d) 60 km/h

(e) 90 km/h

Soln. 4.

(a) Let length of the train = L

According to the question,

$$\frac{L+240}{18} = \frac{L+300}{21}$$

$\therefore L = 120$ m

Taking the length of the 2nd bridge into consideration,

$$\text{Speed of train} = \frac{L+240}{18} = \frac{120+240}{18}\ \text{m/s} = \frac{360}{18} \times \frac{18}{5}\ \text{km/h}$$

$= 72$ km/h

5. From stations Manesar and Nainital, two trains start moving towards each other at speed 100 km/h and 75 km/h, respectively. When the two trains meet each other, it is found that one train covers 50 km more than another. Find the distance between stations.
(a) 180 km
(b) 200 km
(c) 255 km
(d) 305 km
(e) None of these

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Soln. 5.

(e) Let the trains meet after time 't' at a distance 'x' km from Nainital,
then another train coming from Manesar covers a distance of $(x + 50)$ km.

For station Manesar, $(x + 50) = 100t$
$\Rightarrow x = 100t - 50$ ..... (i)

For station Nainital, $x = 75t$ ..... (ii)

From Eqs. (i) and (ii), we get
$75t = 100t - 50 \Rightarrow t = 2$ h

Distance between stations:
$= (100 + 75)t = 175 \times 2 = 350$ km

6. The distance between two stations Patiala and Rewadi is 205 km. A train with speed of 25 km/h leaves Patiala at 8:00 am towards Rewadi. Another train with speed of 35 km/h leaves Rewadi at 9 : 00 am towards Patiala. Then, at what time both trains meet?
(a) 12 : 00 am
(b) 11 : 00 am
(c) 9 : 30 pm
(d) 11 : 30 am
(e) 12 : 00 pm

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Soln. 6.

(e) First train leaves at 8:00 am and second at 9:00 am.
So, first train i.e., from Patiala to Rewadi has covered

25 km distance in 1 h. So, distance left between the station = 205 – 25 = 180 km

Now, trains are travelling in opposite directions.

So, relative speed = 25 + 35 = 60 km/h

Time taken to cover 180 km = $\frac{180}{60}$ = 3 h

∴ The time, at which both the trains will meet, is 3 h after second train left
i.e., 9 : 00 am + 3 h = 12 : 00 pm

7. A train leaves Manali for Gurgaon at 3 : 45 a.m. and goes at the rate of 50 km/h. Another train leaves Gurgaon for Manali at 2 : 35 a.m. and goes at the rate of 60 km/h. If the distance between both is 620 km, at what distance from Manali will the two trains meet?
(a) 200 km
(b) 250 km
(c) 145 km
(d) 300 km
(e) 375 km

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Soln. 7.
(b)
The 2nd train leaving Gurgaon starts its journey earlier and it travels = 60 × (3:45 a.m. – 2:35 a.m.)

$= 60 \times 1\frac{1}{6}\text{h} = 70$ km, when the 1st train (that leaves Manali) starts its journey.

Now, both the trains cover (620 – 70) km i.e., 550 km with relative speed (50 + 60) km/h = 110 km/h.

Therefore, the trains meet after $\frac{550}{110} = 5\text{h}$

After the 1st train starts at 3 : 45 a.m.,
Now, the 1st train covers 5 × 50 km = 250 km to meet the 2nd train.

8. The distance travelled by a train is 1830 km. The speed of the train is one more than twice the time taken to travel the distance. What will be the respective ratio of the time taken and speed of train?
(a) 30 : 61
(b) 61 : 30
(c) 25 : 51
(d) 51 : 25
(e) None of these

Soln. 8.

(a) Let time taken to cover the distance = t
$\therefore$ Speed = (2t + 1)

$\Rightarrow t(2t + 1) = 1830$

$$\Rightarrow 2t^2 + t - 1830 = 0$$

Taking '+' sign, $t = \frac{-1 + 121}{4} = \frac{120}{4} = 30$

$\therefore$ Required ratio = 30 : (2×30 + 1) = 30 : 61

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9. A train overtakes two persons walking along a railway track. The first one walks at 5.4 km/h and the other one walks at 4.5 km/h. The train needs 8.5 s and 8.4 s respectively, to overtake them. What is the speed of the train, if both the persons are walking in the same direction as the train?

(a) 66 km/h
(b) 72 km/h
(c) 78 km/h
(d) 81 km/h
(e) None of the above

Soln. 9.

(d) Speed of Ist person

$$= 5.4 \text{ km/h} = \left(5.4 \times \frac{5}{18}\right) \text{m/s}$$
$$= \frac{3}{2} \text{m/s} = 1.5 \text{ m/s}$$

Speed of IInd person $= 4.5$ km/h

$$= \left(4.5 \times \frac{5}{18}\right) \text{m/s} = \frac{5}{4} \text{m/s} = 1.25 \text{ m/s}$$

Let the speed of train be x m/s.

Then, $(x - 1.25) \times 8.4 = (x - 1.5) \times 8.5$
$\Rightarrow 0.1x = 2.25 \Rightarrow x = 22.5$ m/s

$$\therefore \text{Speed of the train} = \left(22.5 \times \frac{18}{5}\right) = 81 \text{ km/h.}$$

10. A 125 m long train takes 25 s to cross a person who is going in the same direction with the speed of 4 km/h. After crossing that person, the train can reach next station in 1 hr. How long that person takes to reach that station after being crossed by them?

(a) $4\frac{1}{4}$ h

(b)$5\frac{3}{4}$h

(b) $3\frac{3}{4}$h

(d) $5\frac{1}{4}$h
(e) None of the above

Soln.10.

(e) Speed of the person = 4 km/h
$= 4 \times \frac{5}{18}\text{m/s} = \frac{10}{9}\text{m/s}$
Let speed of train be x m/s.
Then, relative speed of train $= \left(x - \frac{10}{9}\right)\text{m/s}$

As, train takes 25 s to cross the person

$$\therefore 25 = \frac{125}{\left(x - \frac{10}{9}\right)} \Rightarrow x - \frac{10}{9} = 5$$

$\therefore x = \frac{55}{9}\text{m/s}$

Now, distance covered by the train in 1 hr

$= \frac{55}{9} \times 60 \times 60 = 22000\text{ m} = 22\text{ km}$
Thus, time taken by the person to cover the distance of
$22\text{ km} = \frac{22}{4}\text{h} = 5\frac{1}{2}\text{h}$.

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