TIME, SPEED & DISTANCE
[Part – 2]

Agenda of Today's session

Homework Question → 5 min

* 2 Important Concepts with 6-7 Question → 50 Min

* 7-8 Practice → 35 min

→ 30 Questions (Homework
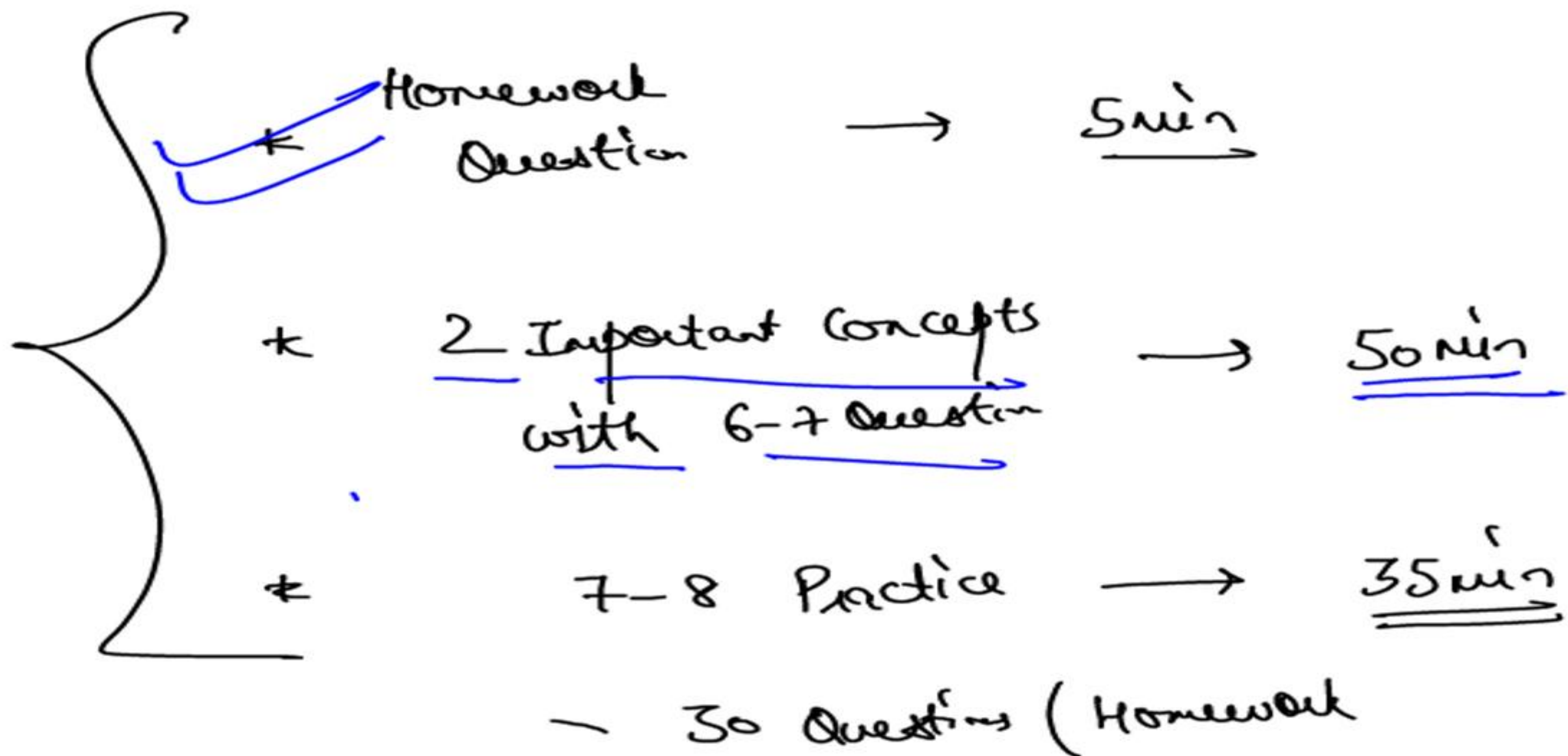
Train Car Time

~~120 Km~~ 480 Km 8 hr

↑20 min

~~180 Km~~ 200 km 400 km 8 hr 20min

↑80 km 600 km 10 hr

Eg11. A distance of 600 Km is to be covered in 2 parts. In 1st phase 120 Km is travelled by train and rest by car and it took total of 8 Hr, but if 200 Km is covered by train and rest by car it takes 20 min more. find the ~~avg~~ speed of car and train ?

~~(a) 80 & 60 km/hour~~
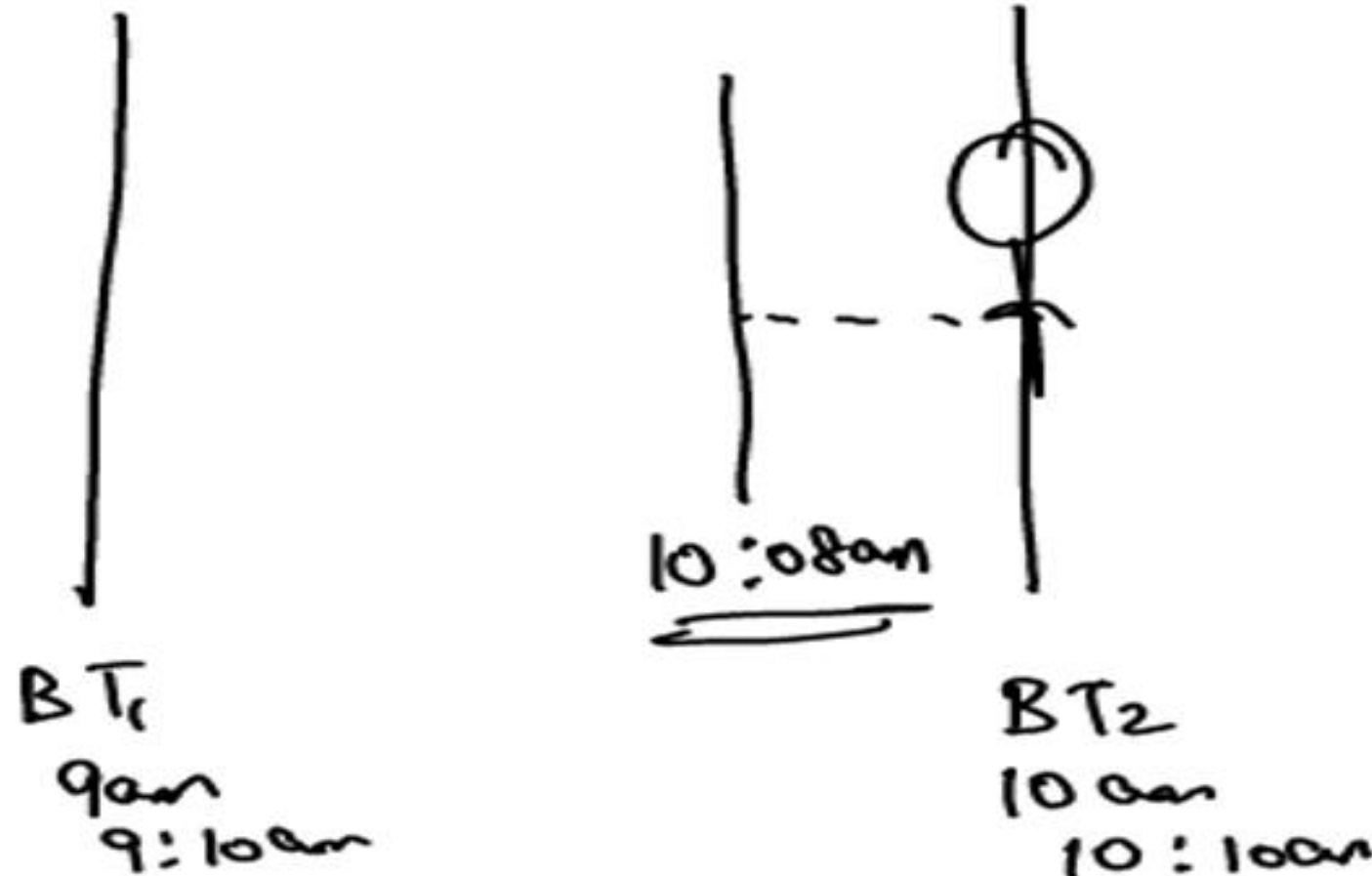(b) 90 & 60 km/hour
(c) 120 & 90 km/hour
(d) 120 & 100 km/hour

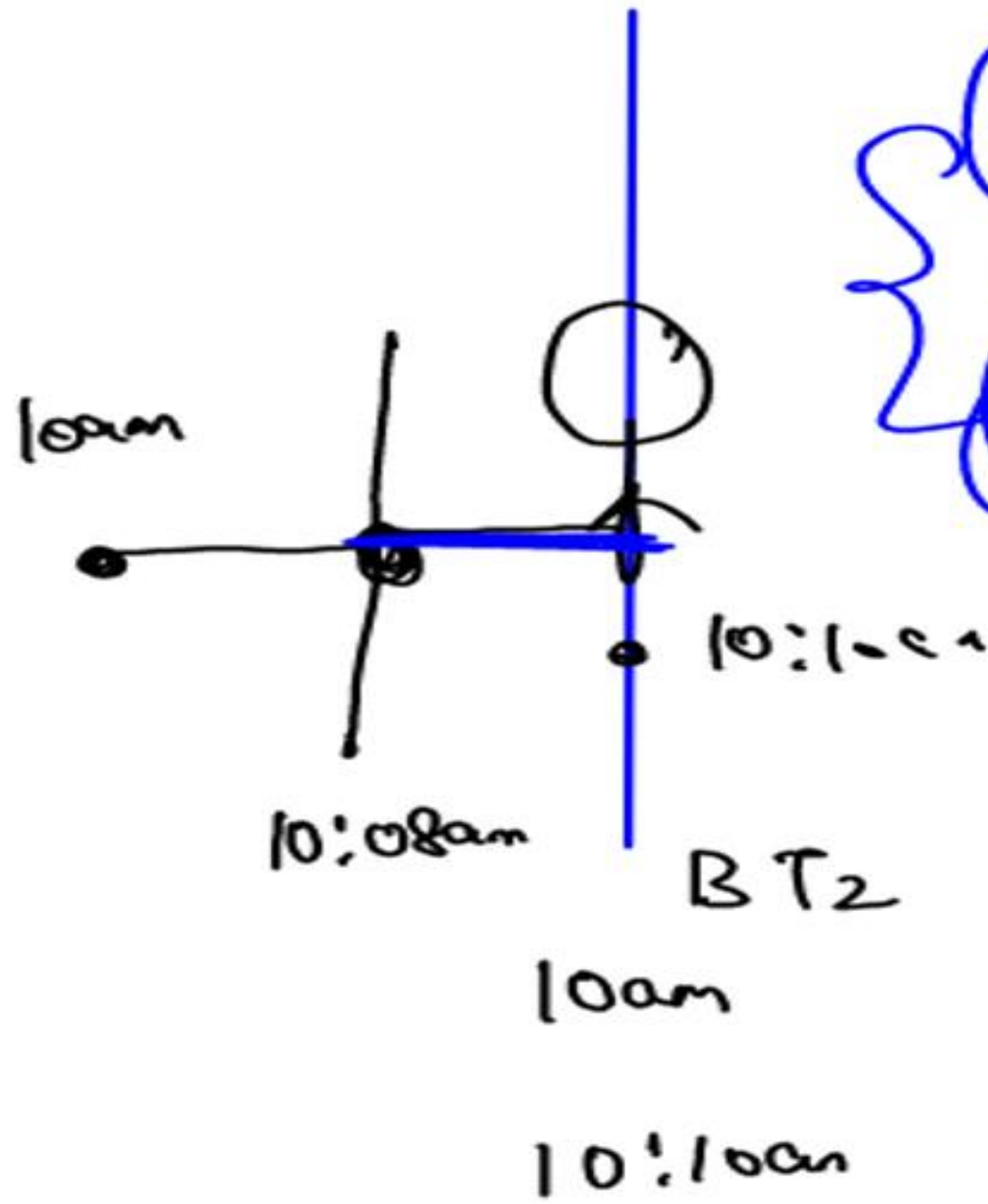$$S_T = 60 \, km/hr$$
$$S_C = 80 \, km/hr$$

CONCEPT OF BUS TERMINAL & GUN FIRING

Eg. Buses are leaving bus terminal after every 10 minutes (T_1)

But, a person who is moving towards the terminal meets the bus after every 8 minutes (T_2).

BT_1
9am
9:10am

10:08am

BT_2
10 am
10:10am

$T_1 \rightarrow$ 10 min

$T_2 \rightarrow$ 8 min

10am

10:1... am

10:08am

BT_1

9am

9:10am

BT_2

10am

10:10am

$\dfrac{S_M}{S_B} = \dfrac{|T_1 - T_2|}{T_2}$

Bus

$T_1 - T_2$

Man

T_2

$T_2 : T_1 - T_2$

$$\left\{ \frac{\text{Speed of Man}}{\text{Speed of Bus}} = \frac{|T_1 - T_2|}{T_2} \right.$$

$$\frac{\text{Speed of Train}^{/Man}}{\text{Speed of Sound}} = \frac{|T_1 - T_2|}{T_2}$$

$$\frac{S_M}{S_B} = \frac{2}{8}^{1}_{4}$$

Here,

T_1 = Time after which buses leaves the terminal.

T_2 = Time after which it meets with the person.

$S_B = 20 \, Km/h$

$T_1 = 10 \, min$

$T_2 = 8 \, min$

$S_M = ??$

$$\frac{S_M}{S_B} = \frac{(T_1 - T_2)}{T_2}$$

$$\frac{S_M}{20} = \frac{\cancel{2}^{1}}{\cancel{8}^{4}}$$

$$S_M = \underline{5 \, Km/h}$$

Eg12. Buses start from a bus terminal with a speed of 20 km/hr at intervals of 10 minutes. What is the speed of a man coming from the opposite direction towards the bus terminal if he meets the buses at intervals of 8 minutes?

(a) 3 km/hour   (b) 4 km/hour

(c) 5 km/hour   (d) 7 km/hour

Ans. (c)

$T_1 = 20 \text{ min} \qquad T_2 = 24 \text{ min}$

$S_M = 30 \text{ km/h}$

$$\frac{S_M}{S_B} = \left(\frac{T_1 - T_2}{T_2} \right)$$

$$\frac{30}{S_B} = \frac{4}{24 \, 6}$$

$$S_B = \underline{180 \text{ km/h}}$$

Eg13. The buses are departed after every 20 min, but man going away from the bus depot after every 24 min get the buses. Find the speed of buses if the speed of man is 30 Km/Hr.

(a) 120 km/hour

(b) 150 km/hour

(c) 180 km/hour

(d) 210 km/hour

Ans. (c)

$$T_1 = 13 \text{ min} \qquad T_2 = 12\tfrac{1}{2}$$

$$S_S = 330 \text{ m/sec}$$

Eg14. Two guns are fired at 13 minutes interval. But the passenger in the train hears the sound of second gun after 12 minute 30 seconds of the first. If the speed of sound is 330 m/s then the speed of train was
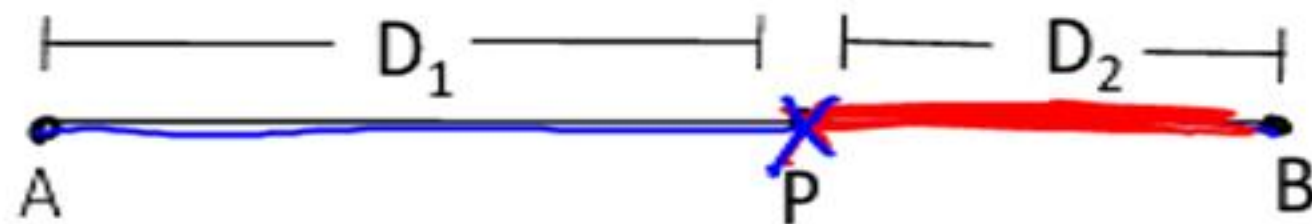
$$\frac{S_T}{S_S} = \left| \frac{T_1 - T_2}{T_2} \right)$$

$$\frac{S_T}{330} = \frac{\tfrac{1}{2}}{12\tfrac{1}{2}}$$

$$S_T = \frac{\overset{66}{\cancel{330}}}{25} \times \frac{18}{\cancel{5}}$$

$$= 47\frac{13}{25} \text{ km/h}$$

(a) $47\frac{13}{25}$ km/hour

(b) $45\frac{13}{25}$ km/hour

(c) $42\frac{13}{25}$ km/hour

(d) $44\frac{25}{13}$ km/hour

Ans. (a)

Here,

$S_1 \rightarrow$ Speed of train starting from A

$S_2 \rightarrow$ Speed of train starting from B

$T \rightarrow$ Time after which they meet each other.

$T_1 \rightarrow$ Time taken by the train 1 to reach at its destination after crossing each other.

$T_2 \rightarrow$ Time taken by the train 2 to reach at its destination after crossing each other.

$$D_1 = S_1 \cdot T \qquad D_2 = S_1 \cdot T_1$$

$$D_2 = S_2 \cdot T \qquad D_1 = S_2 \cdot T_2$$

$$\frac{D_1}{D_2} = \frac{S_1}{S_2} \qquad \frac{D_1}{D_2} = \frac{S_2 T_2}{S_1 T_1}$$

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

$$\frac{S_1^2}{S_2^2} = \frac{T_2}{T_1}$$

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

A very important formula :

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

$A \longrightarrow$ $\longleftarrow B$

$\underset{X}{\bullet}$ ──────────── $\underset{Y}{\bullet}$

Eg15. Two trains, A and B start from stations X and Y towards Y and X respectively. After passing each other, they take 4 hrs 48 min and 3 hr 20 min to reach Y and X respectively. If train A is moving at 45 km/hr, then the speed of train B is:

(a) 60 km/hr

(b) 64.8 km/hr

(c) 54 km/hr

(d) 37.5 km/hr

$T_1 = 4 \text{ hrs } 48 \text{ min}$ $S_A = 45 \text{ km/hr}$

$T_2 = 3 \text{ hr } 20 \text{ min}$ $S_B = ??$

$$\frac{45}{S_B} = \sqrt{\frac{\cancel{200}^{100}}{\cancel{288}_{144}}}$$

$$\frac{\cancel{45}^{9}}{S_B} = \frac{\cancel{10}^{5}}{\cancel{12}_{6}}$$

$$S_B = 54 \text{ km/hr}$$

PYQ of SSC

Ans. (c)

Q1. A train without stoppage travels with an average speed of 70 km/h. and with stoppage, it travels with the average speed of 56km/h. How many minutes does the train stop on an average per hour?

(a) 14   (b) 15

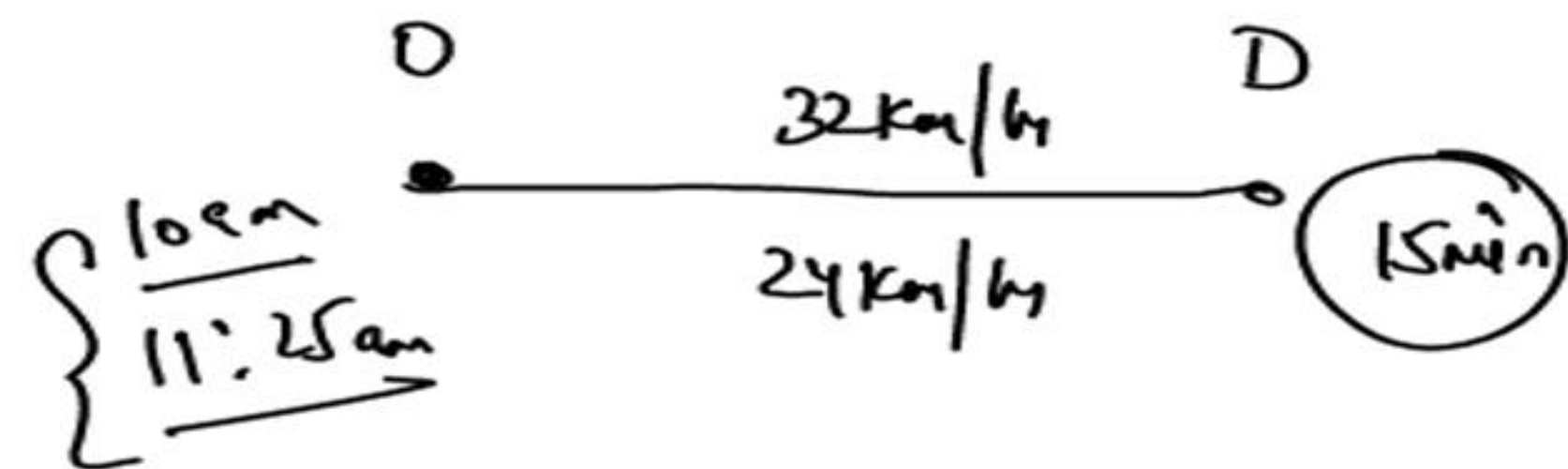(c) 12   (d) 16

Ans. (c)

Q2. A man walks a certain distance by foot and rides back on horse in 4 hr. 30 min. He could ride on horse both ways in 3hrs. The time required by the man to walk by foot both ways is :

(a) 4 Hrs 30 Min

(b) 4 Hrs 45 Min

(c) 5 Hrs

(d) 6 Hrs

Ans. (d)

Q3. A delivery boy started from his office at 10 a.m. to deliver an article. He rode his scooter at a speed of 32 km/h. He delivered the article and waited for 15 minutes to get the payment. After the payment was made, he reached his office at 11.25 a.m., travelling at a speed of 24 km/h. Find the total distance travelled by the boy.

(a) 32 km

(b) 35 km

(c) 40 km

(d) 30 km

O — D

32 km/h

24 km/h

15 min

10 am

11:25 am

$\frac{32 : 24}{4 \quad 3}$

$T_{OD} : T_{DO} = \frac{3}{4}$

$\frac{3}{7} \times 70 = 30 \, min$

$DOD = \frac{32 \cdot \frac{1}{2}}{} = 16 \, Km$

Ans. (a)

Q4. Two cars start from the same place at the same time at right angles to each other. Their speeds are 54 km/hr and 72 km/hr, respectively. After 20 seconds the distance between them will be:

(a) 720 m   (b) 480 m
(c) 500 m   (d) 540 m

Ans. (c)

Q5. Each wheel of a bus is making 7 revolutions per second. If the diameter of a wheel is 56 cm, then the speed of the bus (in cm/sec) would be:

(a) 616

(b) 1232

(c) 1000

(d) 176

Ans. (b)

Train   Car

Speed 5 : 4

Time 4 : 5

$=160 min$ $200 min$

$1 \rightarrow 40 min$

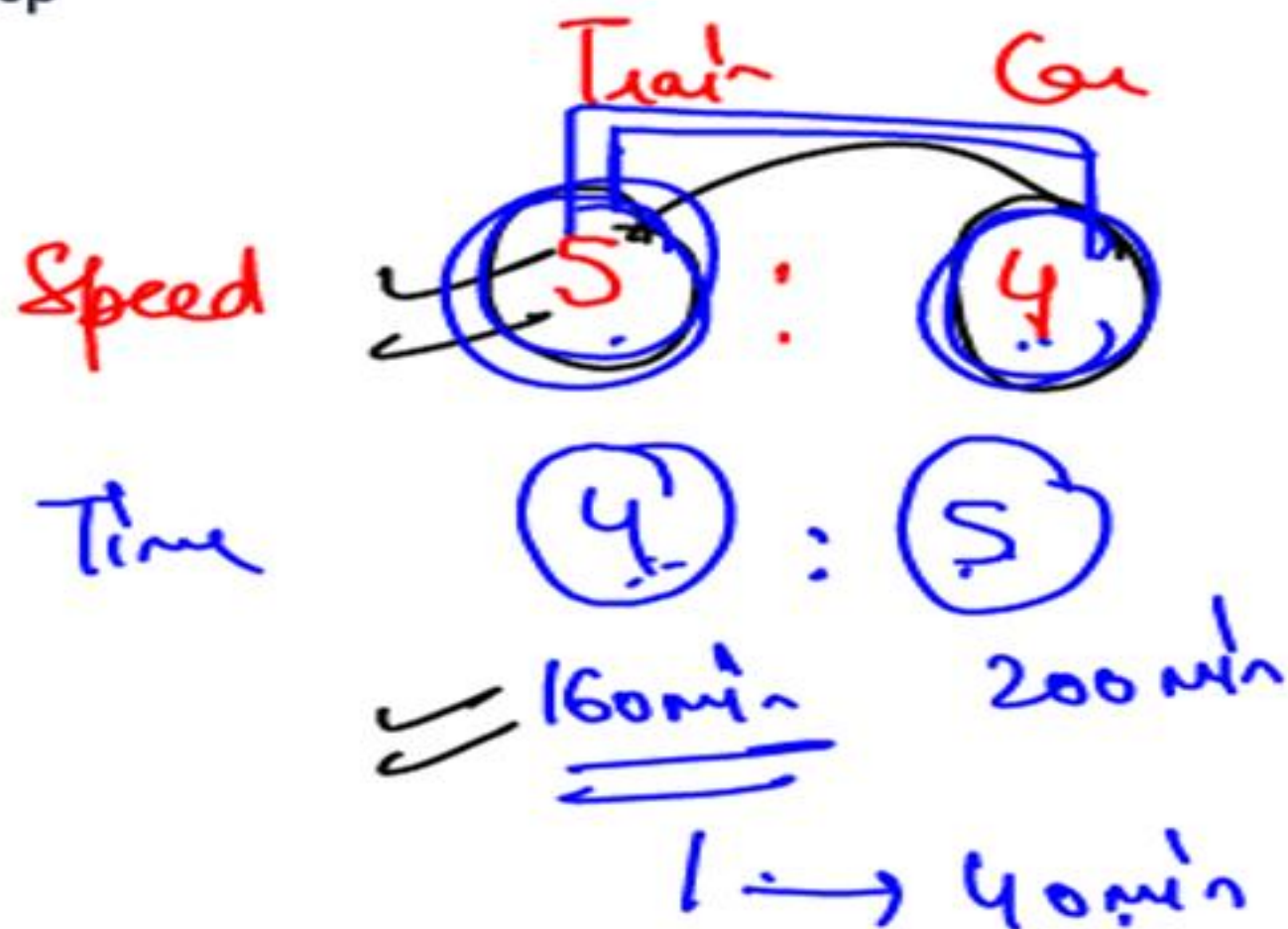$$S_T = \frac{165 \cdot \frac{3}{60}}{8 \cdot 160}$$

Q6. A train can travel 25% faster than a car. Both start from point A at the same time and reach point B 165 km away at the same time. On the way the train takes 40 minutes for stopping at the stations. What is the difference in the speeds (in km/hr) of train and car ?

(a) 6.375   (b) 7.635

(c) 9.75   (d) 12.375

Time $\rightarrow$ 90 sec

$$Diff = \frac{1}{5} \cdot \frac{165 \cdot 3}{8}$$

$$\frac{99}{8} = 12 \cdot$$

Ans. (d)

Q7. A man driving at $3/4^{th}$ of his original speed reaches his destination 20 minutes later than the usual time. Then the usual time is:

(a) 45 Min

(b) 60 Min

(c) 48 Min

(d) 120 Min

Ans. (b)

Q8. Ajay covers certain distance with his own speed but when he reduces his speed by 10 km/h, his time duration for the journey increases by 40 hours while if, he increases his speed by 5 km/h from his original speed, he takes 10 hours less than the original time taken. Find the distance covered by him.

(a) 1000 km

(b) 1200 km

(c) 1500 km

(d) 1800 km

Ans. (c)

Q9. Alok starts walking from P with speed of 6 km/h towards Q. Raman starts at same time from P towards Q with speed of 9 km/h. Raman reaches Q. turns back and starts walking towards P. He meets Alok at R. if PQ is 15 km, then what is PR?

(a) 20 km

(b) 12 km

(c) 15 km

(d) 18 km

Ans. (b)

Q10. Two cyclists, X and Y, start at the same time from place A and go towards place B at a speed of 6 km/h and 8 km/h, respectively. Despite stopping for 15 minutes during the journey, Y reaches 10 minutes earlier than X. The distance between the places, A and B, is:

(a) 6 km

(b) 8 km

(c) 16.5 km

(d) 10 km

Ans. (d)

Q11. A man travelled a distance of 35 km in 5 hours. He travelled partly on foot at the rate of 4 km/h and the rest on bicycle at the rate of 9 km/h. The distance travelled on foot is:

(a) 8 km

(b) 10 km

(c) 15 km

(d) 12 km

Ans. (a)

Q12. A man walks at a speed of 8 km/h. After every kilometer, he takes a rest for 4 minutes. How much time will he take to cover a distance of 6 km?

(a) 70 Min

(b) 65 Min

(c) 60 Min

(d) 69 Min

No Rest $= \dfrac{6}{8} = \dfrac{3}{4} \times 60 \Rightarrow 45\,min$

$5 \times 4 = 20\,min$

Ans. (b)

Q13. A plane left half an hour later than the scheduled time and in order to reach its destination 1500 km away in time, it had to increase its speed by $33\frac{1}{3}\%$ over its usual speed. Find its increased speed.

(a) 250 km/h

(b) 500 km/h

(c) 750 km/h

(d) 1000 km/h

$1 \text{ unit} \rightarrow \frac{1}{2}h$

Time   Speed

④   3

③   4

$\frac{1}{2}h$

$\dfrac{1500}{1\frac{1}{2}} = 1000 \text{ km/h}$

Ans. (d)

Q14. Pranav walked at 5 km/h for certain part of the journey and then he took an auto for the remaining part of the journey travelling at 25 km/h. If he took 10 hours for the entire journey, what part of journey did he travelled by auto if the average speed of the entire journey be 17 km/h?

(a) 750 km   (b) 100 km

(c) 150 km   (d) 200 km

Ans. (c)

Q15. A train takes 2½ hours less for a journey of 300 km, if its speed is increased by 20 km/h from its usual speed. How much time will it take to cover a distance of 192 km at its usual speed?

(a) 6 Hrs.

(b) 2.4 Hrs.

(c) 4.8 Hrs.

(d) 3 Hrs.

Ans. (c)

Q16. 45 pillars are standing in a line such that distance between any two consecutive pillars is same. A car travelling with uniform speed of 72 km/h takes 18 seconds to reach from 1st pole to 10th pole. What is the distance between 10th and 31st pole (in metres)?

(a) 800   (b) 820

(c) 840   (d) 910

Ans. (c)

Q17. Two trains start from stations A and B and travel towards each other at speeds of 50 kmph and 60 kmph respectively. At the time of their meeting, the second train has travelled 120 km more than the first. The distance between A and B is

(a) 1200 km

(b) 1440 km

(c) 1320 km

(d) 990 km

Ans. (c)

2 hrs   120 Km

$$SC = 60 \text{ Km/hr}$$

2 hrs   180 Km

$$SC = \frac{180}{x} \quad 90 \text{ Km/hr}$$

Q18. A car driver leaves Bangalore at 8.30 A.M. and expects to reach a place 300 km from Bangalore at 12.30 PM. At 10.30 he finds that he has covered only 40% of the distance. By how much he has to increase the speed of the car in order to keep up his schedule?

(a) 45 km/hr   (b) 40 km/hr

(c) 35 km/hr   (d) 30 km/hr

Ans. (d)

Q19. A man travels 450 km to his home partly by train and partly by car. He takes 8 hrs 40 mins if he travels 240 km by train and rest by car. He takes 20mins more if he travels 180 km by train and the rest by car. The speed of the car in km/hr is how much?

(a) 45

(b) 50

(c) 60

(d) 48

Ans. (a)

Q20. A motor car moves at a speed of 72 km/h and 54 km/h after and before repairing respectively. It covers D distance in 6 hours after repairing. How much time (in hours) will it take to cover 5D distance before repairing?

(a) 40   (b) 45

(c) 30   (d) 36

Ans. (a)

Mohit and Rohit start simultaneously from two towns, P and Q, towards Q and P respectively at 8:00 AM. R is a checkpost which is midway between P and Q. Both Mohit and Rohit turn back towards their respective starting points whenever they reach R and every time they reach their starting points they turn back and return to R. If the speeds of Mohit and Rohit are 45 km/h and 60 km/h respectively and PQ = 24 km, when will they reach R at the same time?

(a) 10 : 24 AM

(b) 11 : 36 AM

(c) 2 : 12 PM

(d) never reach R at the same time

Ans. (d)

Q22. 29 boys are standing in a line such that distance between any two consecutive boys is same. A teacher takes 7 Seconds to reach from first boy to 15th boy. How much more time (in seconds) will he take to reach the 22nd boy?

(a) 2.5   (b) 3   (c) 3.5   (d) 4

Ans. (c)

Q23. The speed of train A is 16 km/h less than the speed of train B. To cover a distance of 384 km, B takes 4 hours less time than A. What is the speed (in km/h) of train B?

(a) 50

(b) 45

(c) 48

(d) 32

Ans. (c)

Q24.

A man starts running from point P at 11:00 AM with a speed of 10 km/hr. He runs for 2 hours and then takes a 1 hour rest. He continues this till he is caught by another man who starts at 2:00 PM from point P and runs non-stop at a speed of 15 km/hr towards the first man. At what time (in PM) will the first man be caught?

(a) 6 : 20   (b) 4 : 40
(c) 6 : 00   (d) 5 : 30

5pm

11am − 1pm → 20 km

1pm − 2pm → x

2pm → 4pm → 20 km

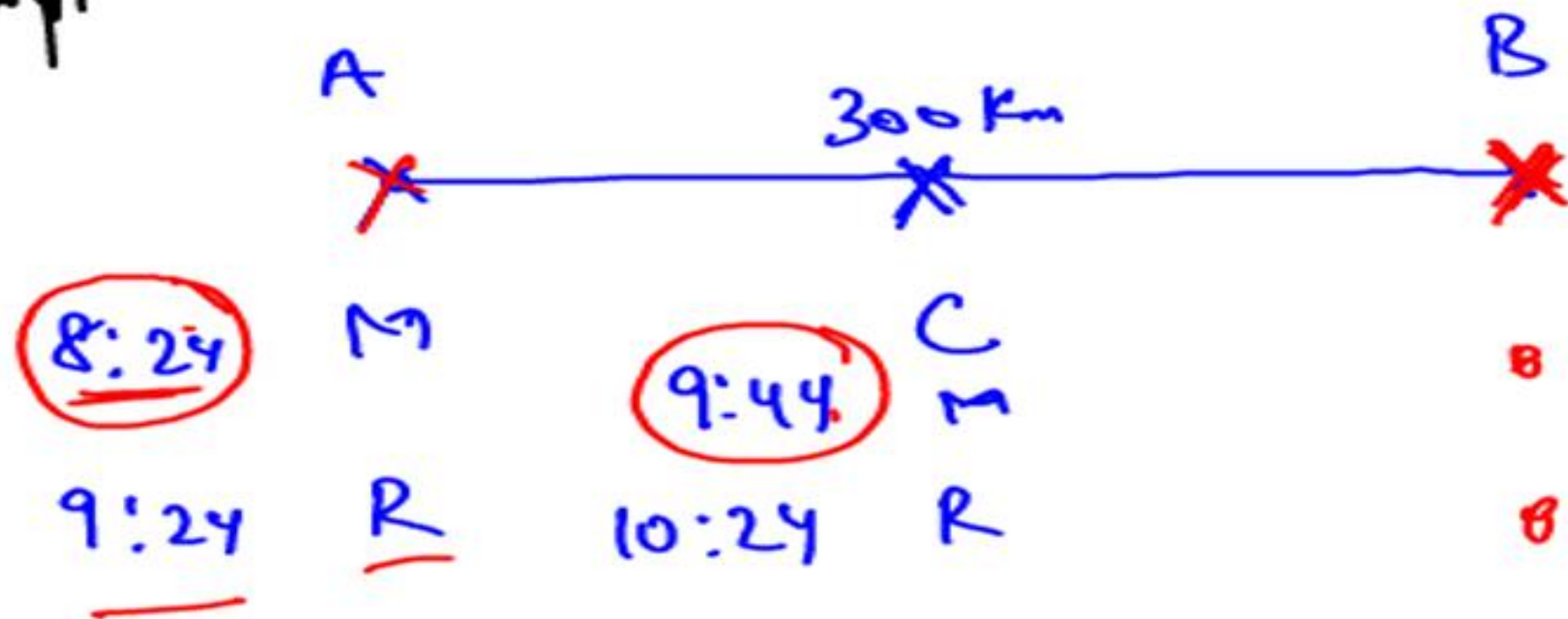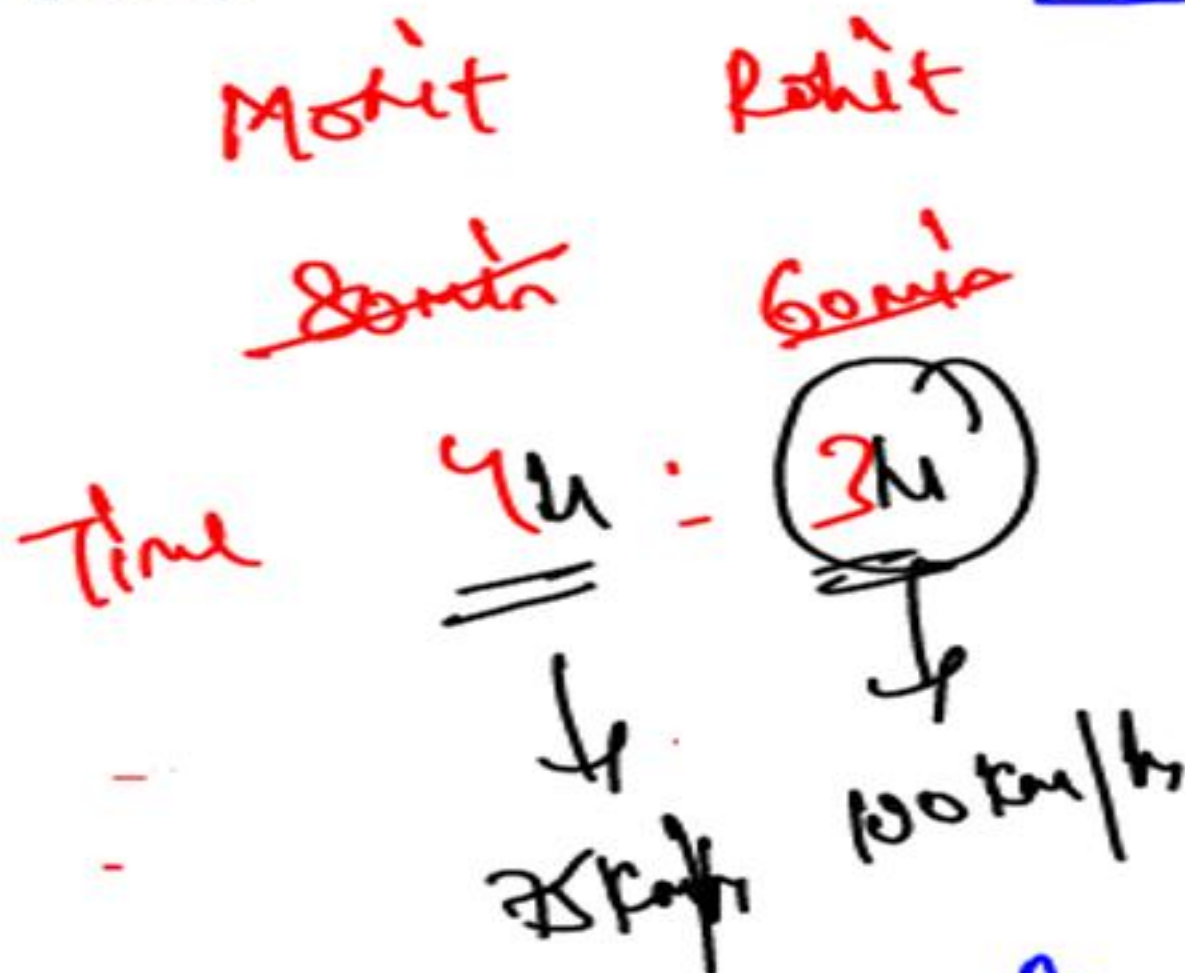4 − 5 → 0

$\dfrac{40}{15}$ → 2hr 40min

4 : 40pm

Ans. (b)

Q25. Two places A & B are 300 Km apart, Mohit starts from city A at 8:24 am and an hour later Rohit starts from city A & after travelling for one hour he reaches at city C that Mohit had passed 40 min earlier. City C falls on the way from A to B. If they reaches city B at same time, find their speed.

(a) 60 km/hr, 80 km/hr
(b) 75 km/hr, 90 km/hr
(c) 75 km/hr, 100 km/hr
(d) 60 km/hr, 90 km/hr

Mohit   Rohit

Sonita   Sonia

Time $\frac{4u}{} = \boxed{3u}$

$\downarrow$ $\downarrow$

25 km/h   100 km/h

Time 2min

A ————————— 300 Km ————————— B

8:24 M   C   B
9:24 R   9:44 M   B
           10:24 R

Ans. (c)

Q26. A man walks a distance of 35 kms. He walks for sometime at 4km/hr and for some time at 5km/hr. If he walks at 5km/hr instead of 4 km/hr and 4km/hr instead of 5 km/hr, he will walk 2 kms more in the same time. Find his total time of the journey.

(a) 8.5 hrs   (b) 7.5 hrs

(c) 8 hrs   (d) 7 hrs

Ans. (c)

Q27. Travelling at **60 km/h**, a person reaches his destination in a certain time. He covers **60%** of his journey in $2/5^{th}$ of the time. At what speed (in km/h) should he travel to cover the remaining journey so that he reaches the destination right on time?

(a) 36

(b) 42

(c) 48

(d) 40

Ans. (d)

Q28. Flight A usually takes 1 hour more than Flight B to travel a distance of 7200 km. Due to engine trouble speed of flight B falls by a factor of $1/6^{th}$, so it takes 36 minutes more than flight A to complete the same journey. What is the speed of flight A (in km/hr)?

(a) 800

(b) 900

(c) 750

(d) 720

Ans. (a)

Q29. A man leaves his home and walks at a speed of 12 km per hour, reaching the railway station 10 minutes after the train had departed. If instead he had walked at a speed of 15 km per hour, he would have reached the station 10 minutes before the train's departure. The distance (in km) from his home to the railway station is

(a) 18

(b) 20

(c) 24

(d) 25

Ans. (a)

Q30. The distance from A to B is 60 km. Partha and Narayan start from A at the same time and move towards B. Partha takes four hours more than Narayan to reach B. Moreover, Partha reaches the mid-point of A and B two hours before Narayan reaches B. The speed of Partha, in km per hour, is:
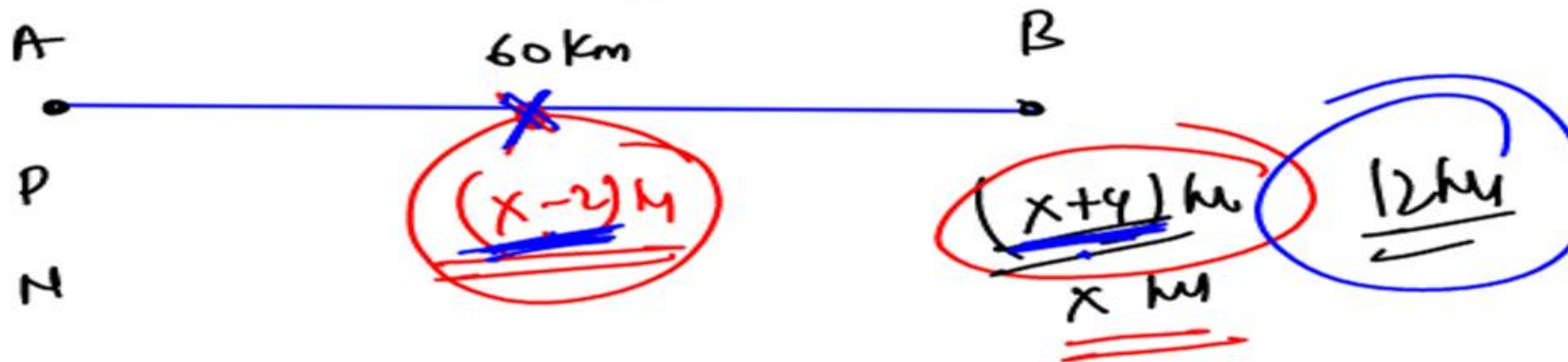
(a) 6

(b) 3

(c) 4

(d) 5

Time → 2 min

A   60 Km   B

P

N

$(x-2)\,hr$ $\dfrac{(x+4)\,hr}{x\,hr}$ $12\,hr$

$$2(x-2) = x+4$$

$$x = 8$$

Ans. (d)