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.
   \[ 25 = \frac{100+x}{\frac{72 \times 5}{18}} \]
   \[ \Rightarrow 25 \times \frac{72 \times 5}{18} = 100+x \]
   \[ \Rightarrow x = 500 - 100 = 400 \text{ m.} \]

2. (d) Train takes 20 seconds to cover its length and 36 seconds to cross the platform, it means it has taken 16 seconds at 54 km/hr to cross the length of the platform.
   \[ \text{Length of the platform} = \text{Distance} \times \text{Time} \]
   \[ = 54 \times 16 \text{ km/hr} \]
   \[ = 54 \times 16 \times \frac{5}{18} \text{ m/sec} \]
   \[ = 240 \text{ m.} \]

3. (a) Train has 12 bogies. Each bogie is 15 metre long.
   \[ \therefore \text{Total length of bogie} = 15 \times 12 \]
   \[ = 180 \]
   Since, train crosses in 18 second
   \[ \therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{180}{18} = 10 \text{ m/sec} \]
   Due to some problem, 2 bogies were detached
   \[ \therefore \text{Remaining bogies} = 12 - 2 = 10 \]

4. (d) Relative speed of both trains
   \[ = 60 + 90 = 150 \text{ km/hr} \]
   Total distance = 1.10 + 0.9 = 2 km
   \[ \therefore \text{Required time} = \frac{2 \times 60 \times 60}{150} = 48 \text{ seconds} \]

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
   \[ \frac{n}{2} [2 	imes 40 + (n-1) 5] = 385 \]
   or \[ \frac{n}{2} (80 + 5n - 5) = 385 \]
   or \[ 80n + 5n^2 - 5n = 770 \]
   or \[ 5n^2 + 75n - 770 = 0 \]
   \[ \therefore n = 7 \text{ hr} \]

6. (c) Relative speed = 90 + 60 = 150 km/hr.
   Total distance to be covered = 300 + 200 = 500 m
   Time required
   \[ = \frac{500}{150 \times 1000} = 12 \text{ sec.} \]

7. (d) Speed = \[ \left( \frac{5 \times \frac{5}{18}}{18} \right) \text{ m/sec} = \frac{25}{18} \text{ m/sec.} \]
   Distance covered in 15 minutes
   \[ = \left( \frac{25}{18} \times 15 \times 60 \right) \text{ m} = 1250 \text{ m.} \]