

# CH 3 DISTANCE SPEED AND TIME

## ANSWERS AND EXPLANATIONS

### EXERCISE 1

1. (b) Let  $x$  be the length of the bridge.

Length of the train = 100 m

Speed of train = 72 km/hr

$$= \frac{72 \times 5}{18} \text{ m/s}$$

Time taken by train = 25 seconds.

$$\therefore 25 = \frac{100 + x}{72 \times \frac{5}{18}}$$

$$\Rightarrow 25 \times 72 \times \frac{5}{18} = 100 + x$$

$$\Rightarrow x = 500 - 100 = 400 \text{ m.}$$

2. (d) Train takes 20 seconds to cover its length and 36 seconds to cross the platform, it mean it has taken 16 second at 54 km/hr to cross the length of platform.

$\therefore$  Length of the platform

= Distance  $\times$  Time

$$= 54 \times 16 \text{ km / hr}$$

$$= 54 \times 16 \times \frac{5}{18} \text{ m/sec}$$

$$= 240 \text{ m.}$$

3. (a) Train has 12 bogies. Each bogie is 15 metre long.

$\therefore$  Total length of bogie =  $15 \times 12$

$$= 180$$

Since, train crosses in 18 second

$$\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{\text{Length}}{\text{Time}} = \frac{180}{18} = 10$$

Due to some problem, 2 bogies were detached

$\therefore$  Remaining bogies =  $12 - 2 = 10$

$\therefore$  Total length of bogie =  $15 \times 10 = 150$

$$\text{Thus, time} = \frac{\text{distance}}{\text{speed}} = \frac{150}{10} = 15 \text{ sec}$$

4. (d) Relative speed of both trains

$$= 60 + 90 = 150 \text{ km / h}$$

Total distance =  $1.10 + 0.9 = 2 \text{ km}$

$\therefore$  Required time

$$= \frac{2 \times 60 \times 60}{150} = 48 \text{ seconds.}$$

5. (d) Let the car take  $n$  hr. to cover 385 km. Using the formula for sum of  $n$  terms of an A.P., we get

$$\frac{n}{2} [2 \times 40 + (n-1)5] = 385$$

$$\text{or } \frac{n}{2} (80 + 5n - 5) = 385$$

$$\text{or } 80n + 5n^2 - 5n = 770$$

$$\text{or } 5n^2 + 75n - 770 = 0$$

$$\therefore n = 7 \text{ h}$$

6. (c) Relative speed =  $90 + 60 = 150 \text{ km/hr}$ .

Total distance to be covered =  $300 + 200 = 500 \text{ m}$

Time required

$$= \frac{500}{150 \times 1000} \times 3600 = 12 \text{ sec.}$$

7. (d) Speed =  $\left(5 \times \frac{5}{18}\right) \text{ m/sec} = \frac{25}{18} \text{ m/sec.}$

Distance covered in 15 minutes

$$= \left(\frac{25}{18} \times 15 \times 60\right) \text{ m} = 1250 \text{ m.}$$



