



# Time, Speed and Distance

## RELATIONSHIP BETWEEN TIME, SPEED, AND DISTANCE

As we know, distance = speed × time

$$D = S \times T$$

It means that if a person is running at a speed of 20 km/h and he runs for 2 h, he will be covering a total distance of 40 km. That is, distance =  $20 \times 2 = 40$  km

## Conversion from m/s to km/h and Vice Versa

If speed is given in m/s and it is required to convert it into km/h, then we multiply it by 18/5, and when speed is given in km/h and we have to convert it into m/s, then we multiply it by 5/18

$$36 \text{ km/h} = 36 \times \frac{5}{18} = 10 \text{ m/s}$$

$$20 \text{ m/s} = 20 \times \frac{18}{5} = 72 \text{ km/h}$$

## Different cases

By using the basic relationship between time, speed, and distance, the following three different cases are possible:

**Case I** When S (distance) is constant  $V \propto \frac{1}{T}$

$$\text{So, } V_1 / V_2 = T_2 / T_1 \text{ (Direct)}$$

**Case II** When T (time) is constant  $S \propto V$

$$\text{So, } S_1 / S_2 = V_1 / V_2$$

**Case III** When S (speed) is constant  $T \propto D$

$$\text{So, } T_1 / T_2 = D_1 / D_2$$

## Approaches

### Using STD table

#### Advantages of tabular form

Table helps to organize complex information given in the question.

It increase speed and accuracy while solving TSD questions

Further, We can apply tabular form in all types of questions like trains, boats etc.

Speed (S)	Time (T)	Distance(D)
D/T	D/S	S×T
÷	÷	×

Peter covers a distance in 1 hour 24 minutes. He covers two thirds of this distance with a speed of 4 km/h distance and rest of the distance at a speed of 5 km/h . Find Total distance

S	T = 7/5	D
4	?	2x/3
5	?	x/3

S	T = 7/5	D
4	2x/12	2x/3
5	x/15	x/3

$$\frac{2x}{12} + \frac{x}{15} = \frac{7}{5}$$

on simplification  $x = 6$  km

## PRODUCT CONSTANCY METHOD

Application of % to STD

$$\text{Speed} \times \text{Time} = \text{Distance}$$

Imagine above variables in following format

$$S \times T = D$$

$$1 \times 1 = 1$$

$$\uparrow \times \downarrow = 1$$

### Example

Time, Speed, and Distance (TSD) When speed of a car is increased by 25%, time taken reduces by 20 minutes in covering a certain distance. What is the actual time taken to cover the same distance by actual speed?

#### Solution

##### Normal Method

Since we know  $S = V \times T$  (Distance = Speed × Time) New speed = 1.25 V, so new time =  $T/1.25$  So, reduction in time =  $T - T/1.25 = 0.25 T/1.25 = T/5$

$$T/5 = 20 \text{ min} \Rightarrow T = 100 \text{ min}$$

##### Fraction Method

$$\text{if } (S \uparrow) 25\% \rightarrow \frac{1}{4} \rightarrow \frac{5}{4} \text{ then } (T \downarrow) \rightarrow \frac{4}{5} \rightarrow \frac{1(\downarrow) \rightarrow 20 \text{ Min}}{5 \rightarrow 100 \text{ Min}}$$

##### Product Constancy Method

Since speed has been increased by 25%, so time will reduce by 20%. Now, 20% T(Time) = 20 min So, Total time = 100 min

### Example

TSD Mayank goes to his office from his home at a speed of 20 kmph and gets late by 10 min. However, when he increases his speed to 25 kmph, he is 20 min early. What is the distance from his office to his home?

#### Normal Method

Let us assume that distance = D

$$\text{So, } D/20 - D/25 = 30/60 \text{ h} = 1/2 \text{ So, } D = 50 \text{ km}$$

#### Fraction Method

$$\text{Speed } (S \uparrow) = 20 \uparrow 25 \rightarrow 25\% \uparrow$$

$$\text{Time } (T \downarrow) = 10 \text{ min late} + 20 \text{ min early} = 30 \text{ minutes}$$

$$\text{if } (S \uparrow) 25\% \rightarrow \frac{1}{4} \rightarrow \frac{5}{4} \text{ then } (T \downarrow) \rightarrow \frac{4}{5} \rightarrow \frac{1(\downarrow) \rightarrow 30 \text{ Min}}{5 \rightarrow 150 \text{ Min} = 2.5 \text{ Hour}}$$

$$\text{So } D = 20 \times 2.5 = 50 \text{ KM}$$

#### Product Constancy Method

$$S = V \times T \rightarrow (S) 25\% \uparrow \rightarrow (T) 20\% \downarrow \rightarrow 30 \text{ min} \Rightarrow T = 150 \text{ min} = 2.5 \text{ hour So, total distance} = 20 \times 2.5 = 50 \text{ km}$$

## TYPE

An areoplane covers a certain distance at a speed of 240 km/hour in 5 hours. To cover the same distance in 5/3 hours it must travel at a speed of :

#### Solution:

(d) Distance = Constant

So, Speed  $\propto$  1/Time

Ratio of time = 5 : 5/3

Ratio of time = 3 : 1

Ratio of speed = 1 : 3



1 unit  $\rightarrow$  240 km/hr  
 3 units  $\rightarrow$   $240 \times 3$   
 $= 720$  km/hr

### TYPE

If a man walks 20 km at 5 km/hr. he will be late by 40 minutes. If he walks at 8 km/hr, how early from the fixed time will he reach?

**Solution:**

(c) Time taken at 5 km/hr  $= 20/5$   
 $= 4$  hr.

Actual time  $= (4 - 2/3) = 10/3$  hrs.

Time taken at 8 km/hr  $= 20/8$   
 $= 5/2$  hrs

Time difference  $= 10/3 - 5/2 = 5/6$  hrs.  
 $= 50$  min. required time.

### TYPE

A train passes a 50 meters long platform in 14 seconds and a man standing on the platform in 10 seconds. The speed of the train is:

**Solution:**

(d) Distance travelled in 14 sec.  $= 50 + l$

Distance travelled in 10 sec.

$= l$

So, Speed of train  $= 50/(14 - 10)$  m/sec.

$= 50/4 \times 18/5$  km/hr  $= 45$  km/hr

### TYPE

A man can reach a certain place in 30 hours. If he reduces his speed by  $1/15$ th, he goes 10 km less in that time. Find his speed per hour.

**Solution:**

(d) Actual : Reduced

Ratio of speed  $= 15 : 14$

Ratio of time  $= 14 : 15$

14  $\rightarrow$  28 hrs

15  $\rightarrow$  30 hrs

So, in 2 hrs it travels 10 kms

Speed  $= 10/2 = 5$  km/hr

### TYPE

Two trains, A and B, start from stations X and Y towards each other, they take 4 hours 48 minutes and 3 hours 20 minutes to reach Y and X respectively after they meet if train A is moving at 45 km/hr., then the speed of the train B is

**Solution:**

(c) In these type of question use the given below formula to save your valuable time.

$$\frac{S_1}{S_2} = \sqrt{\frac{T_2}{T_1}}$$

Where  $S_1, S_2,$  and  $T_1, T_2$  Are the respective speeds and times of the objects.

$$= 45/S_2 = \sqrt{\frac{10}{\frac{3}{24}}}$$

$$= S_2 = 45 \times 6/5 = 54 \text{ km/hr}$$

Required speed  $= 24$  km/hr

### TYPE

A train 270 meters long is running at a speed of 36 km/hr. then it will cross a bridge of length 180 meters in

**Solution:**

(b) According to question (174)

$$\text{Crossing time} = \sqrt{\frac{l_1+l_2}{\text{Speed}}}$$

$$\rightarrow \sqrt{\frac{270+180}{36 \times 5/18}} = \frac{450}{10} \text{ time}$$

$= 45$  second

### TYPE

A is twice as fast as B and B is thrice as fast as C is. The journey covered by C in 1.5 Hours will be covered by A in

**Solution:**

According to Question,

A : B : C

2 : 1

3 : 1

A : B : C

6 : 3 : 1 Ratio of speed

$\frac{1}{6} : \frac{1}{3} : \frac{1}{1}$  Ratio of time

[time  $\propto \frac{1}{\text{speed}}$ ]

$= 1 : 2 : 6$

Time taken by A,

$= 1$  ratio  $= 1 \times 1/4$  hours  $= 15$  min

### TYPE

A thief is noticed by a policeman from a distance of 200m the thief starts running and the policeman chasis him.

The thief and the policeman run at the rate of 10km hr.

and 11 km./hr. respectively. What is the difference

between them after 6 minutes ?

**Solution:**

(a)



$$V_{\text{rel.}} = 11 - 10 = 1 \text{ km/hr}$$

$$= \frac{1 \times 1000}{60} \text{ mt/min}$$

Distance between them after 6 min.

$$= 200 - \frac{1000}{60} \times 6 = 100 \text{ mtr.}$$

### TYPE

Two trains 140 m and 160 m long run at the speed of 60 km/hr, and 40 km/hr. respectively in opposite directions on parallel tracks. The time (in seconds) which they take to cross, each other is :

**Solution:**

$$(b) T = \frac{D}{T} = \frac{l_1+l_2}{S_1+S_2} = \frac{300}{18}$$

$$\frac{300 \times 18}{500} \rightarrow T = 54/5 = 10.88 \text{ sec.}$$

### TYPE

Points 'A' and 'B' are 70 km apart on a highway and two cars start at the same time; If they travel in the same direction, they meet in 7 hours, but if they travel towards



each other they meet in one hour. Find the speed of the two cars (in km/hr)

**Solution:**

(b) Let the speed of the cars be  $S_1$  and  $S_2$   
 $= S_1 - S_2 = \frac{70}{7} = 10$  ..... (i)

and  $S_1 + S_2 = 70/1 = 70$  ..... (ii)

from equation (i) and (ii)

$S_1 = \frac{10+70}{2} = 40$  km/hr

$S_2 = \frac{70-10}{2} = 30$  km/hr

= Required speeds are 40 km/hr and 30 km/hr

**TYPE**

A and B travel the same distance at speed of 9km/hr and 10 km/hr respectively. If A takes 36 minutes more than B, the distance travelled by each is

**Solution:**

(b) Given :-

A's speed = 9 km/hr

B's speed = 10 km/hr

A	:	B	
Ratio of speed = 9		10	[Speed $\propto \frac{1}{Time}$ ]
Ratio of time = 10		8	

↖

1 hour more

→ Here we find A takes 60 min more than that of B

But actual more time

= 36 min.

i.e. 60 units = 36

1 unit = 36/60 = 3/5

→ Their travelled distance is same

→ Distance = Time × Speed

= 9 × 10

= 90 ratio

→ Actual distance, covered by them =  $90 \times \frac{3}{5} = 54$  km

**TYPE**

Walking 6/7<sup>th</sup> of his usual speed a man is 12 minutes late. The usual time taken by him cover that distance in

**Solution:**

(b)	Actual	:	New
Speed	7	:	6

time	6	:	7
	1 unit	→	12 minutes
	6 units	→	72 minutes

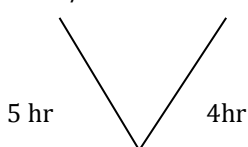
= usual time = 1 hours 12 minutes

**TYPE**

Shri X goes to his office by scooter at a speed of 30 km/hr and reaches 6 minutes earlier. If he goes at a speed of 24 km/hr, he reaches 5 minutes late. The distance of his office is

**Solution:**

(c) 24 km/hr                      30 km/hr



120 km  
 $= (5 - 4) = 1$  unit  $\rightarrow 1 \frac{11}{60}$   
 120 unit  $\rightarrow 11/60 \times 120 = 22$  km  
 Thus, Distance from house to office = 22 km

**Previous year questions**

**Q1.**

A motor starts with the speed of 70 kmph with its speed increasing every two hours by 10 kmph. In how many hours will it cover 345 kms ?

- (a) 2.25hours
- (b) 4.50hours
- (c) 4 hours 5 minutes
- (d) Cannot be determined
- (e) None of these

**Q2.**

A train running at the speed of 20 metres/second crosses a pole in 24 seconds less than the time it requires to cross a platform thrice its length at the same speed. What is the length of the train ?

- (a) 270 metres
- (b) 340 metres
- (c) 180 metres
- (d) Cannot be determined
- (e) None of theSe

**Q3.**

A man takes 6 hours 35 minutes in walking to a certain place and riding back. He would have taken 2 hours less by riding both ways. What would be the time he would take to walk both ways ?

- (a) 4 hours 35 minutes
- (b) 8 hours 35 minutes .
- (c) 10 hours
- (d) 8 hours 25 minutes
- (e) None of these

**Q4.**

A train travelling at the speed of 60 kmph crosses a platform in 20 seconds. What is the length of the train ?

- (a) 333 metres
- (b) 300 metres
- (c) 336 metres
- (d) Cannot be determined
- (e) None of these

**Q5.**

A boat running downstream covers a distance of 30 kms in 2 hours. While coming back the boat takes 6 hours to cover the same distance. If the speed of the current is half that of the boat, what is the speed of that boat in kmph ?

- (a) 15
- (b) 5
- (c) 10



(d) Cannot be determined

(e) None of these

**Q6.**

Samir drove at the speed of 45 kmph. from home to a resort. Returning over the same route he got stuck in traffic and took an hour longer, also he could drive only at the speed of 40 kmph. How many kilometres did he drive each way ?

(a) 250 kms

(b) 300 kms

(c) 310 kms.

(d) 275 kms.

(e) None of these

**Q7.**

A boat running at the speed of 34 kmph downstream covers a distance of 4.8 kms. in 8 minutes. The same boat while running upstream at same speed covers the same distance in 9 minutes. What is the speed of the current?

(a) 2.4 kmph

(b) 3 kmph

(c) 2 kmph

(d) 3.2 kmph

(e) None of these

**Q8.**

A bus started its journey from Ramgarh and reached Devgarh in 44 minutes with its average speed of 50 km/hour. If the average speed of the bus is increased by 5 km/hour, how much time will it take to cover, the same distance ?

(a) 40 minutes

(b) 38 minutes

(c) 36 minutes

(d) 31 minutes

(e) 49 minutes

**Q9.**

10. A man walked at a speed of 4 km/hr from point A to B and came back from point B to A at the speed of 6 km/hr. What would be the ratio between the time taken by man in walking from point A to B to point B to A respectively ?

(a) 5 : 3

(b) 2 : 3

(c) 2:01

(d) 4:03

(e) 3 : 2

**Q10.**

A bus covered a certain distance from village A to village B at the speed of 60 km./hr. However on its return journey it got stuck in traffic and covered the same distance at the speed of 40 km/ hr. and took 2 hours more to reach its destination. What Is the distance covered between village A and B ?

(a) 240 km.

(b) 260 km.

(c) 200 km.

(d) Cannot be determined '

(e) None of these

**Q11.**

A train speeds past a pole in 20 seconds and speeds past a platform 100 metres in length in 30 seconds. What is the length of the train ?.

(a) 100 metre

(b) 150 metre

(c) 180 metre

(d) 200 metre

(e) None of these

**Q12.**

A 320 metre long train takes 80 seconds more to cross a platform twice its length than it takes to cross a pole at the same speed. What is the speed of the train in metre/second ?

(a) 16

(b) 10

(c) 6

(d) Cannot be determined

(e) None of these

**Q13.**

A 180-metre long train crosses another 270-metre long train running in the opposite direction in 10.8 seconds. If the speed of the first train is 60 kmph. what is the speed of the second train in kmph ?

(a) 80

(b) 90

(c) 150

(d) Cannot be determined

(e) None of these

**Q14.**

The respective ratio between the speed of a car, a train and a bus is 5 : 9 : 4. The average speed of the car, the bus and the train is 72 kmph together. What is the average speed of the car and the train together ?

(a) 82 kmph

(b) 78 kmph

(c) 84 kmph

(d) Cannot be determined

(e) None of these

**Q15.**

The ratio between the speed of a train and a car is 16: 15 respectively. Also, a bus covered a distance of 480 kms. in 8 hours. The speed of the bus is three-fourth the speed of the train. How much distance will the car cover in 6 hours ?

(a) 450 km

(b) 480 km

(c) 360 km



(d) Cannot be determined

(e) None of these

**Q16.**

A man crosses a stationary train in 12 minutes. The same train crosses a man in 54 seconds. What is the respective ratio between the speed of the train and the man ?

(a) 40 : 7

(b) 400 : 3

(c) 40:03:00

(d) Cannot be determined

(e) None of these

**Q17.**

Train -A crosses a stationary train-B in 50 seconds and a pole in 20 seconds with the same speed. The length of the train -A is 240 metres. What is the length of the stationary Train-B?

(a) 360 metres

(b) 260 metres

(c) 300 metres

(d) Cannot be determined

(e) None of these

**Q18.**

The respective ratio between the speed of a car, a jeep and tractor is 3 : 5 : 2. The speed of the jeep is 250 percent of the speed of the tractor which covers 360 km in 12 hours. What is the average speed of car and jeep together ?

(a) 60 km/hr

(b) 75 km/hr.

(c) 40 km/hr

(d) Cannot be determined

(e) None of these

**Q19.**

A man crosses a stationary bus in 18 seconds. The same bus crosses a pole in 4 seconds. What is the respective ratio between the speed of the bus and the speed of the man?

(a) 9 : 2

(b) 9 : 4

(c) 18:05

(d) Cannot be determined

(e) None of these

**Q20.**

The speed of a car is 1.5 times the speed of a bus. If the car travels at the speed of 60 km/ hr., what will be the difference in the time taken by the bus and the time taken by the car to cover 720 km ?

(a) 5 hours

(b) 6 hours

(c) 4 hours

(d) 8 hours

(e) None of these

**Q21.**

A 320 metre long train crosses a platform thrice its length in 40 seconds. What is the speed of the train in km/hour ?

(a) 120.6

(b) 115.2

(c) 108.4

(d) Cannot be determined

(e) None of these

**Q22.**

A bike covers a certain distance at the speed of 64 km/hr. in 8 hours. If the bike was to cover the same distance in approximately 6 hours, at what approximate speed should the bike travel?

(a) 80 kmph

(b) 85 kmph

(c) 90 kmph

(d) 75 kmph

(e) 70 kmph

**Q23.**

The ratio between the speed of a train and a car is 18 : 13 respectively. Also, a bus covered a distance of 480 kms. in 12 hours. The speed of the bus is five-ninth the speed of the train. How much distance will the car cover in 5 hours ?

(a) 250 kms.

(b) 280 kms.

(c) 260 kms.

(d) Cannot be determined

(e) None of these

**Q24.**

A 300 metre long train moving with an average speed of 126 km/hr. crosses a platform in 24 seconds. A man crosses the same platform in 5 minutes. What is the speed of man in metre/second ?

(a) 1.8 metre/second

(b) 1.2 metre/second

(c) 1.5metre/second

(d) Cannot be determined

(e) None of these

**Q25.**

Train-A crosses a stationary train B in 35 seconds and a pole in 14 seconds with the same speed. The length of the train-A is 280 metres. What is the length of the stationary train-B?

(a) 360 metres

(b) 480 metres

(c) 400 metres

(d) Cannot be determined

(e) None of these

**Q26.**

A car covers a distance of 540km in 9 hours. Speed of a train is double the speed of the car. Two-third of the



speed of the train is equal of a bike. How much distance will the bike cover in 5 hours ?

- (a) 450 km
- (b) 360 km
- (c) 400 km
- (d) 500 km
- (e) None of these

**Q27.**

Train-A crosses a pole in 25 seconds and another Train-B crosses a pole in 1 minute and 15 seconds. Length of train-A is half length of train-B. What is the respective ratio between the speed of Train-A and Train-B ?

- (a) 3:02
- (b), 3 : 4
- (c) 4:03
- (d) Cannot be determined '
- (e) None of these

**Q28.**

The average speed of a car is  $\frac{9}{5}$  times the average speed of a bus. A tractor covers 575km in 23 hours. How much distance will the car cover in 4 hours if the speed of the bus is twice the speed of the tractor ?

- (a) 340 km
- (b) 480 km
- (c) 360 km
- (d) 450 km
- (e) None of these

**Q29.**

A car covers the first 39 km. of it's journey in 45 minutes and covers the remaining 25 km. in 35 minutes. What is the average speed of the car ?

- (a) 40 kmph
- (b) 64 kmph
- (c) 49 kmph
- (d) 48 kmph
- (e) None of these

**Q30.**

An aeroplane flies with an average speed of 756 km/hr. A helicopter takes 48 hours to cover twice the distance covered by aeroplane in 9 hours. How much distance will the helicopter cover in 18 hours? (assuming that flights are non-stop and moving with uniform speed)

- (a) 5014 km
- (b) 5140 km
- (c) 5130 km
- (d) 5103 km
- (e) None of these

**Q31.**

A 320 metre long train moving with an average speed of 120 km/hr crosses a platform in 24 seconds. A man

crosses the same platform in 4 minutes. What is the speed of man in metre/second?

- (a) 2.4
- (b) 1.5
- (c) 1.6
- (d) 2
- (e) None of these

**Q32.**

The ratio between the speed of a bus and train is 15 : 27 respectively. Also, a car covered a distance of 720 km. in 9 hours., The speed of the bus is three-fourth of the speed of the car. How much distance will the train cover in 7 hours ?

- (a) 760 km.
- (b) 756 km.
- (c) 740 km.
- (d) Cannot be determined
- (e) None of these

**Q33.**

A 280 metre long train moving with an average speed of 108 km/hr crosses a platform in 12 seconds. A man crosses the same platform in 10 seconds. What is the speed of the man in metre/second ?

- (a) 5 m/s
- (b) 8 m/s
- (c) 12 m/s
- (d) Cannot be determined
- (e) None of these

**Q34.**

The average speed of a train is  $\frac{10}{7}$  times the average speed of a car. The car covers a distance of 588 km in 6 hours. How much distance will the train cover in 13 hours ?

- (a) 1750 km
- (b) 1760 km
- (c) 1720 km
- (d) 1850 km
- (e) None of these

**Q35.**

Amit, Sucheta and Neeti start running around a circular track and complete one round in 18 24 and 32 seconds respectively. In how many seconds will the three meet again at the starting point if they all have started running at the same time ?

- (a) 196 sec
- (b) 288 sec
- (c) 324 sec
- (d) Cannot be determined
- (e) None of these

**Q36.**

Philip, Tom and Brad start jogging around a circular field and, complete a single round in 18, 22 and 30





seconds respectively. In how much time will they meet again at the starting point ?

- (a) 8 mins. 15 secs.
- (b) 21 mins.
- (c) 16 mins. 30 secs.
- (d) 12 mins.
- (e) None of these

**Q37.**

A 320 metre long train crosses a pole in 50 seconds. What is the speed of train ?

- (a) 4.6 m/sec
- (b) 7.2 m/sec
- (c) 5.4 m/sec
- (d) 6.4 m/sec
- (e) Cannot be determined

**Q38.**

A car covers a distance of 528 km. in a certain time at a speed of 66 km./hr. How much distance would a truck cover at an average speed which is 24 km./ hr. less than that of the speed of the car in time which is 7 hours more than that taken by the car ?

- (a) 336 km.
- (b) 682 km.
- (c) 598 km.
- (d) 630 km.
- (e) None of these

**Q39.**

A person travels from P to Q at a speed of 40 kmph and returns to Q by increasing his speed by 50%. What is his average speed for both the trips?

- (a) 36 kmph
- (b) 45 kmph
- (c) 48 kmph
- (d) 50 kmph
- (e) None of these

**Q40.**

A 320 metre long train crosses a pole in 16 seconds. It stops five times of duration 18 minutes each. What time will it take in covering a distance of 576 km?

- (a) 9 hours
- (b)  $37\frac{1}{4}$  hours
- (c)  $19\frac{1}{2}$  hours
- (d)  $17\frac{1}{2}$  hours
- (e) None of these

**Q41.**

The speed of a boat in still water is 6 kmph and that of current is 3 kmph. The boat starts from point A and rows to point B and comes back to point A. It takes 12 hours during this Journey. How far is point A from point B ?

- (a) 27 km
- (b) 25 km
- (c) 20 km

- (d) 30 km
- (e) None of these

**Q42.**

A 360 metre long train runs at the speed of 80 kmph. In what time will the train cross a man running at 8 kmph in the same direction of train ?

- (a) 16 seconds
- (b) 18 seconds
- (c) 20 seconds
- (d) 15 seconds
- (e) None of these

**Q43.**

The speed of a boat in still water is 9.5 kmph while that of current is 2.5 kmph. If the boat takes 114 minutes in rowing from point A to B and coming back to point A, what is the distance between A and B ?

- (a) 8.4 km.
- (b) 4.8 km.
- (c) 8.8 km.
- (d) 7.4 km.
- (e) None of these

**Q44.**

A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water ?

- (a) 4 kmph
- (b) 6 kmph
- (c) 8 kmph
- (d) 3.5 kmph
- (e) None of these

**Q45.**

A car starts at 11 am from point A towards point B at 36 kmph while another car starts at 1 pm from point B towards A at 44 kmph. They cover a distance of 592 km till meeting. At what time will they meet each other ?

- (a) 8 pm
- (b) 6 : 30 pm
- (c) 7 : 30 pm
- (d) 5 : 30 pm
- (e) None of these

**Q46.**

A man takes  $16\frac{1}{9}$  times as long to row a distance upstream as to row the same distance downstream. What is the speed of the boat in still water if it takes 3 hours to travel 38.4 km downstream ? (in km/h)

- (a) 11
- (b) 10
- (c) 12.4
- (d) 12
- (e) None of these

**Q47.**



Prem and Shyam decide to go on a trip to point Y on a particular day from point X. Prem leaves for point Y at 11 : 00 am, at speed of 72 km/hour. Shyam leaves for point Y at 11: 30 same day as Prem left. At what speed should Shyam travel to catch up with Prem in 4 hours ? (in km/hour)

- (a) 85
- (b) 81
- (c) 80
- (d) 82
- (e) 86

**Q48.**

49.6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same work in 2 days, How much time taken by 15 men and 20 boys in doing the same type of work ?

- (a) 4 days
- (b) 5 days
- (c) 6 days
- (d) Rs. days
- (e) 8 days

**Q49.**

A person has to travel from point B in certain time. Travelling at a speed of 5 kmph he reaches 48 minutes late and while travelling at a speed of 8 kmph he reaches 15 minutes early. What is the distance from point A to point B ?

- (a) 15 kms
- (b) 9 kms
- (c) 12 kms
- (d) 18 kms
- (e) 14 kms

**Q50.**

Ram and Shyam are travelling from point A to B, which are 60km apart. Travelling at a certain speed Ram takes one hour more than Shyam to reach point B. If Ram doubles his speed he will take 30 minutes less than Shyam to reach point B. At what speed was Ram driving from point A to B?

- (a) 15 kmph
- (b) 35 kmph
- (c) 30 kmph
- (d) 25 kmph
- (e) 20 kmph

**Q51.**

To reach a point B at 10 am from point A, Abhinav travels at an average speed of 15 kmph. He reaches the point B at 12 noon, if he travels at an average speed of 10 kmph. Find the average speed of Abhinav if he intends to reach the point B at 9 am ? (in kmph)

- (a) 107/7
- (b) 120/7.
- (c) 93/7

(d) 121/7

(e) None of these

**Q52.**

To reach point B from point A at 4pm, Sara will have to travel at an average speed of 18 kmph. She will reach point B at 3 pm if she travels at an average speed of 24 kmph. At what average speed should Sara travel to reach point B at 2 pm ?

- (a) 36 kmph
- (b) 28 kmph
- (c) 25 kmph
- (d) 30 kmph
- (e) 32 kmph

**Q53.**

Train A which is 320m long can cross a pole in 16 seconds. If it halts 5 times each time for exactly 18 minutes, how many hours will it take to cover a distance of 57 kms? (in hours)

- (a) 8
- (b) 21/2
- (c) 17/2
- (d) 9
- (e) 19/23

**Q54.**

On walking at 3/4 of his usual speed a man reaches his office 20 minutes late. What is the usual time taken by him in reaching his office?

- (a) 75 minutes
- (b) 60 minutes
- (c) 40 minutes
- (d) 30 minutes
- (e) None of these

**Q55.**

56. The distance between two places A and B is 140 kms. The first scooter departs from place A to B, at a speed of 50kmph at 10 am. The second scooter departs from place B to A at a speed of 30 kmph at 12 pm. At what time will both the scooters meet each other ?

- (a) 12 : 30 pm
- (b) 01 : 50 pm
- (c) 1 : 00 pm
- (d) 12 : 50 pm
- (e) 1 : 30 pm

**Q56.**

A 260 metre long train crosses a 120 metre long wall in 19 seconds. What is the speed of the train?

- (a) 27 km/hr
- (b) 49 km/hr
- (c) 72 km/hr
- (d) 70 km/hr
- (e) None of these

**Q57.**





Two cars start at the same time from A and B which is 120 km apart. If the two cars travel in opposite direction they meet after one hour and if they travel in same direction (from A towards B) then they meet after 6 hours. What is the speed of car starting from A?

- (a) 70 kmph
- (b) 120 kmph
- (c) 60 kmph
- (d) Data inadequate
- (e) None of these

**Q58.**

Find the speed of train in km/hr whose length is 200 m and crosses a platform of length 240 m in 22 seconds?

- (a) 60
- (b) 48
- (c) 53
- (d) Data inadequate
- (e) None of these

**Q59.**

A man starts going for morning walk every day. The distance walked by him on the first day was 2 kms. Everyday he walks half of the distance walked on the previous day. What can be the maximum total distance walked by him in his life time?

- (a) 4 kms.
- (b) 120 kms.
- (c) 18 kms.
- (d) Data inadequate
- (e) None of these

**Q60.**

A car covers its journey at the speed of 80 km/hour in 10 hours. If the same distance is to be covered in 4 hours, by how much the speed of car will have to increase?

- (a) 8 km/hr
- (b) 10 km/hr
- (c) 12 km/hr
- (d) 16 km/hr
- (e) None of these

**Q61.**

Raman drove from home to a neighboring town at the speed of 50 km./hr. and on his returning journey, he drove at the speed of 45 km./hr. and also took an hour longer to reach home. What distance did he cover each way?

- (a) 450 kms.
- (b) 225 kms.
- (c) 900 kms
- (d) 500 kms.
- (e) None of these

**Q62.**

A 350 metre long train crosses a pole in 30 seconds. What is the speed of train (in kmph)?

- (a) 430
- (b) 425
- (c) 385
- (d) 420
- (e) None of these

**Q63.**

Two stations, A and B are 850 km apart from each other. One train starts from station A at 5 am and travels towards station B at 62 kmph. Another train starts from station B at 7 am and travels towards station A at 59 kmph. At what time will they meet?

- (a) 1 pm
- (b) 11:45 am
- (c) 12 : 30 pm
- (d) 1 : 30 pm
- (e) None of these

**Q64.**

A 280 metres long train, travelling at a uniform speed, crosses a platform in 60 seconds and a man standing on the platform in 20 seconds. What is the length of the platform?

- (a) 640 metres
- (b) 420 metres
- (c) 280 metres
- (d) Cannot be determined
- (e) None of these

**Q65.**

Train A crosses a pole and platform in 18 seconds and 39 seconds respectively. The length of platform is 157.5 metre. What will be the length of train B if it is equal to the sum of half of the length of train A and twice the length of the platform?

- (a) 382.5 metre
- (b) 328.5 metre
- (c) 238.5 metre
- (d) 315 metre
- (e) None of these

**Q66.**

The distance between two points is 36 km. A boat rows in still water at 6 kmph. It takes 8 hours less to cover this distance in downstream in comparison to that in upstream. The rate of stream is

- (a) 3 kmph
- (b) 2 kmph
- (c) 2.5 kmph
- (d) 4 kmph
- (e) None of these

**Q67.**

Anna left for city A from city B at 5 : 20 am. She travelled at the speed of 80 kmph for 2 hours 15 minutes. After that speed was reduced to 60 kmph. If

the distance between two cities be 350 km, at what time did Anna reach city A ?

- (a) 9 : 20am
- (b) 9 : 25 am
- (c) 9 : 35 am
- (d) 10 : 05 am
- (e) None of these

**Q68.**

Rohan covered  $\frac{2}{3}$ rd of a certain distance in 2 hours 30 minutes at the rate of  $x$  kmph. He covers the remaining distance at the rate of  $(x+ 2)$  kmph in 50 minutes. What is the total distance?

- (a) 21 km
- (b) 18 km
- (c) 16 km
- (d) 15 km
- (e) 20 km

**Q69.**

A and B started towards each other at the same time from places 114 kms. apart and met in 8 hours. If A's rate was 6 kms. an hour, what was B's?

- (a) 14.25 km/hr.
- (b) Rs. km./hr
- (c)  $57/8$  km./hr
- (d)  $17/2$  km/hr.
- (e)  $33/4$  km/hr

**Q70.**

Sunil left for city 'x' from city 'y' at 5.50a.m. He travelled at the speed of 80 km/hr. for 2 hours 15 minutes. After that the speed was reduced to 60 km/hour. If the distance between two cities is 350 kms at what time did Sunil reach the city 'Y'?

- (a) 10.05 a.m.
- (b) 10.35 a.m.
- (c) 9.50 a.m.
- (d) 9.55 a.m.
- (e) None of these

**Q71.**

Two trains A and B of equal length of 200 metres running in opposite direction cross each other in 16 seconds. What is the speed of train A?

- (a) 90 km/hr.
- (b) 40 km/hr.
- (c) 80 km/hr.
- (d) Data inadequate
- (e) None of these

**Q72.**

An employee may claim Rs 7.00 for each km when he travels by taxi and Rs 6.00 for each km if he drives his own car. If in one week he claimed Rs 675 for travelling 90 km, how many kms did he travel, by taxi ?

- (a) 135

- (b) 155
- (c) 162
- (d) 170
- (e) None of these

**Q73.**

A train B speeding with 120 kmph crosses another train C running in the same direction, in 2 minutes. If the lengths of the trains B and C be 100m and 200m respectively, what is the speed (in kmph) of the train C ?

- (a) 111
- (b) 123
- (c) 127
- (d) 129
- (e) None of these

**Q74.**

A train crosses a 300 metre long platform in 38 seconds while it crosses a signal pole in 18 seconds. What is the speed of the train in kmph ?

- (a) Cannot be determined
- (b) 72
- (c) 48
- (d) 54
- (e) None of these

**Q75.**

A man goes uphill with an average speed of 24 kmph. and comes down with an average speed of 36 kmph. The distance travelled in both the cases being the same. The average speed (in kmph) for the entire journey is:

- (a) 30
- (b) 28.8
- (c) 32.6
- (d) 30.8
- (e) None of these

**Q76.**

A train overtakes two persons, who are walking in the same direction in which the train is going, at the rate of 2 kmph and 4 kmph, and passes them completely in 9 and 10 seconds respectively. The length of the train (in metres) is : (l) 72

- (a) 54
- (b) 50
- (c) 45
- (d)
- (e) None of these

**Q77.**

Train-A crosses a pole in 33 seconds and another Train-B crosses a pole in 55 seconds. Length of Train-A is three-fourth of Train-B. What is the respective ratio between the speed of Train-A and Train-B ?

- (a) 5:11
- (b) 5:04



(c) 11:03

(d) Cannot be determined

(e) None of these

**Q78.**

There is a hill behind a person's house. He walks up the top of the hill at a speed of  $3\frac{1}{2}$  km/hour, but walks down it at 4 km/hour. If it takes him 6 hours for the entire journey, the distance, in km, from his house to the top of the hill is

(a)  $21\frac{1}{4}$

(b) 6

(c) 27-Apr

(d) 9

(e) None of these

**Q79.**

Directions : The cost of fuel running the engine of an army tank is proportional to the square of the speed and Rs. 64 per hour for a speed of 16 kmph. Other costs amount to Rs. 400 per hour. The tank has to make a journey of 400 km at a constant speed. - The most economical speed for this journey is :

(a) 20 kmph

(b) 30 kmph

(c) 35 kmph

(d) 40 kmph

(e) None of these

**Q80.**

Directions : The cost of fuel running the engine of an army tank is proportional to the square of the speed and Rs. 64 per hour for a speed of 16 kmph. Other costs amount to Rs. 400 per hour. The tank has to make a journey of 400 km at a constant speed. - The total cost for the journey at this most economical speed is :

(a) Rs. 6000

(b) Rs. 8000

(c) Rs. 10000

(d) Rs. 11000

(e) None of these

**Q81.**

Directions : The cost of fuel running the engine of an army tank is proportional to the square of the speed and Rs. 64 per hour for a speed of 16 kmph. Other costs amount to Rs. 400 per hour. The tank has to make a journey of 400 km at a constant speed. - Ravi can walk a certain distance in 40 days when he rests 9 hours a day. How long will he take to walk twice the distance, twice as fast and rest twice as long each day ?

(a) 40 days

(b) 80 days

(c) 50 days

(d) 100 days

(e) None of these

**Q82.**

A can walk a certain distance in 20 days when he rests 8 hours a day. How long will he take to walk twice the distance, twice as fast and rests twice as long each day ?

(a) 40 days

(b) 60 days

(c) 80 days

(d) 100 days

(e) None of these

**Q83.**

A person leaves a place A to place B at 6 a.m. and reaches place B at 10 a.m. Another person leaves B at 7.30 a.m. and reaches A at 11 a.m. They will meet each other at

(a) 7.40 a.m.

(b) 8.20 a.m.

(c) 8.40 a.m.

(d) 9.20 a.m.

(e) None of these

**Q84.**

A can walk a certain distance in 10 days when he rests 9 hours a day. How long will he take to walk twice the distance, twice as fast and rests twice as long each day ?

(a) 4 days

(b) 10 days

(c) 15 days

(d) 25 days

(e) None of these

**Q85.**

A 222 metre long train crosses a pole in 6 seconds. The same train crosses a man running in the same direction in 10 seconds. What will be the speed of man ?

(a) 15 m/sec

(b) 17 m/sec

(c) 18 m/sec

(d) 14 m/sec

(e) None of these

**Q86.**

How long (time in seconds) will a 450 metre long train takes to cross a girl walking with a speed of 5 km/hr in the direction of the moving train ? The speed of the train is 65 km/hr.

(a) 27

(b) 28

(c) 30

(d) 29

(e) None of these

**Q87.**



An express train travelled at an average speed of 100 km/hr, stopping for 3 minutes after 75 km, A local train travelled at a speed of 50 km/hr, stopping for 1 minute after every 25 km. If the trains began travelling at the same time, how many kms did the local train travel in the time it took the express train to travel 600 km?

- (a) 307.5 km
- (b) 900 km
- (c) 1000 km
- (d) 1200 km
- (e) None of these

**Q88.**

If a student walks from his house to school at 5 km/hr, he is late by 30 minutes. However, if he walks at 6 km/hr, he is late by 5 minutes only. The distance of his school from his house is.

- (a) 2.5 km
- (b) 3.6 km
- (c) 5.5 km
- (d) 12.5 km
- (e) None of these

**Q89.**

A plane left 30 minutes later than the scheduled time and in order to reach the destination 1500 km away in time, it had to increase the speed by 250 km/hr from the usual speed. Its usual speed is:

- (a) 720km/hr
- (b) 730 km/hr
- (c) 740 km/hr
- (d) 750km/hr
- (e) None of these

**Q90.**

The speed of a boat in still water is 17.5 kmph and that of current is 2.5 kmph. The boat goes from X to Y in downstream and returns to point Z, The whole journey takes 429 minutes. The distance between Z and Y is  $\frac{2}{5}$ th of the distance between X and Y, Find the total distance covered by the boat. (Approximated to the nearest integer).

- (a) 130 km.
- (b) 140 km.
- (c) 160 km.
- (d) 120 km
- (e) None of these

**Q91.**

The ratio between the rates of travelling of A and B is 2:3 and therefore A takes 10 minutes more than the time taken by B to reach a destination. If A had walked at double the speed, he would have covered the distance in

- (a) 30 min
- (b) 25 min

- (c) 20 min
- (d) 15 min
- (e) None of these

**Q92.**

Two trains running in opposite directions cross a man standing on the platform in 27 seconds and 17 seconds respectively and they cross each other in 23 seconds. The ratio of their speed is:

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

**Q93.**

The speed of the boat in still water is 16 kmph and speed of the current is 2 kmph. It takes a total of 6.5 hours to row upstream from point A to point B and downstream from point B to point C. If the distance from point A to point B is two-third the distance between point B and C, what is the total distance travelled by the boat (both upstream and downstream) ?

- (a) 112 km
- (b) 98 km
- (c) 124 km
- (d) 90 km
- (e) 105 km

**Q94.**

Train A travelling at 126 km/hour speed, completely crosses Train B in 9 seconds. Train B is half the length of Train A and is travelling at a speed of 90 km/hour in the opposite direction (towards Train A). How much will Train A take to cross a platform of length 690 metres?

- (a) 28 seconds
- (b) 32 seconds
- (c) 25 seconds
- (d) 30 seconds
- (e) 35 seconds

**ANSWERS :**

1 b	2 e	3 b	4 d	5 c	6 e
7 c	8 a	9 e	10 a	11 d	12 e
13 b	14 c	15 a	16 c	17 a	18 a
19 a	20 b	21 b	22 b	23 c	24 a
25 e	26 c	27 a	28 c	29 d	30 d
31 d	32 b	33 b	34 e	35 b	36 c
37 d	38 d	39 c	40 c	41 a	42 b
43 a	44 b	45 c	46 b	47 b	48 a
49 e	50 e	51 b	52 a	53 e	54 b
55 a	56 c	57 a	58 e	59 a	60 e
61 a	62 d	63 a	64 e	65 a	66 a
67 e	68 d	69 e	70 e	71 d	72 a
73 a	74 d	75 b	76 c	77 b	78 c



79 d   80 b   81 d   82 a   83 c   84 d  
 85 a   86 a   87 a   88 d   89 d   90 a  
 91 d   92 d   93 e   94 d

- 1.**(2) Initial speed of motor = 70 kmph.  
 Distance covered in first 2 hours  
 $= 2 \times 70 = 140$  kms  
 For next two hours speed of motor = 80 kmph  
 $\therefore$  Distance covered in next 2 hours =  $2 \times 80 = 160$  kms.  
 Distance covered in first 4 hours  
 $= 140 + 160 = 300$   
 Remaining distance =  $345 - 300 = 45$  km  
 This distance will be covered at the speed of 90 kmph.  
 $\therefore$  Time taken =  $45/90 = \frac{1}{2}$  hours  
 $\therefore$  Total time taken  
 $= 4 + \frac{1}{2} = 9/2$  hours
- 2.**(5) Let the length of train be  $x$  meters.  
 Time taken in crossing the pole =  $x/20$   
 Time taken in crossing the bridge  
 $= 4x/20$   
 As given,  $4x/20 - x/20 = 24$   
 $= 3x/20 = 24$   
 $= x = (24 \times 20)/3$   
 $= 160$  m
- 3.**(2) Time taken in walking one way + riding other way  
 $= 6$  hours 35 minutes ..... (i)  
 Time taken riding both ways  
 $= 4$  hours 35 minute ..... (ii)  
 By equation (i)  $\times 2 -$  (ii),  
 $2 \times$  Time taken in walking one way  
 $= 13$  hours 10 minutes - 4 hours = 35 minutes  
 $= 8$  hours 35 minutes
- 4.**(4) When a train crosses a platform, the distance covered = Length of platform and the train.  
 Speed = Length of(Platform + train)/Time taken  
 Thus we have inadequate data.
- 5.**(3) Let the speed of boat in still water =  $x$  kmph  
 $\therefore$  Speed of current =  $x/2$  kmph  
 When boat runs downstream,  
 $30/(x + x/2) = 2$   
 $= (30 \times 2)/3x = 2$   
 $= 6x = 60$   
 $= x = 60/6 = 10$  kmph
- 6.**(5) Let the require distance be  $x$  km.  
 According to the question,  
 $x/40 - x/45 = 1$   
 $= (9x - 8x)/360 = 1$   
 $= x/360 = 1$   
 $= x = 360$  km
- 7.**(3) Length of the train = 240 metre  
 $\therefore$  Length of the platform  
 $= 480$  metre

We know that when a train crosses a platform, it covers a distance equal to the sum of its length and that of platform.

- $\therefore$  Speed of train  
 $= (240 + 480)/40$  m/sec  
 $= 720/40 = 18$  m/sec
- 8.**(1) Distance between Ramgarh and Devgarh =  $(50 \times 44/60) = 110/3$   
 New speed = 55 kmph  
 $= 55/60$  km/minute  
 $\therefore$  Required Time = Distance/ Speed  
 $= 110/3 \times 60/55 = 40$  minutes
- 9.**(5) Required ratio =  $6 : 4 = 3 : 2$   
 [As time taken is inversely proportional to the speed.]

- 10.**(1) Let the distance between villages A and B be  $x$  km.  
 $\therefore x/40 - x/60 = 2$   
 $= (3x - 2x)/120 = 2$   
 $= x = 2 \times 120 = 240$  km
- 11.**(4) Let the length of train be  $x$  metre.  
 $\therefore$  Speed of train =  $x/20 = (x + 100)/30$   
 $= 3x = 2x + 200$   
 $= x = 200$  m = length of train
- 12.**(5) Let the speed of the train be  $x$  m/sec.  
 $\therefore (320 \times 3)/x - 320/x = 80$   
 $= (320 \times 2)/x = 80$   
 $= x = (320 \times 2)/80 = 8$  m/sec. = speed of train
- 13.**(2) Time taken by trains in crossing each other  
 $= (\text{Sum of length of trains})/\text{Relative speed}$   
 $60$  kmph =  $(60 \times 5)/18 = 50/3$  m/sec.  
 If the speed of other train be  $x$  m/sec. then,  
 $10.8 = (180 + 270)/(50/3)$  m/ sec.  
 If the speed of other train be  $x$  m/sec. then,  
 $10.8 = (180 + 270)/(50/3 + x)$   
 $= 180 + 10.8x = 450$   
 $= 10.8x = 450 - 180 = 270$   
 $= x = 270/10.8 = 25$  meter/ sec.  
 $= 25 \times 18/5$  kmph = 90 kmph
- 14.**(3)  $5x + 9x + 4x = 72 \times 3$   
 $= 18x = (72 \times 3)/18 = 12$  kmph  
 $\therefore$  Average speed of car and train  
 $= 5x + 9x/2 =$  kmph
- 15.**(1) [Tricky Approach]  
 Speed of the bus  
 $= 480/8 = 60$  kmph  
 $\therefore$  Speed of the train  
 $= 60 \times 4/3 = 80$  kmph  
 $\therefore$  Speed of the car =  $15/16 \times 80$   
 $= 75$  kmph  
 $\therefore$  Required distance  
 $= \text{Speed} \times \text{Time}$   
 $= 75 \times 6 = 450$  km.
- 16.**(3) If the length of the train be  $l$  meter, then  
 Required ratio =  $l/54 : 1/(12 \times 60) = 40 : 3$
- 17.**(1) If the length of train B be  $x$  meter, then



$$\begin{aligned} \text{Speed of train} &= (240 + x)/50 = 240/20 \\ &= (240 + x)/50 = 12 \\ &= 240 + x = 600 \\ &= x = 360 \text{ meter} \end{aligned}$$

$$\begin{aligned} \mathbf{18.}(1) \text{ Speed of tractor} &= 360/12 \\ &= 30 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \text{Speed of jeep} &= 30 \times 250/100 \\ &= 75 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \therefore \text{Speed of car} &= 3/5 \times 75 = 45 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \therefore \text{Average speed of car and jeep together} &= (75 + 45)/2 \text{ kmph} = 60 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \mathbf{19.}(1) \text{ If the length of the bus be } x \text{ meter, then} \\ \text{Required ratio} &= x/4 : x/18 = 9 : 2 \end{aligned}$$

$$\begin{aligned} \mathbf{20.}(2) \text{ Speed of bus} &= 60/15 = 40 \text{ kmph} \\ \therefore \text{Required difference} &= (720/40 - 720/60) \text{ hours} \\ &= (18 - 12) \text{ hours} = 6 \text{ hours} \end{aligned}$$

$$\begin{aligned} \mathbf{21.}(2) \text{ Speed of train} &= [\text{Length of (train + platform)}] / \text{Time taken} \\ &= (320 + 3 \times 320)/40 \text{ meter/ second} \\ &= 32 \text{ meter/ second} \\ &= (32 \times 18)/5 \text{ kmph} \\ &= 115.2 \end{aligned}$$

$$\begin{aligned} \mathbf{22.}(2) \text{ Distance} &= 64 \times 8 = 512 \text{ km.} \\ \therefore \text{Required speed} &= \text{Distance/Time} \\ &= 512/6 = 85.33 \text{ kmph.} \end{aligned}$$

$$\begin{aligned} \mathbf{23.}(3) \text{ Speed of bus} &= \text{Distance covered/ Time taken} \\ &= 480/12 = 40 \text{ kmph} \\ \therefore \text{Speed of train} &= 9/5 \times 40 \\ &= 72 \text{ kmph} \\ \text{Speed of car} &= 72 \times 13/18 \\ &= 52 \text{ kmph} \end{aligned}$$

$$\therefore \text{Distance covered by car in 5 hours} = 5 \times 52 = 260 \text{ km}$$

$$\mathbf{24.}(1) \text{ Let the length of the platform be } x \text{ meter.}$$

$$\begin{aligned} \text{Speed of train} &= 126 \text{ kmph.} \\ &= (126 \times 5)/18 \text{ m/sec.} = 35 \text{ m/ sec.} \end{aligned}$$

$$\begin{aligned} \text{Now, Speed of train} &= (x + 300)/24 \\ &= 35 = (x + 300)/24 \\ &= 35 \times 24 = x + 300 \\ &= 840 = x + 300 \end{aligned}$$

$$x = 840 - 300 = 540 \text{ meter}$$

$$\begin{aligned} \therefore \text{Speed of man} &= \text{Distance / Time} \\ &= 540/5 \times 60 = 1.8 \text{ m/sec.} \end{aligned}$$

$$\mathbf{25.}(5) \text{ Let the length of train B be } x \text{ meter.}$$

$$\begin{aligned} \therefore \text{Speed of train A} &= \text{Sum of length of trains/Time taken} \\ &= [\text{length of train - A} + x] / \text{time taken} \\ &= (280 + x)/35 = 280/14 \\ &= (280 + x)/35 = 20 \\ &= 280 + x = 700 \\ &= x = 700 - 280 = 420 \text{ meter} \end{aligned}$$

$$\begin{aligned} \mathbf{26.}(3) \text{ Speed of car} &= \text{Distance/Time} \\ &= 540/9 = 60 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \text{Speed of train} &= 2 \times 60 \\ &= 120 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \therefore \text{Speed of bike} &= 2/3 \times 120 = 80 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \therefore \text{Distance covered by bike in 5 hours} &= 5 \times 80 = 400 \text{ km} \end{aligned}$$

$$\mathbf{27.}(1) \text{ If the length of train A be } x \text{ meter, then length of train B} = 2x \text{ meter.}$$

When a train crosses a pole, it covers a distance equal to its own length.

$$\begin{aligned} \therefore \text{Required ratio} &= x/25 : 2x/75 \\ &= 1/25 \times 75 : 2/75 \times 75 \\ &= 3 : 2 \end{aligned}$$

$$\begin{aligned} \mathbf{28.}(3) \text{ Speed of tractor} &= \text{Distance/ time} \\ &= 575/23 = 25 \text{ kmph} \end{aligned}$$

$$\therefore \text{Speed of bus} = 50 \text{ kmph}$$

$$\begin{aligned} \therefore \text{Speed of car} &= 9/5 \times 50 = 90 \text{ kmph} \end{aligned}$$

$$\begin{aligned} \therefore \text{Distance covered by car in 4 hours} &= 4 \times 90 = 360 \text{ km} \end{aligned}$$

$$\begin{aligned} \mathbf{29.}(4) \text{ Average speed} &= \text{Total distance/ Total time} \\ &= (39 + 25)\text{km}/(45 + 35) \text{ minute} \\ &= 64/(80/60) \text{ kmph} \\ &= (64 \times 60)/80 \text{ kmph} \\ &= 48 \text{ kmph} \end{aligned}$$

$$\mathbf{30.}(4) \text{ Distance covered by aeroplane in 9 hours} = \text{Speed} \times \text{Time}$$

$$= 9 \times 756 = 6804 \text{ km}$$

$$\therefore \text{Speed of helicopter}$$

$$= (2 \times 6804)/48$$

$$= 283.5 \text{ kmph}$$

$$\therefore \text{Distance covered by helicopter in 18 hours}$$

$$= (283.5 \times 18) \text{ km}$$

$$= 5303 \text{ km}$$

$$\mathbf{31.}(4) \text{ Speed of train} = 120 \text{ kmph}$$

$$= (120 \times 5)/18 = 110/3 \text{ m/sec.}$$

$$\therefore 100/3 = (\text{Length of train and platform}) / (\text{Time taken in crossing})$$

$$= 100/3 = 320 + x/24$$

$$\text{Where } x = \text{length of platform}$$

$$= 24 \times 100/3 = 320 + x$$

$$= 800 = 320 + x$$

$$= x = 800 - 320 = 480 \text{ m}$$

$$\therefore \text{Main's speed} = 480/(4 \times 60) = 2 \text{ m/sec}$$

$$\mathbf{32.}(2) \text{ Speed of car}$$

$$= \text{Distance/ covered/ Time taken}$$

$$= 720/9 = 80 \text{ kmph}$$

$$\therefore \text{Speed of bus} = 3/4 \times 80$$

$$= 60 \text{ kmph}$$

$$\therefore \text{Speed of train} = 27/15 \times 60$$

$$= 108 \text{ kmph}$$

$$\therefore \text{Distance covered by train in 7 hours}$$

$$= 7 \times 108 = 756 \text{ km.}$$

$$\mathbf{33.}(2) \text{ Speed of train} = 108 \text{ kmph}$$

$$= (108 \times 5)/18 = 30 \text{ m/second}$$





If the length of platform be  $x$  meter, then

$$x + 280/12 = 30$$

$$= x + 280 = 30 \times 12 = 360$$

$$= x = 360 - 280 = 80 \text{ meter}$$

$$\therefore \text{Man's speed} = \text{Distance/ Time}$$

$$= 80/10 = 8 \text{ m/second}$$

**34.(5)** Average speed of car  
 $= \text{Distance/ Time} = 588/6 = 98 \text{ kmph}$

$$\therefore \text{Average speed of train}$$

$$= (98 \times 10)/7 = 140 \text{ kmph}$$

$$\text{Distance covered by train in 13 hours} = \text{Speed} \times \text{Time}$$

$$= 140 \times 13 = 1820 \text{ km}$$

**35.(2)** [Tricky approach]  
 Required time = LCM of 18.24 and 32 seconds.  
 $= 288$

**36.(3)** Required time = LCM of 18, 22 and 30 seconds  
 $= 990 \text{ seconds}$   
 $= 990/60 \text{ minutes}$   
 $= 16 \text{ minutes } 30 \text{ seconds}$

**37.(4)** Speed of train  
 $= 320/50 = 6.4 \text{ m/sec.}$

**38.(4)** Time taken by car  
 $= 528/66 = 8 \text{ hours}$

$$\text{Time} = 15 \text{ hours}$$

$$\text{Speed of truck} = 66 - 24 = 42 \text{ kmph}$$

$$\therefore \text{Distance covered by truck}$$

$$= \text{Speed} \times \text{Time}$$

$$= 15 \times 42 = 630 \text{ km}$$

**39.(3)** Speed while returning  
 $= 40 \times 150/100$   
 $= 60 \text{ kmph}$   
 Average speed  $= (2 \times 40 \times 60)/(40 + 60)$   
 $= 4800/100 = 48 \text{ kmph}$

**40.(3)** Speed of train  
 $= (\text{Length of train})/(\text{Time taken incrossing})$   
 $= 320/16 = 20 \text{ m/sec.}$   
 $= 20 \times 18/5 = 72 \text{ kmph}$

$$\text{Total period of stoppage}$$

$$= 5 \times 18$$

$$= 90 \text{ minutes} = 3/2 \text{ hours}$$

$$\text{Total time taken in covering a distance of 576 km}$$

$$= (576/72 + 3/2) \text{ hours}$$

$$= 8 + 3/2 = 19/2 \text{ hours}$$

**41.(1)** Rate downstream  
 $= 6 + 3 = 9 \text{ kmph}$

$$\text{Rate upstream}$$

$$= 6 - 3 = 9 \text{ kmph}$$

$$\text{Rate upstream}$$

$$= 6 - 3 = 3 \text{ kmph}$$

If the required distance be  $x$  km,  
 then

$$x/9 + x/3 = 12$$

$$= x + 3x/9 = 12$$

$$= 4x/9 = 12$$

$$= 4x = 12 \times 9$$

$$= x = 12 \times 9/4 = 27 \text{ km}$$

**42.(2)** Relative speed of train  
 $= (80 - 8) \text{ kmph}$   
 $= 72 \text{ kmph}$

$$= (72 \times 5/18) \text{ m/sec.}$$

$$= 20 \text{ m/sec.}$$

$$\therefore \text{Required time}$$

$$= \text{Length of train/ Relative speed}$$

$$= 360/20 = 18 \text{ seconds}$$

**43.(1)** Rate downstream of boat  $= (9.5 + 2.5) \text{ kmph}$   
 $= 12 \text{ kmph}$

$$\text{Rate upstream of boat}$$

$$= (9.5 - 2.5) \text{ kmph}$$

$$= 7 \text{ kmph}$$

$$\text{Distance between A and B}$$

$$= x \text{ km (let)}$$

$$\text{According to question,}$$

$$x/7 + x/12 = 114/60$$

$$= (12x + 7x)/(12 \times 7) = 114/5$$

$$= 19x/7 = 114/5$$

$$= 19x = 114/5 \times 7$$

$$= x = (114 \times 7)/(5 \times 19)$$

$$= 8.4 \text{ km.}$$

**44.(2)** Rate downstream  
 $= \text{Distance/ Time} = 16/2 = 8 \text{ kmph}$

$$\text{Rate of upstream} = 16/4 = 4 \text{ kmph}$$

$$\text{Speed of boat in still water}$$

$$= \frac{1}{2} (\text{Rate downstream} + \text{Rate Upstream})$$

$$= \frac{1}{2} (8 + 4) = 6 \text{ kmph}$$

**45.(3)** Let both cars meet each other after  $t$  hours  
 from 11 am.

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\therefore 36 \times t + 44 (t - 2) = 592$$

$$= 36t + 44t - 88 = 592$$

$$= 80t = 592 + 88 = 8.5 \text{ hours i.e.}$$

$$= 7 : 30 \text{ pm}$$

**46.(2)** Speed of boat in still water  $= x \text{ kmph}$   
 Speed of current  $= y \text{ kmph}$

$$\therefore \text{According to the question,}$$

$$38.4/(x + y) = 3$$

$$= x + y = 38.4/3 = 12.8 \text{ kmph}$$

$$\text{Again, } 38.4/(x - y) = 16/9 \times 3 = 16/3$$

$$= x - y = (38.4 \times 3)/16 = 7.2 \text{ kmph}$$

$$\therefore \text{Speed of boat in still water}$$

$$= \frac{1}{2} (12.8 + 7.2) \text{ kmph}$$

$$= 10 \text{ kmph}$$

**47.(2)** Distance covered by Prem in half an hour  
 $= 72 \times \frac{1}{2} = 36 \text{ km}$

Shyam has to cover an additional distance of 36 km in 4 hours.

$$\text{Relative speed of Shyam}$$

$$= (x - 72) \text{ kmph}$$

$$\therefore 36/(x - 72) = 4$$

$$= x - 72 = 9$$

$$= x = 81 \text{ kmph}$$

**48.(1)** According to the question,

$$6 \times 10 \text{ men} + 8 \times 10 \text{ boys} = 26 \times 2 \text{ men} + 48 \times 2 \text{ boys}$$



$$= (60 - 52) \text{ men} = (96 - 80) \text{ boys}$$

$$= 8 \text{ men} = 16 \text{ boys}$$

$$= 1 \text{ man} = 2 \text{ boys}$$

$$\therefore 6 \text{ men} + 8 \text{ boys} = (12 + 8) \text{ boys} = 20 \text{ boys}$$

$$15 \text{ men} + 20 \text{ boy} = 50 \text{ boys}$$

$$\therefore M_1 D_1 = M_2 D_2$$

$$= 20 \times 10 = 50 \times D_2 = 200/50 = 4 \text{ days}$$

**49.**(5) Let distance between A and B be x km. (let)

$$\text{Difference of time} = 48 + 15$$

$$= 63 \text{ minutes} = 63/60 \text{ hours}$$

According to the question,

$$x/5 - x/8 = 63/60$$

$$= 3x/2 = 21$$

$$=$$

$$= 3x = 2 \times 21$$

$$= x = (2 \times 21)/3$$

$$= 14 \text{ km.}$$

**50.**(5) AB = 60 km

Ram's speed = x kmph  
Shyam's speed = y kmph

**Case I,**

$$60/x - 60/y = 1 \dots\dots\dots (i)$$

**Case II,**

$$60/y - 60/2x = 30/60 = \frac{1}{2} \dots\dots\dots (ii)$$

On adding equations (i) and (ii)

$$60/x - 60/2x = 1 + \frac{1}{2}$$

$$= 60/x - 30/x = 3/2$$

$$= (60 - 30)/x = 3/2$$

$$= 3x = 30 \times 2$$

$$= x = (30 \times 2)/3 = 20 \text{ kmph.}$$

**51.**(2) Let the distance between point A and point B be x km.

Difference of time = 2 hours

$$\therefore x/12 - x/15 = 2$$

$$= (5x - 4x)/60 = 2$$

$$= x/60 = 2$$

$$= x = 60 \times 2 = 120 \text{ km.}$$

$$\therefore \text{Time taken at 15 kmph to cover}$$

$$= 120 \text{ km.}$$

$$\therefore \text{Time taken at 15 kmph to cover 120 km} = 120/7 \text{ kmph.}$$

**52.**(1) Difference of time = 1 hour

Distance = AB = x km

According to the question,

$$x/18 - x/24 = 1$$

$$= (4x - 3x)/72 = 1$$

$$= x = 72 \text{ km}$$

Time taken at 18 kmph

$$= 72/18 = 4 \text{ hours}$$

$$\therefore \text{Speed to cover 72 km in 2 hours}$$

$$= 72/2 = 36 \text{ kmph}$$

**53.**(5) Speed of train

$$= (\text{Length of train})/(\text{Time taken in crossing})$$

$$= 320/16 = 20 \text{ m/sec.}$$

$$= (20 \times 18/5) \text{ kmph}$$

$$= 72$$

$\therefore$  Time spent in haltage

$$= 5 \times 18$$

$$= 90 \text{ minutes} = 3/2 \text{ hours}$$

$\therefore$  Total time taken in covering 576 km.

$$= (576/72 + 3/2) \text{ hours}$$

$$= 19/2 \text{ hours}$$

**54.**(2) Actual speed = x kmph

New speed =  $3x/4$  kmph

Total distance = y km

$$\therefore y/(3x/4) - y/x = 20/60$$

$$= (3/4 - 1) y/x = 1/3$$

$$= y/x = 1$$

$\therefore$  Required time = 60 minutes

**55.**(1) Let both scooters meet after t hours from 10 a.m.

$\therefore$  Distance = Speed  $\times$  Time

$\therefore$  Distance covered by scooter

A in t hours + distance covered by scooter B in (t - 2) hour

$$= 140$$

$$= 50t + 30(t - 2) = 140$$

$$= 80t - 60 = 140 = 80t = 200$$

$$= t = 200/80 = 5/2 \text{ hours}$$

i.e. after 2 hours 30 minutes i.e. at 12 : 30 p.m.

**56.**(3) We know that

Speed = Distance/ Time

$$= (260 + 120)/19 \text{ m/sec.}$$

$$= 380/19 \text{ m/sec.} = 20 \text{ m/sec.}$$

$$= 20 \times 18/5 \text{ km/hr} = 72 \text{ km/hr.}$$

**57.**(1) Let speed of car starting at A = x km/hr

And speed of car starting at B = y km/hr

$$\therefore x + y = 120 \dots\dots (i)$$

$$6x - 6y = 120 \dots\dots\dots (ii)$$

$$= x = 70 \text{ km/hr.}$$

$$y = 50 \text{ km/hr}$$

**58.**(5) Speed of train

$$= [\text{Length of (train + platform)}]/\text{Time taken to cross}$$

$$= 440/22 = 20 \text{ m/s}$$

$$= 20 \times 18/5 = 72 \text{ km/hr}$$

**59.**(1) The distance walked on the first day = 2 kms

The distance walked on subsequent days is half the distance walked on the previous days.

$\therefore$  Total distance walked

$$= 2 + 1 + \frac{1}{2} + \frac{1}{4} + \dots$$

This is a Geometric series Whose First term, a = 2  
common ratio, r =  $\frac{1}{2}$

Maximum total distance walked by the person in his life-time

menas the number of terms in the series would be infinite.

Hence, the series would be an infinite Geometric series.

Sum of an infinite Geometric series is given by

$$S = a/(1 - r)$$

$$= S = 2/(1 - 1/2)$$

$$= S = 2/(1/2)$$

$$= s = 4 \text{ kms}$$

**60.**



**61.**(1) Let the required distance be  $x$  km.

According to the question,

$$x/45 - x/50 = (10x - 9x)/450 = 1$$

$$= x = 450 \text{ km.}$$

**62.**

**63.**

**64.**(5) When a train crosses a platform it covers a distance equal to the sum of length of platform and train

Let the length of platform be  $x$  meter.

$\therefore$  Speed of train

$$= (x + 280)/60 = 280/20 = 14$$

$$= x + 280 = 60 \times 14 = 840$$

$$\therefore 840 - 280 = 560 \text{ meter}$$

**65.**(1) Let, Length of train A =  $x$  meter

$$\therefore x/18 = (x + 157.5)/39$$

$$= [13x = 6x + 157.75] \text{ meter}$$

$$= (67.5 + 315) \text{ meter}$$

$$= 382.5 \text{ meter}$$

**66.**(1) Speed of current =  $x$  kmph

$\therefore$  Rate downstream

$$= (6 + x) \text{ kmph}$$

Rate upstream =  $(6 - x)$  kmph

$$\therefore 36(6 - x) - 36(6 + x) = 8$$

$$= 36(6 + x - 6 - x)/[(6 - x)(6 + x)] = 8$$

$$= (36 \times 2x)/[(6 - x)(6 + x)] = 8$$

$$= 9x = 36 - x^2$$

$$= x^2 + 9x - 36 = 0$$

$$= x^2 + 12x - 36 = 0$$

$$= x^2 + 12x - 3x - 36 = 0$$

$$= x(x + 12) - 3(x + 12) = 0$$

$$= (x - 2)(x + 12) = 0$$

$$= x = 3 \text{ kmph}$$

**67.**(5) Distance covered in 2 hours 15 minutes i.e.  $9/4$  hours

$$= 80 \times 9/4 = 180 \text{ km}$$

Time taken to cover remaining distance

$$= (350 - 180)/60 = 17/6 \text{ hours}$$

$$= 2 \text{ hours } 50 \text{ minutes}$$

Total time taken = 2 hours 15 minutes + 2 hours 50

minutes = 5 hours 5 minutes

Hence, Anna reached city A at 10 : 25.

**68.**(4) Let the total distance be  $3y$  km. According to the question.

Speed  $\times$  Time = Distance

$$\therefore x \times 5/2 = 2y$$

$$= 5x = 4y \dots\dots\dots (i)$$

Again,  $(x + 2) \times 52/60 = y$

$$= (x + 2) \times 5 = 6y \dots\dots\dots (ii)$$

On dividing equation (ii) by (i)

$$(x + 2)/x = 3/2$$

$$= 3x = 2x + 4$$

$$x = 4$$

From equation (i)

$$5 \times 4 = 4y$$

$$y = 5$$

$$\therefore \text{Total distance} = 3y = 3 \times 5$$

$$= 15 \text{ km.}$$

**69.**(5) According to the question, Distance covered by A

$$\text{in 8 hrs.} = 6 \times 8 = 48 \text{ km}$$

$\therefore$  Distance covered by A in 8 hrs.

$$= 6 \times 8 = 48 \text{ km}$$

$\therefore$  Distance covered by B in 8 hrs.

$$= (114 - 48) \text{ km} = 66 \text{ km}$$

$\therefore$  Required speed

$$= 66/8 \text{ kmph}$$

**70.**(5) Distance between two cities = 350 km

Distance travelled by Sunil with the speed of 80 km/hr

in  $9/2$  hours or 2.25 hr.

$$= 80 \times 2.25 \text{ km} = 180 \text{ km}$$

$\therefore$  Remaining distance

$$= 350 - 180 = 170 \text{ km}$$

Speed = 60 km/hr

Time taken to reach in city

$$x = 170/60 = 2.83 \text{ hr}$$

Total time = 2.5 + 2.85

$$= 5.08 \text{ hr} = 305 \text{ minutes}$$

$$= 6 \text{ hours } 5 \text{ minute}$$

Sunil started journey at 5.50 a.m. & finished the journey at

$$= 11.55 \text{ a.m.}$$

**71.**(4) [As nothing can be said about the speed]

Distance = 200 meter

time = 16 seconds

$$\text{Speed} = \text{distance}/\text{time} = 200/16$$

$$= 12.5 \text{ m/sec.}$$

$$= 12.5 \text{ m/sec.}$$

$$= 12.5 \times 18/5$$

$$= 45 \text{ km/hr.}$$

**72.**(1) Let the employee travelled  $x$  kms by taxi.

$\therefore$  Distance covered by him by his own car =  $(90 - x)$  km.

According to the question.

$$x \times 7 + (90 - x) \text{ km.}$$

According to the question.

$$x \times 7 + (90 - x) \times 6 = 675$$

$$= 7x + 540 - 6x = 675$$

$$x = 675 - 540 = 135$$

$\therefore$  Required distance = 135 km.

**73.**(1) Let the speed of train C be  $x$  kmph.

Speed of train B relative to C

$$= (120 - x) \text{ kmph}$$

$$= [(120 - x) \times 5/18] \text{ m/sec}$$

$$= (600 - 5x)/18 \text{ m/sec.}$$

Distance covered

$$= 100 + 200 = 300 \text{ m}$$

$$\therefore 300/(600 - 5x)/18 = 120$$

$$= 300 = 120(600 - 5x)/18$$

$$= 10 \times 9 = 2(600 - 5x)$$

$$= 90 = 1200 - 10x$$

$$= 10x = 1200 - 90$$

$$= x = 1110/10 = 111$$

Hence, the speed of train C is 111 kmph.



**74.**(4) When a train crosses a platform it covers a distance equal to the sum of lengths of platform and the train itself. If the length of train be  $x$  meters, then

$$= (x + 300)/38 \text{ m/sec.} \dots\dots\dots (i)$$

When the train crosses a signal post it covers its own length.

$\therefore$  Speed of train

$$= x / 18 \text{ m/sec.} \dots\dots\dots (ii)$$

From equations (i) and (ii)

$$= (x + 300)/38 = x/18$$

$$= 38x - 18x = 300 \times 18$$

$$= 20x = 300 \times 18$$

$$= x = (300 \times 18)/20$$

$$= x = 270 \text{ meters}$$

$\therefore$  Speed of train =  $270/18$

$$= 15 \text{ m/sec.}$$

$$= 15 \times 18/5 = 54 \text{ kmph}$$

**75.**(2) Average speed =  $2xy/(x + y)$

(when the same distances are covered)

$$= (2 \times 24 \times 36)/(24 + 36) \text{ kmph}$$

$$= (2 \times 24 \times 36)/60 = 28.8 \text{ kmph}$$

**76.**(3)  $2 \text{ kmph} = (2 \times 5)/18 \text{ meter/sec.}$

$$= 10/9 \text{ meter/sec.}$$

Let the length of the train be  $x$  meter and its speed be  $y$  meter/sec.

Then,

$$x/(y - 5/9) = 9$$

$$= 9y - 5 = x$$

$$\therefore 9y - x = 5 \dots\dots\dots (i)$$

$$\text{and } x(9y - 10) = 9x$$

$$= 10(9y - 10) = 9x$$

$$= 90y - 9x = 100 \dots\dots\dots (ii)$$

By equation (i)  $\times 10$  - equation (ii)

we have

$$90y - 10x = 50$$

$$90y - 9x = 100$$

$$= \quad + \quad \quad \quad$$

$$-x = -50$$

$$= \text{Length of train} = 50 \text{ m}$$

**77.**(2) Let the length of train B =  $x$

$\therefore$  Length of train A =  $3x/4$  meter

$\therefore$  Required ratio =  $3x/4 \times 33 : x/55$

$$= 5 : 4$$

**78.**(3) If the distance be  $x$  km, then

$$x/(3/2) + x/(9/2) = 6$$

$$= (2x/3 + 2x/9) = 6$$

$$(6x + 2x)/9 = 6$$

$$= 8x = 9 \times 6$$

$$= x = 54/8 = 27/4 = 27/4 \text{ km}$$

**79.**(4)  $C = kx^2$

When  $x = 16$  kmph

$$C = \text{Rs. } 64$$

$$\therefore 64 = k \times 16^2 = k \times 256$$

$$\therefore C = \frac{1}{4} x^2$$

Total expenditure per hour

$$= \frac{1}{4} x^2 + 400$$

When speed =  $40 \text{ kmph}$ , the expenditure will be minimum.

**80.**(2) Total expenditure

$$= \frac{1}{4} \times 40 \times 40 \times 10 + 400 \times 10$$

$$= \text{Rs. } 8000$$

**81.**(4) [Tricky approach]

Working hours per day

$$= 24 - 9 = 15 \text{ hours}$$

Total time

$$= 15 \times 40 = 600 \text{ hours}$$

Decrease in walking hours per day after increase in hours of rest

$$= 24 - (2 \times 9) = 6 \text{ hours}$$

$$\text{Required time} = 600/6 = 100 \text{ days}$$

**82.**(1) Working hours per day

$$= 24 - 8 = 16 \text{ hours}$$

$$\text{Total working time} = 16 \times 20 = 320 \text{ hours}$$

Distance is doubled and speed too.

Working hours per day

$$= 24 - 16 = 8 \text{ hours}$$

$\therefore$  Required time

$$= 320/8 = 40 \text{ days}$$

**83.**(3) If  $AB = x \text{ km}$ , then

Speed of person starting from A

$$= x/4 \text{ kmph}$$

Speed of person starting from B

$$= x/(7/2) = 2x/7 \text{ kmph}$$

Relative speed

$$= x/4 + 2x/7 = (7x + 8x)/28$$

$$= 15x/28 \text{ kmph}$$

Distance covered by first person till 7.30 a.m.

$$= x/4 \times 3/2 = 3x/8 \text{ km}$$

Remaining distance

$$= x - 3x/8 = 5x/8 \text{ km.}$$

Time of meeting

$$= \text{Remaining distance} / \text{Relative speed}$$

$$(5x/8)/(15x/28) = 5x/8 \times 28/15x = 7/6 \text{ hours}$$

$$= 7/6 \times 60 = 70 \text{ minutes}$$

**84.**(4) Working hours per day

$$= 24 - 9 = 15$$

Total working hours

$$= 15 \times 10 = 150 \text{ hours}$$

Distance is doubled and speed too. (Both cancel each other.)

New working hours (per day)

$$= 24 - 18 = 6 \text{ hours}$$

$\therefore$  Required time

$$= 150/6 = 25 \text{ days}$$

**85.**(1) Speed of train =  $222/6$

$$= 37 \text{ m/sec.}$$

If the speed of man be  $x \text{ m/sec.}$

then

$$220/(37 - x) = 10$$

$$= 220 = 370 - 10x$$

$$= 10x = 370 - 220 = 150$$

$$= x = 15 \text{ m/sec}$$



**86.**(1) Relative speed

$$= 65 - 5 = 60 \text{ kmph}$$

$$= 60 \times 5/18 \text{ m/sec.} = 50/3 \text{ m/sec.}$$

∴ Require time

$$= 450/(50/3) = 450 \times 3/50$$

$$= 27 \text{ seconds}$$

**87.**(1) Effective time taken by express train in covering 75 km

$$= (60/100 \times 75 + 3) \text{ minutes}$$

$$= 48 \text{ minutes}$$

Time taken in covering 600 km

$$= (48 \times 7 + 45) \text{ minutes}$$

$$= 336 + 45 = 381 \text{ minutes}$$

Effective time taken by local train in covering 25 km

$$= 31 \text{ minutes}$$

**31) 381 (12**

31

71

62

9

∴ Distance covered in 9 minutes

$$= 50/60 \times 9 = 7.5 \text{ km}$$

Distance covered in (31 × 12) minutes

$$= 12 \times 25 = 300 \text{ km}$$

Total distances

$$= 300 + 7.5 = 307.5 \text{ km}$$

**88.**(4) If the required distance be x km, then

$$x/5 - x/6 = (30 - 5)/60$$

$$= (6x - 5x)/30 = 25/60 = 5/12$$

$$= x = (30 \times 5)/12 = 12.5 \text{ km}$$

**89.**(4) Usual speed of plane

$$= x \text{ kmph}$$

∴ New speed = (x + 250) kmph

$$\therefore 1500/x - 1500/(x + 250) = 30/60$$

$$= 1500(x + 250 - x) / [x(x + 250)] = \frac{1}{2}$$

$$= x(x + 250) = 750(750 + 250)$$

$$= x = 750 \text{ kmph}$$

**90.**Rate downstream of boat

$$= 17.5 + 2.5 = 20 \text{ kmph}$$

Rate upstream of boat

$$= 17.5 - 2.5 = 15 \text{ kmph}$$

Distance XY = x km.

∴ Distance YZ = 2x/5 km.

Total time = 429 minutes

$$143/20 \text{ hours} = 143/20 \text{ hours}$$

$$\therefore x/20 + 2x/(5 \times 15) = 143/20$$

[∴ Distance/Speed = Time]

$$= x/4 + 2x/15 = 143/4$$

$$= (15x + 8x)/60 = 143/4$$

$$= 23x = 143 \times 15$$

$$= x = 143 \times 15/23 = 93 \text{ km.}$$

∴ Total distance

$$= x + 2x/5 = 7x/5$$

$$= 7 \times 93/5 = 130 \text{ km.}$$

**91.**(40) Time taken by B = x minutes.

Time taken by A = (x + 10) minutes

$$\therefore 2/3 = x/(x + 10)$$

$$= 2x + 20 = 3x$$

$$x = 20 \text{ minutes}$$

∴ Time taken by A

$$= 30 \text{ minutes}$$

So, Time taken by A when he doubles his speed

$$= 30/2 = 15 \text{ minutes}$$

**92.**(4) Length of first train = x meter

Length of second train = y meter

then Speed of first train

$$= (x/27) \text{ m/sec.}$$

& Speed of second train

$$= (y/17) \text{ m/sec.}$$

Relative Speed

$$= (x/27 + y/17) \text{ m. sec.}$$

$$\text{Now, } 23 = (x + y)/(x/27 + y/17)$$

$$= x/27 + y/17 = x/23 + y/23$$

$$= x/23 - x/27 = y/17 - y/23$$

$$= (27x - 23x)/(23 \times 27)$$

$$= (23y - 17y)/(23 \times 17)$$

$$= 4x/27 = 6y/17$$

$$= x/y = 6/17 \times 27/4 = 81/34$$

**93.**(5) Length of BC = x km(let)

∴ Length of AB = 2x/3 km.

Rate downstream = 16 + 2

$$= 18 \text{ kmph}$$

Rate upstream = 16 - 2

$$= 14 \text{ kmph}$$

According to the question,

$$2x/(3 \times 14) + x/18 = 6.5$$

$$= x/21 + x/18 = 6.5$$

$$= 6x + 7x/126 = 6.5$$

$$= 13x = 6.5 \times 126$$

$$x = 6.5 \times 126/13 = 63$$

∴ Total distance = 2x/3 + x

$$= 5x/3 = 5 \times 63/3 = 105 \text{ km.}$$

**94.**(4) Let the length of train A be x meter.

∴ Length of train B

$$= x/2 \text{ meter}$$

Speed of train A = 126 kmph

$$= (126 \times 5/18) \text{ m/sec}$$

$$= 35 \text{ m/sec.}$$

Speed of train B = 90 kmph

$$= (90 \times 5/18) \text{ m/sec.}$$

$$= 25 \text{ m/sec.}$$

= length of trains A and B/ Time taken in crossing

$$= 35 + 25 = [x(x/2)/9]$$

$$= 60 \times 9 = 3x/2$$

$$= 3x = 90 \times 12$$

$$= x = (90 \times 120/3)$$

$$= 360 \text{ meter}$$

∴ Time taken in crossing the platform

= Length of train A and Platform/(Speed of train A)

$$= (360 + 690)/35$$



= 1050/35 seconds

= 30 seconds





