

SOLUTION QUESTIONS

1. (b) $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

$$\therefore \text{Time (समय)} = \frac{4}{45} = \frac{4}{225} \text{ hrs}$$

$$\text{Time (Sec.)} = \frac{4}{225} \times 3600 = 64 \text{ sec}$$

2. (d) Distance (दूरी) = Constant so, Speed
 $\propto \frac{1}{\text{Time}}$

$$\text{Ratio of time (समय का अनुपात)} = 5 : \frac{5}{3}$$

$$\text{Ratio of time} = 3 : 1$$

$$\text{Ratio of speed} = 1 : 3$$

$$1 \text{ unit} \rightarrow 240 \text{ km/hr}$$

$$3 \text{ units} \rightarrow 240 \times 3 = 720 \text{ km/hr}$$

$$\text{So, i.e. Required speed} = 720 \text{ km/hr}$$

3. (c) $\text{Speed} = 30 \text{ km/hr} = 30 \times \frac{5}{18} \text{ m/sec.}$

$$= \frac{25}{3} \text{ m/sec}$$

$$\text{So, Time} = \frac{D}{S} = \frac{100}{25/3} = 12 \text{ sec.}$$

4. (c) time taken at 5 km/hr (5 कि. मी. प्रति घंटे की गति से लिया गया समय) = $\frac{20}{5} = 4 \text{ hrs.}$

$$\text{Actual time (वास्तविक समय)} = \left(4 - \frac{2}{3}\right) = \frac{10}{3}$$

$$\text{hrs.}$$

$$\text{time taken at 8 km/hr (8 कि. मी. प्रति घंटे की गति से लिया गया समय)} = \frac{20}{8} = \frac{5}{2} \text{ hrs.}$$

$$\text{time difference} = \frac{10}{3} - \frac{5}{2} = \frac{5}{6} \text{ hrs.}$$

$$= 50 \text{ min. required time}$$

5. (d) $15 \text{ min} = \frac{1}{4} \text{ hrs.}$

$$1 \text{ hrs} = 5 \text{ kms.}$$

$$\frac{1}{4} \text{ hrs.} = \frac{5}{4} \text{ kms.}$$

So, length of bridge (अतः पुल की लम्बाई)

$$= \frac{5}{4} \text{ kms.} = 1250 \text{ mt.}$$

Alternate:

$$V = 5 \text{ km/hr} = \frac{5 \times 1000}{60} \text{ m/min.}$$

$$= \frac{250}{3} \times 15 = 1250 \text{ mtr.}$$

6. (b) $S = \frac{D}{T} = \frac{250}{75} \text{ m/sec} = \frac{250}{75} \times \frac{18}{5} = 12 \text{ km/hr}$

7. (c) $L_t = L_p = J$

$$S = 90 \text{ km/hr} = \frac{90 \times 1000}{60} \text{ mt./min}$$

$$= 1500 \text{ mt/min}$$

$$\Rightarrow J = L_t = L_p = 750 \text{ mt.}$$

8. (d) Distance travelled in 14 sec. सेकण्ड में तय की गई दूरी = $50 + J$
 distance travelled in 10 sec. (10 सेकण्ड में तय की गई दूरी) = J

So, Speed of train (अतः ट्रेन की गति)

$$= \frac{50}{14 - 10} \text{ m/sec}$$

$$= \frac{50}{4} \times \frac{18}{5} \text{ km/hr} = 45 \text{ km/hr}$$

9. (d) $\text{Speed} = \frac{D}{T} = \frac{200}{24} \text{ m/sec}$
 $= 36 \text{ km/hr}$

10. (d) $\text{Speed} = 10/\text{sec} = 10 \times \frac{18}{5} \text{ km/hr}$
 $= 36 \text{ km/hr}$

11. (b) $\text{Speed} = \frac{150}{25} \text{ m/sec} = 6 \times \frac{18}{5} \text{ km/hr}$
 $= 21.6 \text{ km/hr}$

12. (c) Distance covered in 100 sec. (100 सेकंड में तय की गई दूरी) = $800 + J$ Distance covered in 60 sec. (60 सेकंड में तय की गई दूरी) = $400 + J$
 So, distance covered in 40 sec (अतः 40 सेकंड में तय की गई दूरी)

$$\text{Speed} \rightarrow \frac{400}{40} \text{ m/sec.} = 10 \text{ m/s}$$

Distance covered in 60 sec (60 सेकेंड में तय की गई दूरी)

$$= 10 \times 60 = 600 \text{ meter}$$

$$\text{So, } 400 + j = 600$$

$$\Rightarrow j = 200 \text{ meter}$$

$$13. \quad (b) \quad \text{Speed} = \frac{D}{T} = \frac{125}{30} \text{ m/sec.}$$

$$= \frac{125}{30} \times \frac{18}{5} \text{ km/hr}$$

$$= 15 \text{ km/hr}$$

$$14. \quad (a) \quad \text{Speed} = \frac{120}{10} \text{ m/sec.} = 12 \text{ m/sec}$$

$$15. \quad (c) \quad T = \frac{D}{S} = \frac{75 \times 18}{20 \times 5} = \frac{27}{2} \text{ sec.}$$

$$= 13.5 \text{ sec.}$$

16. (b) Distance travelled in 8 sec (8 सेकेंड में तय की गई दूरी) = $j + 264$

$$\text{Speed} = \frac{j+264}{20-8} \text{ m/sec.} = \frac{264}{12}$$

$$= 22 \text{ m/sec.}$$

Distance travelled in 8 sec (8 सेकेंड में तय की गई दूरी) = $j = 8 \times 22 = 176 \text{ mt}$

$$17. \quad (d) \quad \begin{array}{lcl} \text{Actual} & : & \text{Reduced} \\ \text{Ratio of speed} = & 15 & : \quad 14 \\ \text{Ratio of time} = & 14 & : \quad 15 \end{array}$$

$$14 \rightarrow 28 \text{ hrs}$$

$$15 \rightarrow 30 \text{ hrs}$$

So, in 2 hrs it travels 10 kms (अतः 2 घंटे में यह 10 कि.मी. दूरी तय करेंगी)

$$\text{Speed} = \frac{10}{2} = 5 \text{ km/hr}$$

18. (d) Speed of the train is (ट्रेन की गति)
= 180 km/hr

$$\therefore 1 \text{ km/hr} = \frac{5}{18}$$

because, 1 km = 1000 metres

$$1 \text{ hrs} = 60 \times 60 \text{ second}$$

$$= \frac{1000}{60 \times 60} \Rightarrow \frac{5}{18} \text{ m/s}$$

$$\therefore \text{Speed in m/s} = 180 \times \frac{5}{18}$$

$$= 50 \text{ m/s}$$

19. (c) Let the length of the train (माना कि ट्रेन की लम्बाई) = j meter

and the length of the platform j_1

(और प्लेटफार्म की लम्बाई) = 162 metres another platform's length j_2 (दूसरे प्लेटफार्म की लम्बाई) = 120 metres

(when a train crosses a platform i.e. it covers the equal distance of length of train + length of platform) (जब एक ट्रेन एक प्लेटफार्म को पार करती है तो वह अपनी लम्बाई तथा प्लेटफार्म की लम्बाई के बराबर दूरी तय करती है)

ATQ

$$\frac{j+j_1}{\text{Speed}} = \text{time}_1 = \frac{j+162}{\text{Speed}} = 18 \text{ second}$$

$$= \frac{j+162}{18} = \text{Speed} \quad \dots\dots (i)$$

Again,

$$\frac{j+j_2}{\text{Speed}} = \text{time}_2$$

$$= \frac{j+120}{\text{Speed}} = 15 \text{ second}$$

$$= \frac{j+120}{15} = \text{Speed} \quad \dots\dots (ii)$$

(i) = (ii) because speed of the same train is

$$\text{equal} = \frac{j+162}{6} = \frac{j+120}{15}$$

$$\Rightarrow \frac{j+162}{6} = \frac{j+120}{5}$$

$$\Rightarrow 5j + 810 = 6j + 720$$

$$\Rightarrow 6j - 5j = 810 - 720$$

$$\Rightarrow j = 90 \text{ metres}$$

So the length of the train is 90 metres.
(अतः ट्रेन लम्बाई 90 मीटर है)

Alternate:-

$$\text{Length of the train} = \frac{j_1 t_2 - j_2 t_1}{t_1 - t_2}$$

$$= \frac{162 \times 15 - 120 \times 180}{18 - 15}$$

$$= \frac{3(162 \times 5 - 120 \times 6)}{3} = \mathbf{90 \text{ metres}}$$

20. (d) \therefore Speed of the running train is (ट्रेन की गति)
= 90 km/hr Length of the train is (ट्रेन की लम्बाई) = 120 metres

We know that,

What A train crosses through the platform, it covers the equal distance of the length of platform + length of train (जब एक ट्रेन एक प्लेटफार्म को पार करती है तो वह अपनी लम्बाई तथा प्लेटफार्म की लम्बाई के बराबर दूरी तय करती है)

So, the time will be taken by the train =

$$\frac{\text{Length of train + Length of platform}}{\text{Speed}}$$

$$= \frac{(120 + 230) \text{ metre}}{90 \text{ km/h}} = \frac{350 \times 18}{90 \times 5} = 14 \text{ second}$$

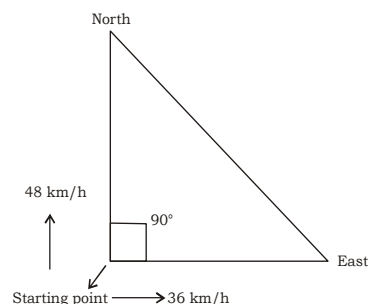
21. (d) The length of pole is considered as negligible i.e. = 0

i.e. When A train crosses a pole, it covers the distance of the length of itself.

the time is taken by the train = 60 kmh \times 30 seconds

$$= 60 \times \frac{5}{18} \times 30 \text{ metres}$$

$$= 10 \times \frac{5}{3} \times 30 = 500 \text{ metres}$$



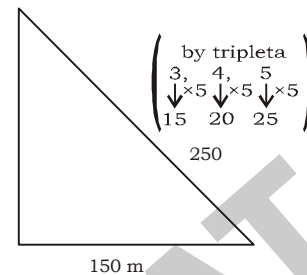
22. (d)

\Rightarrow Distance, covered by car in 15 seconds with the speed of 48 kmph towards the north (उत्तर दिशा में 48 कि. मी. प्रति घंटे की गति से 15 सेकेंड में कार द्वारा तय की गई दूरी)

$$= 48 \times \frac{5}{18} \times 15 = 25 \times 8 = 200 \text{ m}$$

\Rightarrow Distance, covered by car is 15 second with the speed 36 km/h towards the East. (पूर्व दिशा में 36 कि.मी. प्रति घंटे की गति से 15 सेकेंड में कार द्वारा तय की गई दूरी)

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



After 15 seconds the distance between both the conditions of car is (15 सेकेंड के बाद कार के दोनों स्थितियों के बीच की दूरी) = 250 m

23. (d) total distance covered by the train in 30 seconds with the speed of 30 m/s is (30 मीटर प्रति सेकेंड की गति से 30 सेकेंड में ट्रेन द्वारा तय की गई दूरी) = $30 \times 30 \text{ m/s} = 900 \text{ metres}$

Total distance = train's distance + platform's distance

900 = train's distance + 600 (when train crosses through platform it covers equally distance of length of train + length of platform)

Alternate :-

$$\text{Time} = \frac{\text{distance}}{\text{speed}} \times 30 \text{ sec}$$

$$= \frac{\text{Platform + train length}}{\text{speed}}$$

$$30 = \frac{600 + \text{train}}{30}$$

$$\text{train's length} = 900 - 600 = 300 \text{ metres}$$

24. (a) Speed of the train's $\frac{\text{Distance}}{\text{time}} = \frac{120}{6} = 20 \text{ m/s} \Rightarrow \mathbf{72 \text{ km/h}}$

25. (c) A : B length

Ratio of A and $\Rightarrow 5 : 3 (5s : 3x)$

B's length

Ratio of A and $\Rightarrow 6 : 5 (6y : 5y)$ B's speed

We know that,

When a train crosses a pole, i.e. it covers the distance equal to its length.
(जब एक ट्रेन किसी खंभे को पार करती है) Time taken by train A to cross the pole

$$= \frac{\text{Total distance}}{\text{Speed}} = \frac{5x}{6y}$$

Time, taken by train B to cross the pole

$$= \frac{\text{Total distance}}{\text{Speed}} = \frac{3x}{5y}$$

A : B

Ratio of their time (अनके समय का अनुपात)

$$= \frac{5x}{6y} : \frac{3x}{5y} : 18$$

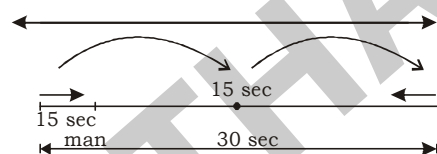
Alternate :-

Ratio of length

$$\begin{array}{cc} 5 & : & 3 \\ 6 & : & 5 \end{array}$$

Ratio of speed

Ratio of time to cross a pole (खंभे का पार करने में लगे समय का अनुपात) = $5 \times 5 : 6$



26. (b)

i.e. train crosses platform in (ट्रेन प्लेटफार्म को पार करेगी) $(30 - 15) = 15$ second speed of

$$\text{train (ट्रेन की गति)} = \frac{60}{15} = 4 \text{ m/s}$$

$$\text{Speed of train (ट्रेन की गति)} = 4 \times \frac{18}{5} \text{ km/h} = 14.4 \text{ km/h}$$

$$27. (c) \text{ Time} = \frac{D}{S} = \frac{300 + 200}{25} = 20 \text{ sec.}$$

$$28. (b) \text{ Speed} = 78 \text{ km/hr}$$

$$= \frac{78}{60} \times 1000 \text{ m/min} = 1300 \text{ m/min}$$

Distance travelled in 1 min. (1 मिनट में तय की दूरी)

1300 mtr.

$$\Rightarrow 1300 = l + 800$$

$$\Rightarrow l = 500 \text{ mt.} = \text{length of tunnel}$$

$$29. (b) \text{ Speed} = 32 \text{ km/hr} = 32 \times \frac{5}{18} \text{ m/sec} = \frac{110}{3} \text{ m/sec}$$

$$T = \frac{D}{S} = \frac{110 + 165}{\frac{110}{3}} = \frac{3(275)}{110} = 7.5 \text{ sec.}$$

$$30. (a) \text{ Speed} = 144 \text{ /hr} = 144 \times \frac{5}{2} = 2.5 \text{ sec} = 40 \text{ m/sec}$$

$$T = \frac{D}{S} = \frac{100}{40} \text{ sec.} = \frac{5}{2} = 2.5 \text{ sec}$$

$$31. (c) \text{ Speed} = \frac{D}{T} = \frac{120}{9} \text{ m/s} = \frac{120}{9} \times \frac{18}{5} \text{ km/hr} = 48 \text{ km/hr}$$

$$32. (c) \therefore \text{truck covers in a minute (एक मिनट में ट्रक द्वारा तय की गई दूरी)} = 550 \text{ metres then the speed of the truck will be (तो ट्रक की गति)} \frac{550 \rightarrow \text{metres}}{60 \rightarrow \text{second}} \left\{ \text{speed} = \frac{\text{Distance}}{\text{Time}} \right\} (1$$

$$\text{minute} = 60 \text{ second}) = \frac{550}{60} \Rightarrow \frac{55}{6} \text{ m/s} \dots\dots\dots(i)$$

whereas, Bus covers in 45 minutes (जबकि 45 मिनट में बस द्वारा तय की गई दूरी) = 33 kms. then the speed of the bus will be (बस की

$$\text{गति)} = \frac{33 \text{ kms}}{45 \text{ minutes}}$$

$$\Rightarrow \frac{33 \times 1000}{45 \times 60} \left\{ \begin{array}{l} 1 \text{ km} = 1000 \text{ metres} \\ 1 \text{ min} = 60 \text{ second} \end{array} \right\}$$

$$\Rightarrow \frac{110}{9} \text{ m/s}$$

So, the Ratio of their speed will be (अतः उनकी गति का अनुपात होगा)

$$= \frac{55}{6} : \frac{110}{9}$$

$$= \frac{1}{2} : \frac{2}{3} = 3 : 4$$

(Truck : Bus)

Alternate:-

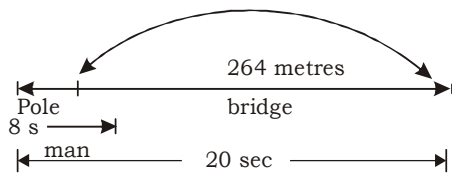
$$\therefore \left\{ \text{speed} = \frac{\text{Distance}}{\text{Time}} \right\}$$

$$\text{Ratio (Truck : Bus)} = \frac{550}{60} \text{ m/s}$$

$$: \frac{33 \times 1000}{45 \times 60} = 3 : 4$$

33. (d) A pole has negligible length regarding a length of train (एक ट्रेन की तुलना में एक पोल की लम्बाई ही तय करती है।)

$$20 - 8 = 12 \text{ second}$$



i.e. train crosses only bridge in (ट्रेन पुल को पार करेगी) = 12 second then the speed of

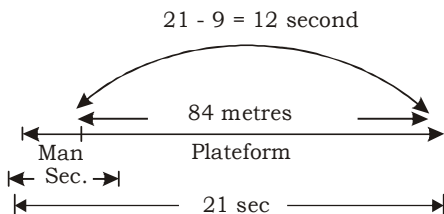
$$\text{train (तो ट्रेन की गति)} = \frac{264 \text{ metre}}{12 \text{ second}}$$

$$= \left\{ \text{speed} = \frac{\text{Distance}}{\text{Time}} \right\}$$

$$= 22 \times \frac{18}{5} = 79.2 \text{ km/h}$$

$$\left\{ \therefore 1 \text{ m/s} = \frac{18}{5} \text{ km/h} \right\}$$

34. (a) \therefore Pole, man post office box, tree have negligible length. (खंभा, पुरुष, डालबक्से वृक्ष की लम्बाई नगण्य होती है)



i.e. train crosses only bridge in = 12 seconds then the speed of train

$$= \frac{84 \text{ metres}}{12 \text{ second}} \left\{ \text{speed} = \frac{\text{Distance}}{\text{Time}} \right\}$$

$$= 7 \text{ m/s} = 7 \times \frac{18}{5} = \frac{126}{5}$$

$$= 25.2 \text{ km/h}$$

35. (a) Boy runs a distance of 20 km in 2.5 hrs. (2.5 घंटे में लड़का 20 कि.मी दौड़ता है) speed of boy (लड़के की गति)

$$= \frac{20 \text{ kms.}}{\frac{5}{2} \text{ hrs}} \left\{ \text{Time} = \frac{\text{Distance}}{\text{speed}} \right\} = 8 \text{ km/hr}$$

If the speed is doubled the new speed will be (यदि गति दोगुनी कर दी जाती है तो नयी गति)

$$= 8 \times 2 = 16 \text{ km/hr}$$

then the time will be taken by the boy to run = 32 kms (तो 32 कि. मी. दौड़ने में लड़के द्वारा लिया गया समय)

$$\text{time} = \frac{32}{16} = 2 \text{ hrs.}$$

$$\left\{ \text{Time} = \frac{\text{Distance}}{\text{Speed}} \right\}$$

36. (d) Let the speed of the train (माना की ट्रेन की गति)

= x m/s and length = j m According to the question time. taken by train to cross the platform (प्लेटफार्म को करने में ट्रेन द्वारा लिया गया समय)

$$= 17 \text{ second}$$

i.e

$$= \frac{j+122}{\text{speed}} = 17$$

$$j + 122 = 17 \text{ speed}$$

$$j = 17 \text{ speed} - 122 \quad \dots(i)$$

\Rightarrow = Time, taken by train to cross the bridge (पुल को पार करने में ट्रेन द्वारा लिया गया समय)

$$= 25 \text{ second}$$

$$\frac{j+210}{\text{speed}} = 25$$

$$j + 210 = 25 \text{ speed}$$

$$j = 25 \text{ speed} - 210 \quad \dots\dots(i)$$

\therefore length of the train is same

$$\therefore (i) \dots (ii)$$

$$17 \text{ speed} - 122 = 25 \text{ speed} - 210$$

$$8 \text{ speed} = 210 = 122 = 25 \text{ speed} - 210$$

$$8 \text{ speed} = 88$$

$$\text{speed} = 11 \times \frac{18}{5} = \frac{198}{5} = 39.6 \text{ km/h}$$

Alternate:

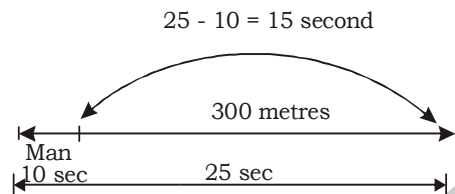
Difference of the length of the objects which is crossed by train and the result is divided by difference of time (ट्रेन द्वारा पार की जाने वाली वस्तुओं की लंबाई के आंतर में समय के अंतर से भाग दिया जाता है)

Speed of train (ट्रेन की गति)

$$= \frac{(210 - 122)}{(25 - 17)} = 11 \text{ m/s}$$

$$= 11 \times \frac{18}{5} = 39.6 \text{ km/h}$$

37. (c)



If train crosses the platform i.e. it covers the distance equal the length of train and platform (यदि ट्रेन प्लेटफार्म को पार करती है तो वह अपनी लंबाई के बराबर तथा प्लेटफार्म की लंबाई के बराबर दूरी तय करती है)

⇒ In the question train crosses the man who stands on the platform in 10 seconds and crosses the man + platform in 25 seconds i.e. train crosses the platform which length is 300 metres in $25 - 10 = 15$ second here train's length is not added. (इस प्रश्न में प्लेटफार्म पर खड़े व्यक्ति को 10 सेकण्ड में पार करती है इसका मतलब है कि ट्रेन 300 मीटर लम्बे प्लेटफार्म को $25 - 10 = 15$ सेकण्ड में पार करती है, यहाँ ट्रेन की लम्बाई नहीं जोड़ी गई है)

So speed of the train (अतः ट्रेन की गति) =

$$\frac{300}{15} \Rightarrow 20 \text{ m/sec}$$

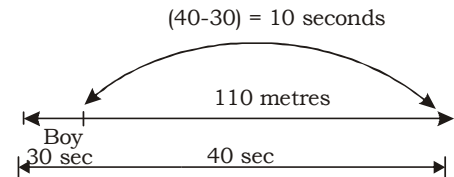
⇒ length of the train (ट्रेन की लंबाई) = $10 \times 20 = 200$ metres (In train crosses the only man in 10 seconds)

⇒ Time, taken by the train to cross a platform 200 metre long (200 मीटर लम्बे प्लेटफार्म को पार करने में ट्रेन द्वारा लिया गया समय) =

$$\frac{(200 + 200)}{20} = \frac{400}{20}$$

Time taken by train (ट्रेन के द्वारा लिया गया समय) = 20 seconds.

38. (d)



According to the explanation of question (101)

$$\Rightarrow \text{Speed of the train (ट्रेन की गति)} = \frac{110}{10} =$$

$$11 \text{ m/s}$$

⇒ Length of the train (ट्रेन की गति) = $30 \times 11 = 330$ metres (If train crosses a man, it crosses itself)

Alternate:-

⇒ Let the speed of the train (माना कि ट्रेन की गति)

$$= x \text{ metre/second}$$

⇒ and length = l metre

⇒ According to the question,

$$\Rightarrow \text{Length of the train (ट्रेन की लंबाई)} l = (x \times 30) \text{ metre} \dots (i)$$

In the respect of bridge

$$\frac{l + 110}{x} = 40 \text{ second}$$

$$\left[\frac{\text{Distance}}{\text{speed}} = \text{time} \right] \Rightarrow \frac{30x + 110}{x}$$

$$= 40 \Rightarrow 30x + 110 = 40x$$

$$\Rightarrow 10x = 110$$

$$\Rightarrow x = 11 \text{ m/s}$$

$$\Rightarrow \text{speed} = 11 \text{ m/s}$$

$$\Rightarrow \text{then length} = (30 \times x) \text{ metres } 30 \times 11 = 330 \text{ metres}$$

39. (c) Let the speed of train (माना कि ट्रेन की गति) = $x \text{ m/s}$

⇒ Length of train (ट्रेन की लंबाई)

$$= l \text{ metres}$$

$$\text{ATQ} \Rightarrow \frac{l + 162}{x} = 18$$

$$\left[\frac{\text{Distance}}{\text{speed}} = \text{time} \right]$$

$$\Rightarrow j + 162 = 18x$$

$$\Rightarrow \text{length} = 18x - 162 \quad \dots(i)$$

Again,

$$\frac{j+120}{x} = 15$$

$$\Rightarrow j + 120 = 15x$$

$$\Rightarrow \text{length} = 15x - 120 \quad \dots(ii)$$

\Rightarrow length of the train is equal (ट्रेन की लंबाई बराबर है)

$$(i) = (ii)$$

$$\Rightarrow 18x - 162 = 15x - 120$$

$$\Rightarrow 3x = 42$$

$$\Rightarrow x = 14 \text{ m/s}$$

$$\Rightarrow \text{Speed of train (ट्रेन की गति)} = 14 \text{ m/s} \\ = 50.4 \text{ km/h.}$$

Alternate:-

Speed of train

$$\frac{\text{Difference of platform length}}{\text{Difference of time taken to cross the platform}}$$

$$\Rightarrow \frac{162 - 120}{18 - 15}$$

$$\Rightarrow \text{Speed} = 14 \text{ m/s.} = 50.4 \text{ km/h}$$

40. (a) **Shortcut:-**

Speed of the train, when it crosses two bridges (ट्रेन की गति जब वह दो पुलों को पार करती है)

$$\Rightarrow \text{Speed} = \frac{\text{Diff. of the length of platform}}{\text{Diff. of time taken to cross platform}}$$

$$= \frac{(300 - 240) \text{ metres}}{(21 - 18) \text{ sec.}} = \frac{60}{3} \Rightarrow 20 \text{ m/s}$$

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

Alternate:-

Let the speed of train (माना कि ट्रेन की गति) =

$x \text{ m/s}$

Length of train (ट्रेल की लंबाई) = j metres

\Rightarrow According to the question,

\Rightarrow First situation

$$\Rightarrow \frac{j+300}{x} = 21$$

$$\text{Length} = 21x - 300 \quad \dots(i)$$

Again,

$$\frac{j+240}{x} = 18$$

$$\text{length} = 18x - 240 \quad \dots(ii)$$

\therefore length is equal

\Rightarrow Therefore

$$(i) = (ii)$$

$$\Rightarrow 21x - 300 = 18x - 240$$

$$\Rightarrow 3x = 60$$

$$\Rightarrow x = 20 \text{ m/s}$$

\Rightarrow Speed in kmph (गति कि.मी प्रति घंटे में)

$$= 20 \times \frac{18}{5} = 72 \text{ kmph}$$

41. (b) Given:

\Rightarrow Speed of Running train (चलती हुए ट्रेन की गति)

$$= 60 \text{ km/hr}$$

\Rightarrow Length of Running train (चलती हुई ट्रेन की लंबाई) = 110 metres

\Rightarrow Length of standing train (रूके हुए ट्रेन की लंबाई) = 170 metres

\Rightarrow Speed of the standing train (रूके हुए ट्रेन की गति) = 0 km/hr

\Rightarrow Time taken by Running train to cross the standing train (चलती हुई ट्रेन द्वारा रूकी हुई ट्रेन को पार करने में लगा समय)

$$= \frac{(110 + 170) \text{ metres}}{60 \text{ km/hr}}$$

$$\Rightarrow \text{time} = \frac{280 \times 18}{60 \times 5}$$

$$\Rightarrow \text{time} = 16.8 \text{ seconds}$$

42. (b) We know when a train crosses a pole/man tree in this case it crosses itself. (इस मामले में कि जब एक ट्रेन किसी खंभे को या किसी व्यक्ति को पार करती है तो वह अपनी लंबाई के बराबर दूरी तय करती है)

⇒ therefore,

⇒ Length of the train (ट्रेन की लंबाई)
= Speed × time

$$\Rightarrow \text{Length} = 36 \times \frac{5}{18} \times 25 \text{ metre}$$

Length of train (ट्रेन की लंबाई)
= **250 metres.**

43. (c) Given.

Ist : 2nd train Ratio of speed of trains

(ट्रेनों की गति अनुपात) = 6 : 7

⇒ Second train covers 364 km in 4 hours
then its speed (दूसरी ट्रेन चार घंटे में 364 कि.मी.
की दूरी तय करती है, तो उसकी गति) = 7 Ratio but
actual speed = 91 km/hr. i.e. 7 ratio → 91

⇒ 1 ratio → 13 km.

Therefore.

Speed of the first train is (पहली ट्रेन की गति)

$$\Rightarrow 6R \Rightarrow 6 \times 13 = 78 \text{ km/hr}$$

44. (b) Total distance = $4 \times 3\frac{3}{4} = 15 \text{ km}$

$$= \text{Time taken on cycle} = \frac{15}{16.5} \times 60 = 54.55 \text{ minutes}$$

45. (d) Speed of train = $\frac{700+500}{10} = 12 \text{ ft/second}$

46. (a)

Actual	New
Speed 4	3
time 3	4

→ $3/2$

$$\text{Normal time} = 3 \times \frac{3}{2} = 4\frac{1}{2} \text{ hrs.}$$

47. (a)

Actual	New
Speed 7	6
time 6	7

$$1 \text{ unit} \rightarrow 25 \text{ minutes}$$

$$6 \text{ unit} \rightarrow 150 \text{ minutes}$$

= usual time = 2 hours 30 minutes

48. (b)

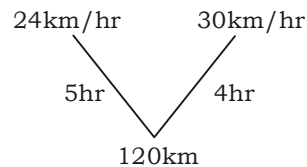
Actual	New
Speed 7	6
time 6	7

$$1 \text{ unit} \rightarrow 12 \text{ minutes}$$

$$6 \text{ unit} \rightarrow 72 \text{ minutes}$$

= usual time = 1 hours 12 minutes

49. (c)

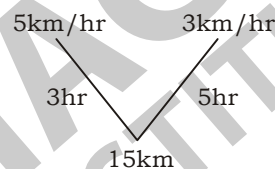


$$= (5 - 4) = 1 \text{ unit} \rightarrow \frac{11}{60}$$

$$120 \text{ unit} \rightarrow \frac{11}{60} \times 120 = 22 \text{ km}$$

∴ distance from house to office (घर से कार्यालय की दूरी) = 22 km

50. (c)



$$= 5 - 3 = 2 \text{ units} \rightarrow \frac{24}{60}$$

$$1 \text{ unit} \rightarrow \frac{1}{5}$$

$$15 \text{ unit} \rightarrow \frac{1}{5} \times 15 = 3 \text{ km}$$

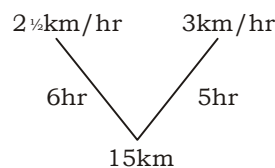
= Required distance (अभीष्ट दूरी) = 3 km

Alternate:-

$$D = \frac{S_1 \times S_2}{S_1 - S_2} \times T(\text{hour})$$

$$D = \frac{5 \times 3}{5 - 3} \times \frac{24}{60} = 3 \text{ km}$$

51. (b)

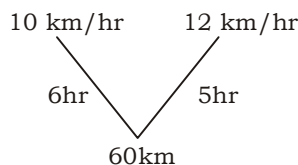


$$= 6 - 5 = 1 \text{ unit} \rightarrow \frac{16}{60}$$

$$15 \text{ unit} \rightarrow \frac{16}{60} \times 15 = 4$$

= Required distance = 4 km

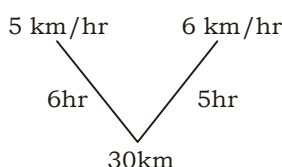
52. (c)



$$= 6 - 5 = 1 \text{ unit} \rightarrow \frac{12}{60} = \frac{1}{5}$$

$$= 60 \text{ unit} \rightarrow \frac{1}{5} \times 60 = 12$$

53. (a)



$$= 6 - 5 = 1 \text{ unit} \rightarrow \frac{7+5}{60} = \frac{1}{5}$$

$$30 \text{ units} \rightarrow \frac{1}{5} \times 30 = 6 \text{ km}$$

54. (c) $1 \text{ km/hr} = \frac{5}{18} \text{ m/s}$

$$= 90 \text{ km/hr} = 90 \times \frac{5}{18} = 25 \text{ m/s}$$

55. (a) Required distance = $72 \times \frac{5}{18} \times 5 = 100 \text{ m}$

56. (c) Speed 4 3
time 3 4

$$1 \text{ unit} \rightarrow 1/2$$

$$4 \text{ units} \rightarrow 2 \text{ hr}$$

$$= \text{distance} = 3 \times 2 = 6 \text{ km}$$

57. (c) Total time taken by train (ट्रेन के द्वारा लिया गया

$$\text{समय}) = 10 \frac{1}{2} \text{ hr}$$

$$= \text{Total distance} = 10 \frac{1}{2} \times 40 = 420 \text{ km}$$

58. (b) speed of train (ट्रेन की गति) = $\frac{10 \times 60}{12} = 50 \text{ km/hr}$

$$= \text{New speed} = 50 - 5 = 45 \text{ km/hr}$$

$$= \text{Required time} = \frac{10}{45} = \frac{2}{9} \times 60$$

$$= 13 \text{ minutes } 20 \text{ second}$$

59. (b) speed of the man (पुरुष की गति) = $\frac{a}{b} \text{ km/hr}$

$$\text{Required time} = \frac{200}{1000} \times \frac{b}{a} = \frac{b}{5a} \text{ hours}$$

60. (d) $1 \text{ m/sec} = \frac{18}{5} \text{ km/hr}$

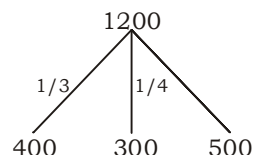
$$\frac{10}{3} \text{ m/sec} = \frac{10}{3} \times \frac{18}{5} = 12 \text{ km/hr}$$

61. (d) Length of the train (ट्रेन की लंबाई) = $90 \times \frac{5}{18} \times 10$
= 250 metres

62. (a) Relative speed of man & train (पुरुष तथा ट्रेन की सापेक्ष गति) = $\frac{100 \times 5}{36} \times \frac{18}{5}$
= 50 km/hr

$$= \text{speed of train (ट्रेन की गति)} = 50 - 5 = 45 \text{ km/hr}$$

63. (b) Let the total distance (माना कि कुल दूरी) = 1200 km



Total time taken (लिया गया कुल समय)

$$= \frac{400}{25} + \frac{300}{30} + \frac{500}{50}$$

$$16 + 10 + 10 = 36 \text{ hours}$$

Average speed =

$$\frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{1200}{36} = 33 \frac{1}{3} \text{ km/hr}$$

64. (a) Let the distance between Allahabad and Nagpur (माना कि ईलाहाबाद तथा नागपुर के बीच की दूरी है)

$$= 300 \text{ km}$$

$$\text{Total time taken (लिया गया कुल समय)} = \frac{300}{100} + \frac{300}{150} = 5 \text{ hr}$$

$$\text{Average speed} = \frac{300+300}{5} = 120 \text{ km/hr}$$

Alternate:- Average speed =

$$\frac{2xy}{x+y} = \frac{2 \times 150 \times 100}{250} = 120 \text{ km/hr}$$

$$65. \text{ (b) Total distance} = 6 \times 5 + 3 \times 6 = 48 \text{ km}$$

$$\text{Total time} = 6 + 3 = 9 \text{ hrs}$$

$$= \text{Average speed} = \frac{48}{9} = 5\frac{1}{3} \text{ km/hr}$$

$$66. \text{ (b) Let the length of each train (माना कि प्रत्येक ट्रेन की लंबाई)} = l$$

$$\text{Relative speed (सापेक्ष गति)} = (46 - 36) \times \frac{5}{18}$$

$$= \frac{25}{9} \text{ m/s}$$

According to the question,

$$= 2l = \frac{25}{9} \times 36 = 1 = 50 \text{ m}$$

$$\text{length of each train (प्रत्येक ट्रेन की लंबाई)} = 50 \text{ m}$$

$$67. \text{ (c) Relative speed} = (45 - 40) \times \frac{5}{18} = \frac{25}{18} \text{ m/s}$$

$$= \text{Required distance} = \frac{25}{18} \times 45 \times 60$$

$$= 3750 \text{ metres or } 3.75 \text{ km}$$

$$68. \text{ (b) } 1 \text{ m/s} = \frac{18}{5} \text{ km/h}$$

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

$$69. \text{ (b) speed of the train (ट्रेन की गति)} = \frac{20}{24} = 50 \text{ km/hr}$$

hr

$$\text{New speed} = 50 - 5 = 45 \text{ km/hr}$$

$$\text{Required time} = \frac{20}{45} = \frac{4}{9} \text{ hr}$$

$$= 26 \text{ min } 40 \text{ sec}$$

$$70. \text{ (b) Let the speed of the cars be } S_1 \text{ and } S_2 \text{ (माना कि करो की गति } S_1 \text{ और } S_2)$$

$$= S_1 - S_2 = \frac{70}{7} = 10 \dots(i)$$

$$\text{and } S_1 + S_2 = \frac{70}{1} = 70 \dots(iii)$$

from equation (i) and (ii)

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

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

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

71. (a) In these type of question go through options to save your valuable time (इस प्रकार के प्रश्नों में अपने बहुमूल्य समय की बचत के लिए विकल्पों को ध्यान से देखें)

option (a):-

$$\text{Abhay's speed (अभय की गति)} = 5 \text{ km/hr}$$

$$\text{Abhay's time (अभय का समय)} = \frac{30}{5} = 6 \text{ hr}$$

$$\text{Sammer's time (समीर का समय)} = 6 - 2 = 4 \text{ km}$$

$$\text{Abhay's new time (अभय का नया समय)} = \frac{30}{5 \times 2} = 3 \text{ hr}$$

Hence option (a) is correct as it satisfies all conditions.

$$72. \text{ (b) Relative speed (सापेक्ष गति)} = 24 - 18 = 6 \text{ km/hr}$$

time required by faster train to overtake slower train (तेज ट्रेन द्वारा धीमे ट्रेन को ओवरटेक करने में लगा समय)

$$= \frac{27}{6} = 4\frac{1}{2} \text{ hr}$$

= distance between Q and R (Q और R के बीच की दूरी)

$$= 18 \times 4\frac{1}{2} = 81 \text{ km.}$$

73. (b)

Train	Car
60km	240km
100km	200km
300km	0km
4hr	4hr
10min	10min
5hr	5hr

+40 () +10min

+200 () +10x5 = 50 min

$$\text{Speed of train} = \frac{300}{5} = 60 \text{ km/hr}$$

74. (c) In these type of question use the given below formula to save your valuable time. (इस प्रकार के प्रश्नों में अपने बहुमूल्य समय की बचत के लिए नीचे दी गई विधि का प्रयोग करें)

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

where S_1 , S_2 and T_1 , T_2 are the respective speeds and times of the objects.

$$\frac{45}{S_2} = \sqrt{3\frac{1}{3} \div 4\frac{4}{5}}$$

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

$$= \text{Required Speed} = 54 \text{ km/hr}$$

75. (c) Total distance (कुल दूरी) = 120 km

$$\Rightarrow \text{Total time} = 15 \text{ hours}$$

$$\Rightarrow \text{He covers half of the journey } \frac{3}{5} \text{ th the time}$$

(वह आधी यात्रा $\frac{3}{5}$ भाग समय में तय करता है)

$$= 15 \times \frac{3}{5} = 9 \text{ hours}$$

$$\Rightarrow \text{Remaining distance (शेष दूरी)} = 120 - 60 = 60 \text{ km.}$$

$$\Rightarrow \text{Remaining time (शेष समय)} = 15 - 9$$

$$\Rightarrow 6 \text{ hours}$$

\Rightarrow Average speed to cover a distance of 60 km will be (60 किमी. दूरी तय करने में औसत गति होगी) =

$$\frac{60 \text{ km}}{60 \text{ hour}}$$

$$\left\{ \text{speed} = \frac{\text{distance}}{\text{time}} \right\}$$

$$\Rightarrow \text{Avg. speed} \Rightarrow 10 \text{ km/hr}$$

76. (b) Train covers a certain distance in 210 minutes at a speed of 60 kmph. (60 किमी. प्रति घंटे की गति से 210 मिनट में ट्रेन द्वारा एक निश्चित दूरी तय की गई)

$$\Rightarrow \text{Total distance, covered by train} = 60 \times \frac{210}{60}$$

$$= 210 \text{ kms.}$$

Therefore, the time taken by the train, to cover

the same distance i.e. 210 kms at a speed of 80 kmph is (अतः 80 किमी. प्रति घंटे की गति से 210 किमी. की दूरी तय करने में ट्रेन द्वारा लिया गया समय)

$$= \frac{210}{80} \text{ time} = 2\frac{5}{8} \text{ hours}$$

77. (b) Total stops will be taken by the man to cover

$$\text{a distance of 90 km is} = \frac{90}{7}$$

$$\Rightarrow 12 \text{ stops} + 6 \text{ km}$$

$$\Rightarrow \text{Time taken in 12 stops}$$

$$= 12 \times 6 \text{ min.}$$

$$= 72 \text{ min (1 hour 12 min)}$$

$$\Rightarrow \text{Time taken by the man to cover 90 km with}$$

$$18 \text{ km/hr without stops} = \frac{90}{18}$$

$$= 5 \text{ hours}$$

$$\Rightarrow \text{Total time to cover total distance (कुल दूरी तय करने में जगा समय)} = 5 \text{ hour} + 1 \text{ hour 12 min} = 6 \text{ hours 12 min.}$$

78. (a) We know that,

$$1 \text{ km/hr} = \frac{5}{18} \text{ m/s}$$

$$\left\{ 1 \text{ km/hr} = \frac{1000 \text{ m}}{60 \times 60 \text{ s}} \right\}$$

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

$$\Rightarrow \text{Then, } 30.6 \text{ km/hr} = 30.6 \times \frac{5}{18} \text{ m/s}$$

$$= 1.7 \times 5 = 8.5 \text{ m/s}$$

79. (c) man covers $\frac{9}{20}$ of the journey by bus (व्यक्ति

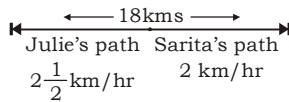
अपनी यात्रा का $\frac{9}{20}$ भाग बस से तय करता है)

$$\Rightarrow \text{Remining journey (शेष यात्रा)} = 1 - \frac{9}{20} = \frac{11}{20}$$

$$\Rightarrow \text{According to question, } \frac{11}{20} \text{ of the journey} =$$

$$\frac{20}{11} \times 10 = 18.18 \text{ km.}$$

80. (a)



Their relative speed in opposite direction (विपरीत दिशा में उनकी सापेक्ष गति)

$$= 2\frac{1}{2} \text{ km/h} + 2 \text{ km/hr}$$

$$= 4\frac{1}{2} \text{ km/hrs}$$

⇒ Time taken by them to cover a distance of

$$18 \text{ kms is } (18 \text{ कि.मी. उसके द्वारा लिया गया समय}) = \frac{18}{\frac{9}{2}}$$

$$\left\{ \text{time} = \frac{\text{distance}}{\text{speed}} \right\}$$

Required time = 4 hours.

81. (c) Distance covered by train at 36 kmph in 55 seconds is (55 सेकेण्ड में 36 कि.मी. प्रति घंटे की गति से ट्रेन द्वारा तय की गई दूरी) = 36 kmph × 55 second (distance = time × speed)

$$= 36 \times \frac{5}{18} \text{ m/s} \times 55 \text{ second}$$

$$= 550 \text{ metre}$$

$$\Rightarrow 550 \text{ metre} = \text{total distance}$$

$$\Rightarrow 550 \text{ metre} = \text{train's length} + \text{length of bridge}$$

$$\Rightarrow 550 \text{ metre} = 200 \text{ m} + \text{length of bridge}$$

$$\Rightarrow \text{length of bridge (पुल की लंबाई)} = 350 \text{ metres.}$$

Alternative:-

$$\text{time} = \frac{I_1 + I_2}{\text{speed}}$$

$$55 = \frac{200 + I_2}{36 \times \frac{5}{18}} \Rightarrow I_2 = 350 \text{ m}$$

$$\text{Length of bridge (पुल की लंबाई)} = 350$$

82. (b) According to question

$$\text{Crossing time} = \frac{I_1 + I_2}{\text{speed}}$$

$$\Rightarrow \frac{270 + 180}{36 \times \frac{5}{18}} = \frac{450}{10}$$

$$= 45 \text{ second}$$

83. (a) Let the speed of trains (माना कि ट्रेनों की गति) =

$$x \text{ km/hr}$$

⇒ Their relative speed in opposite direction (विपरीत दिशा में उनकी सापेक्ष गति)

$$= (43.2 + x) = \text{km/hr}$$

⇒ According to question,

$$\Rightarrow \text{time} = \frac{I_1 + I_2}{\text{speed}}$$

$$\Rightarrow 10 \text{ sec} =$$

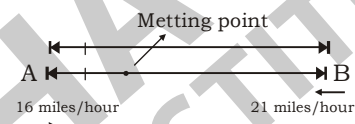
$$\frac{(150 + 120) \text{ m}}{43.2 + x \times \frac{5}{18} \text{ m/s}}$$

$$43.2 \times 5 + 5x = 486$$

$$\Rightarrow x = \frac{486 - 216}{5}$$

⇒ Speed of second train (दूसरे ट्रेन की गति) = 54 km/hr

84. (a)



⇒ In the question, it is given that at the time of their meeting the second train has travelled 60 miles more than the first train. (प्रश्न में यह दिया गया है कि मिलने के समय दूसरी ट्रेन पहली ट्रेन से 60 मील की अधिक दूरी तय कर चुकी होती है)

⇒ It would have happened only because of the exceed speed of second train (यह तभी संभव है जब दूसरी ट्रेन की गति अधिक हो)

$$= 21 - 16 = 5 \text{ mile/h}$$

⇒ i.e. second train covers 60 miles with exceed speed of 5 miles/hour (दूसरी ट्रेन 60 मील की दूरी 5 मील प्रति घंटे की अधिक गति से तय करती है)

$$\Rightarrow \text{i.e. second train runs} = \frac{60 \text{ mile}}{5 \text{ mile/hr}} = 12 \text{ hours}$$

According to the question, Running time of first train = Running time of second train.

$$\text{Distance covered by first train} = 16 \times 12 = 192 \text{ mile}$$

$$\text{Distance covered by second train (दूसरे ट्रेन द्वारा तय की गई दूरी)} = 21 \times 12 = 252 \text{ mile}$$

$$\Rightarrow \text{total distance} = 252 + 192 = 444 \text{ miles}$$

85. (c) Time taken by them to cross each other (एक

दूसरे को पार करने में उनके द्वारा लिया गया समय)

$$= \frac{l_1 + l_2}{\text{Relative speed in oppo. direction}}$$

Time =

$$\frac{(108 + 112)}{(45 + 54) \times \frac{5}{18}} = \frac{220 \times 18}{99 \times 5}$$

Time = 8 second

86. (b) Let the speed of second train is (माना कि दूसरी ट्रेन की गति) = x km/h

\Rightarrow time =

$$\frac{l_1 + l_2}{\text{Relative speed in oppo. direction}}$$

$$\Rightarrow 6 = \frac{(125 + 125)}{(65 + x) \times \frac{5}{18}}$$

$$\Rightarrow 6 = \frac{250 \times 18}{(65 + x) \times 5}$$

$$\Rightarrow 65 + x = 50 \times 3$$

$$\Rightarrow x = 150 - 65$$

$$\Rightarrow x = 85 \text{ km/hr}$$

87. (c)

usual : late

Their Ratio = 40 : 35
of speed 8 : 7

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

Their Ratio = 7 : 8

of time

1 hour late

$$1 \text{ unit} \rightarrow \frac{15}{60} \text{ hours} = \frac{1}{4} \text{ hours}$$

$$8 \text{ units} = 8 \times \frac{1}{4} = 2 \text{ hr.}$$

$$\text{Total distance} = 35 \times 2 = 70 \text{ km.}$$

Alternative:-

\Rightarrow Let the total distance (माना कि कुल दूरी) = d km

According to the question,

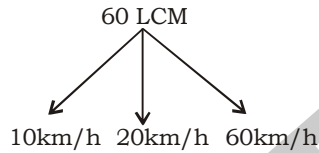
$$\Rightarrow \frac{d}{35} - \frac{d}{40} = \frac{15}{60}$$

$$\Rightarrow 40d - 35d = \frac{15 \times 40 \times 35}{60}$$

$$\Rightarrow 5d = 350$$

$$\Rightarrow \text{distance} = 70 \text{ km.}$$

88. (c)



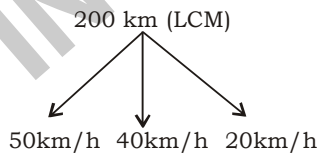
$$\Rightarrow \text{Avg. speed} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{60 \times 3}{\frac{60}{10} + \frac{60}{20} + \frac{60}{60}}$$

$$= \frac{180 \text{ km}}{(6 + 3 + 1) \text{ hour}}$$

$$\Rightarrow \text{Average speed} = 18 \text{ km/hr}$$

89. (b)



\Rightarrow To avoid the calculation problem we let here small part of the journey (गणना को समस्या को खत्म करने के लिए हमने यहाँ पर यात्रा के छोटे भाग को माना है) = 200 km.

\Rightarrow Remaining part (शेष भाग) = 40% + 50% = 90%

$$\Rightarrow (100 - 90) = 10\%$$

i.e. 10% of journey = 200

Total journey (कुल यात्रा) = 2000 kms

$$\Rightarrow \text{Avg. speed (औसत गति)} = \frac{\text{distance}}{\text{time}}$$

$$= \frac{2000}{\frac{1000}{50} + \frac{800}{40} + \frac{200}{20}}$$

Total journey = 2000

50% = 1000 km

40% = 800 km

$$10\% = 200 \text{ km}$$

$$\Rightarrow \frac{2000}{20+20+10}$$

$$\Rightarrow \frac{2000}{50}$$

$$\text{Avg. speed} = 40 \text{ km/h}$$

90. (d) Avg. speed of whole journey (पूरी यात्रा की औसत

$$\text{गति) = } \frac{2s_1s_2}{s_1 + s_2}$$

$$= \frac{2 \times 20 \times 30}{20 + 30}$$

$$= \frac{2 \times 20 \times 30}{50}$$

$$\text{Avg. speed} = 24 \text{ km/hr}$$

91. (c) Let the length of trains (माना कि ट्रेनों की लंबाई) = $4x, 3x$ unit

Let the speeds of trains (माना कि ट्रेनों की गति) = $6y, 5y \Rightarrow$ Ratio of their time to cross a pole (एक खंभे को पार करने में उनके द्वारा लिया गया समय का अनुपात)

$$= \frac{4x}{6y} : \frac{3x}{5y} \left\{ \text{time} = \frac{\text{distance}}{\text{speed}} \right\}$$

$$\Rightarrow \text{Ratio of time (समय का अनुपात)} = 20 : 18$$

92. (a) cyclist : Jogger

$$\text{Ratio of distance} \rightarrow 2 : 1$$

$$\text{Ratio of time} \rightarrow 1 : 2$$

$$\text{Ratio of their speed (Jogger : Cyclist)}$$

$$= \frac{1}{2} : \frac{2}{1} \Rightarrow 1 : 4$$

93. (c) Total distance covered by man in (1:30 pm -

$$10:00 \text{ am}) = 3\frac{1}{2} \text{ hour at a speed of } 12 \text{ km/hr}$$

(व्यक्ति द्वारा 12 कि.मी प्रति घंटे की गति से $3\frac{1}{2}$ घंटे में तय की गई कुल दूरी)

$$= 12 \times 3\frac{1}{2} = 42 \text{ km. (Total distance)}$$

\Rightarrow Time taken by his elder brother to catch him (उसके बड़े भाई द्वारा उसे पकड़ने में लगा समय)

$$= 3\frac{1}{2} \text{ hour} - 1 \text{ hour } 15 \text{ min.}$$

$$\Rightarrow \text{Brother's time} = 3 \text{ hr } 30 \text{ min} - 1 \text{ hr } 15 \text{ min} =$$

$$2 \text{ hr } 15 \text{ min} = 2\frac{15}{60}$$

$$= 2\frac{1}{4} \Rightarrow \frac{5}{4} \text{ hour}$$

$$\Rightarrow \text{Brother's speed (भाई की गति)} = \frac{42}{\frac{5}{4}} = \frac{168}{5} = 33.6 \text{ km/hr}$$

$$\left\{ \text{speed} = \frac{\text{distance}}{\text{time}} \right\} = 18\frac{2}{3} \text{ km/hr}$$

94. (b) Their relative speed in same direction (समान दिशा में उनका सापेक्ष गति)

$$= 1 \text{ km/8 min} - 1 \text{ km/10 min}$$

$$= \frac{1000 \text{ metre}}{8 \text{ min}} - \frac{1000 \text{ metre}}{10 \text{ min}}$$

$$\Rightarrow 1000 \times \left[\frac{10-8}{10 \times 8} \right]$$

$$\Rightarrow \frac{1000 \times 2 \text{ metre}}{80 \text{ min}}$$

$$\Rightarrow 200 \text{ metre/8 min}$$

\Rightarrow Time taken by Police man to over take the thief at the exceeds relative speed of 200 metre/8 min. (पुलिस द्वारा 200 मीटर प्रति 8 मिनट की गति से चोर को ओवरटेक करने में लगा समय)

$$\Rightarrow \frac{100 \text{ metre}}{\frac{200 \text{ metre}}{8 \text{ min}}}$$

$$\Rightarrow 4 \text{ min.}$$

\Rightarrow Distance covered by their before overtake (ओवरटेक से पहले चोर द्वारा तय की गई दूरी) =

$$\frac{1000 \text{ metre}}{10 \text{ min}} \times 4 \text{ min}$$

$$= 400 \text{ metre}$$

95. (c) The fast train completely passes a man sitting in the slow train, In this condition it covers equal distance to its length. (एक तेज ट्रेन एक दूसरे धीमे ट्रेन में बैठे एक आदमी को पूर्णतः पार करती है, इस स्थिति में वह अपनी लंबाई के बराबर दूरी तय करेगी)

\Rightarrow Relative speed in same direction (समान दिशा में सापेक्ष गति) $(40 - 20) = 20 \text{ km/h}$

\Rightarrow Therefore, length of the train (अतः ट्रेन की लंबाई) = speed \times time = $20 \text{ km/hr} \times 5 \text{ sec}$

$$= 20 \times \frac{5}{18} \text{ m/s} \times 5 \text{ sec}$$

$$= 27 \frac{7}{9} \text{ metres}$$

96. (d) In the first situation, (पहली स्थिति में)

⇒ Total distance covered by train (ट्रेन द्वारा तय की

$$\text{गई कुल दूरी}) = 80 \times 4 \frac{1}{2}$$

$$= 360 \text{ kms.}$$

⇒ Therefore,

The speed of the train to cover the same distance 360 km in 4 hours is (4 घंटे में 360 कि.मी. की दूरी तय करने में ट्रेन की गति)

$$= \frac{360}{4} \left\{ \text{speed} = \frac{\text{distance}}{\text{time}} \right\}$$

$$= 90 \text{ km/h}$$

97. (b) Time taken by trains to cross each other in oppo. directions (विपरीत दिशा में एक दूसरे को पार करने में ट्रेनों द्वारा लिया गया समय) =

$$\frac{l_1 + l_2}{\text{Relative speed in oppo. direction}}$$

$$= \frac{(180 + 120)}{(65 + 55)}$$

$$= \frac{300}{120 \times \frac{5}{18}}$$

$$= 9 \text{ second}$$

98. (a) Let their lengths are (माना कि उनकी लंबाई) = l metre (equal)

⇒ Relative speed in same direction (समान दिशा में सापेक्ष गति) = $(90 - 60)$

$$= 30 \text{ km/hr}$$

⇒ Time =

$$\frac{\text{distance}}{\text{Relative speed in same direction}}$$

$$\Rightarrow 30 \text{ sec} = \frac{(l + l) \text{ metre}}{30 \times \frac{5}{18} \text{ m/s}}$$

⇒ lengths of each train (प्रत्येक ट्रेन की लंबाई) = 125 metres

$$99. (a) 1 \text{ km/hr} = \frac{5}{18} \text{ m/s}$$

$$50.4 \text{ km/hr} = \frac{5}{18} \times 50.4$$

$$= 14 \text{ m/s}$$

100. (c) Time taken by trains to cross each other in oppo. direction (विपरीत दिशा में एक दूसरे को पार करने में ट्रेनों द्वारा लिया गया समय)

$$\frac{\text{total distance}}{\text{Relative speed in oppo. direction}}$$

$$= \frac{(125 + 115) \text{ metre}}{(33 + 39) \times \frac{5}{18} \text{ m/s}}$$

$$= \frac{240 \times 18}{72 \times 5}$$

$$\text{Time} = 12 \text{ second}$$

101. (b) Distance, covered by thief in (2 pm - 1:30

$$\text{pm}) = \frac{1}{2} \text{ hr at speed of } 40 \text{ km/hr (40 कि.मी प्रति घंटे}$$

की गति से $\frac{1}{2}$ (आधे घंटे) में चोर द्वारा तय की गई दूरी

$$= 40 \times \frac{1}{2} = 20 \text{ kms.}$$

⇒ Their relative speed in same direction (समान दिशा में उनकी सापेक्ष गति)

$$= (50 - 40) = 10 \text{ km/hr}$$

⇒ According to question,

⇒ 20 km, is the distance that has to cover by owner to over take the thief. (चोर को ओवरटेक करने के लिए मालिक को 20 किमी दूरी तय करनी पड़ेगी)

⇒ Required time

$$= \frac{20 \text{ km}}{10 \text{ Relative speed}}$$

$$= 2 \text{ hours}$$

⇒ Therefore, he will overtake the thief at

$$= 2 \text{ pm} + 2 \text{ hr.}$$

$$= 4 \text{ pm.}$$

102. (b) LCM → 30 km (distance)

$$\begin{array}{ccc} & 6 \text{ hr} & 5 \text{ hr} \\ & \swarrow & \searrow \\ 5 \text{ km/hr} & & 6 \text{ km/hr} \end{array}$$

⇒ Difference of time (समय का अन्तर)

$$= 6 \text{ hr} - 5 \text{ hr} = 1 \text{ hr. (60 min)}$$

But actual difference of time = 6 min

late + 2 min early = 8 min.

i.e.

$$60 \text{ units} \rightarrow 8 \text{ min}$$

$$\Rightarrow 1 \text{ unit} \rightarrow \frac{8}{60}$$

\Rightarrow Total distance of his office (उसके कार्यालय की कुल दूरी)

$$= 30 \times \frac{8}{60} = 4 \text{ km}$$

Alternative:-

Distance between his home to office (उसके घर से कार्यालय की दूरी)

$$= \frac{s_1 s_2}{s_1 - s_2} \times \frac{\text{diff. of time}}{60}$$

$$= \frac{5 \times 6}{6 - 5} \times \frac{8}{60}$$

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

103. (b) According to the question (195).

\Rightarrow Distance between his house to school (उसके घर से स्कूल की दूरी)

$$\Rightarrow \frac{s_1 s_2}{s_1 - s_2} \times \frac{\text{diff. of time}}{60}$$

$$= \frac{4 \times 3}{(4 - 3)} \times$$

$$\frac{(10 \text{ min early} + 10 \text{ min late})}{60}$$

$$\Rightarrow 12 \times \frac{20}{60}$$

$$\Rightarrow \text{Distance} = 4 \text{ km.}$$

104. (b) Let the speed of first is s_1 km/hr and speed of second train is s_2 km/hr (माना कि पहले तथा दूसरे ट्रेन की गति क्रमशः s_1 km/hr और s_2 km/hr है)

\Rightarrow From method

Time =

$$\frac{\text{total distance}}{\left(\text{relative speed in same/opp. direction} \right)}$$

\Rightarrow In the same direction

$$= 27 \text{ sec} =$$

$$\frac{(100 + 95)}{(s_1 - s_2) \times \frac{5}{18}}$$

$$\Rightarrow s_1 - s_2 = 26 \quad \dots\dots(i)$$

In the oppo. direction, (विपरीत दिशा में)

$$\Rightarrow 9 = \frac{(100 + 95)}{(s_1 - s_2) \times \frac{5}{18}}$$

$$\Rightarrow 9 = \frac{195 \times 18}{(s_1 - s_2) \times 5}$$

$$\Rightarrow s_1 + s_2 = 39 \times 2$$

$$\Rightarrow s_1 + s_2 = 78 \quad \dots\dots(ii)$$

From equation (i) and (ii)

$$\Rightarrow s_1 - s_2 = 26$$

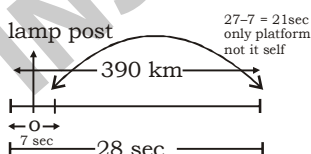
$$\Rightarrow s_1 + s_2 = 78$$

$$\Rightarrow s_1 = \frac{26 + 78}{2}$$

$$\Rightarrow s_1 = \frac{104}{2}$$

$$\Rightarrow s_1 = 52 \text{ km/hr and } s_2 = 26 \text{ km/hr}$$

105. (b)



\Rightarrow According to figure that has shown here train crosses only platform (not itself) in 21 sec. (जैसा कि उपरोक्त चित्र में दर्शाया कि ट्रेन केवल प्लेटफार्म को (अपनी लंबाई को नहीं) 21 सेकण्ड में पार करती है)

$$\Rightarrow \text{speed of the train (ट्रेन की गति)} = \frac{390 \text{ metre}}{21 \text{ sec}}$$

$$\Rightarrow \frac{130}{7} \text{ m/s}$$

We know that,

When train crosses only object that has no distance (i.e. tree, lamp post, man etc.) in that condition train covers equal distance to itself. (हम जानते हैं कि जब एक ट्रेन किसी खंभे/लैम्प पोस्ट/व्यक्ति आदि को पार करती है तो वह अपनी लंबाई के बराबर दूरी तय करती है)

\Rightarrow So the length of the train (अतः ट्रेन की लंबाई)

$$= \frac{130}{7} \text{ m/s} \times 7 \text{ sec}$$

$$= 130 \text{ metres}$$

106. (c) According to the explanation of question (198)

⇒ length of the train = Speed × time

$$= 36 \text{ km/hr} \times 10 \text{ sec}$$

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

$$= 100 \text{ metres}$$

Therefore,

Time taken by train to cross a platform of 55 metre long in time (55 मीटर लम्बे प्लेटफार्म को पार करने में ट्रेन द्वारा लिया गया समय)

$$= \frac{(100+55)}{36 \times \frac{5}{18}} = \frac{155}{10}$$

$$\text{Time} = 15 \frac{1}{2} \text{ sec.}$$

107. (b) Total distance, covered by train in 30 sec. with, speed of 60 km/hr. (60 किमी प्रति घंटे की गति से 30 सेकेंड में एक ट्रेन द्वारा तय की गई कुल दूरी)

$$\Rightarrow \text{Distance} = 60 \text{ kmph} \times 30 \text{ sec}$$

$$= 60 \times \frac{5}{18} \text{ m/s} \times 30 \text{ sec}$$

$$= 500 \text{ metres}$$

$$\Rightarrow \text{Distance of train} + \text{length of platform} = 500\text{m}$$

$$\Rightarrow 200 + \text{platform} = 500$$

$$\Rightarrow \text{Length of platform (प्लेटफार्म की लंबाई)}$$

$$= 500 - 200 = 300 \text{ metres}$$

108. (b) $\frac{2}{5}$ th of journey = 1200 km

$$\therefore \text{total journey} = \frac{1200}{2} \times 5$$

$$= 3000 \text{ kms.}$$

Distance travelled by car (कार द्वारा तय की गई दूरी)

$$= 3000 \times \frac{1}{3} = 1000 \text{ metre}$$

Therefore,

Remaining distance covered by train is (ट्रेन द्वारा तय की गई शेष दूरी)

$$= 3000 - (1200 + 1000)$$

$$= 800 \text{ metres}$$

109. (a) Speed of A, B, and C (A, B तथा C की गति)

$$= \frac{1000}{5}, \frac{1000}{8}, \frac{1000}{10} = 200 \text{ m/}$$

$$\text{min.}, 125 \text{ m/min.}, 100 \text{ m/min.}$$

Distance travelled by B and C before A starts (B द्वारा तथा C के बराबर पहुँचने के लिए A द्वारा लिया गया समय)

$$= \frac{125}{200-125}, \frac{200}{200-100}$$

$$= \frac{5}{3} \text{ min.}, 2 \text{ min}$$

110. (b) The two cars will collide if their speed are in the ratio of the distance to be covered by them (दो कार टकराएंगी यदि उनकी गति उनके द्वारा तय की गई दूरी के अनुपात में होगी)

$$\text{Ratio of distance (दूरी का अनुपात)} = 40 : 50 = 4 : 5$$

⇒ For the cars not to collide (कार नहीं टकराएँ इसके लिए जरूरी है)

$$v_1 : v_2 \neq 4 : 5$$

111. (a) Time will be taken by train if it does not stop (ट्रेन द्वारा लिया गया समय यदि वह नहीं रुकता है)

$$= \frac{\text{distance}}{\text{speed}} = \frac{999 \text{ kms}}{55.5 \text{ km/hr}}$$

$$\text{without stop} = 18 \text{ hr}$$

⇒ but if stops on the way for 1 hour 20 min before reaching at B. (लेकिन B पहुँचने से पहले वह रास्ते में 1 घंटे 20 मिनट रुकती है)

$$\Rightarrow \text{total time} = 18 \text{ hr} + 1 \text{ hour } 20 \text{ min}$$

$$= 19 \text{ hours } 20 \text{ min}$$

$$\Rightarrow \text{Reaching time at B (B पहुँचने का समय)} = 6 \text{ am} + 19 \text{ hour } 20 \text{ min.}$$

$$= 1:20 \text{ am}$$

112. (b) The distance between of school and home (स्कूल तथा घर के बीच की दूरी)

$$= \frac{s_1 \times s_2}{s_1 - s_2} \times \frac{\text{Diff. of time}}{60}$$

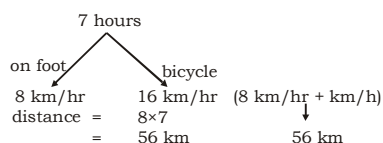
$$= \frac{5 \times 4}{(5-4)} \times$$

$$\frac{(5 \text{ min late} + 10 \text{ min before})}{60}$$

$$\Rightarrow 20 \times \frac{15}{60}$$

⇒ Distance = 5 km

113. (a)



⇒ Remaining distance (शेष दूरी)

$$= 80 - 56 = 24 \text{ km.}$$

According to question,

⇒ 24 km would have covered by bicycle with 8 km/hr

⇒ Time taken by bicycle (साईकिल से लिया गया समय)

$$= \frac{24}{8} = 3 \text{ hours}$$

So, time taken by bicycle = 3 hours

Time taken on foot (पैदल लिया गया समय)

$$= 7 - 3 = 4 \text{ hours}$$

⇒ Distance covered by man on foot (व्यक्ति द्वारा तय की गई दूरी) = 8×4

$$= 32 \text{ km}$$

114. (d) Distance travelled by driver in 2 hours (दो घंटे में ड्राइवर द्वारा तय की गई दूरी)

$$= 300 \times \frac{40}{100} = 120 \text{ km}$$

Distance to be covered in 2 hours (2 घंटे में तय की जाने वाली दूरी)

$$= 300 - 120 = 180 \text{ km}$$

$$\text{Required speed} = \frac{180}{2}$$

$$= 90 \text{ km/h}$$

Required difference (अभीष्ट अंतर)

$$= 90 - \frac{120}{2} = 30 \text{ km/hr.}$$

115. (b) Time taken by man if he did not stop (यदि व्यक्ति नहीं रुकता है, तो उसके द्वारा लिया गया समय)

$$= \frac{5 \text{ km}}{10 \text{ kmph}}$$

$$= \frac{1}{2} \text{ h} = 30 \text{ min}$$

⇒ ∴ man takes rest for 5 minutes on each km (प्रत्येक कि.मी. के बाद व्यक्ति 5 मिनट आराम करता है)

$$\Rightarrow \text{total rest time} = 5 \times 4$$

$$= 20 \text{ min}$$

⇒ total travelling time (यात्रा का कुल समय)

$$= 30 \text{ min} + 20 \text{ min}$$

$$= 50 \text{ min}$$

116. (b) According to question,

⇒ Total distance = Speed × Time

$$10 \text{ km} = \text{Speed} \times 12 \text{ min}$$

$$\text{Speed} = \frac{10 \text{ km}}{12 \text{ min}}$$

$$= \frac{10}{12 \times \frac{1}{60}}$$

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

⇒ New speed after decreasing (कमी के बाद नयी गति)

$$= 50 - 5 = 45 \text{ km/hr}$$

⇒ Time taken with new speed (नयी गति से लिया

$$\text{गया समय}) = \frac{10}{45}$$

$$= \frac{2}{9} \times 60 \text{ min} = \frac{40}{3} \text{ min}$$

117. (b) Their Relative speed in same direction (समान दिशा में उनकी सापेक्ष गति)

$$= 40 - 30 = 10 \text{ km/hr}$$

⇒ Distance covered by P in 30 min (30 मिनट में P द्वारा तय की गई दूरी)

$$= 30 \text{ km/hr} \times 30 \text{ min}$$

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

⇒ Time will be taken by Q to overtake P (P को ओवरटेक करने में Q द्वारा लिया गया समय)

$$= \frac{15}{10} \Rightarrow \frac{3}{2} \text{ hours}$$

118. (a) According to question,

$$A : B : C$$

$$2 : 1$$

$$A : B : C$$

$$\text{Ratio of speed} \quad 6 : 3 : 1$$

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

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

$$= 1 : 2 : 6$$

$$\downarrow \times 1/4$$

$$\frac{3}{4}$$

Time taken by A (A के द्वारा लिया गया समय)

$$= 1 \text{ ratio} = 1 \times \frac{1}{4} \text{ hours}$$

$$= 15 \text{ min}$$

119. (d) Total distance = 310 kms

\Rightarrow Distance travelled by truck in $1\frac{1}{2}$ hours with

speed 90 km/hr (90 कि.मी. प्रति घंटे की गति से $1\frac{1}{2}$ घंटे

में ट्रक द्वारा तय की गई दूरी) = $1\frac{1}{2}$ hour \times 90 km/h

$$= 135 \text{ km.}$$

\Rightarrow Remaining distance = 310 - 135

$$= 175 \text{ km.}$$

\Rightarrow Time will be taken to cover 175 km with speed 70 km/hr (70 कि.मी. प्रति घंटे की गति से 175 कि.मी. दूरी तय करने में लगा समय)

$$= \frac{175}{70} \Rightarrow 2.5 \text{ hours}$$

Total time = 2.5 + 1.5

$$= 4 \text{ hours.}$$

120. (c) Total distance = 60 km/hr \times 1 hour

Therefore,

\Rightarrow Time will be taken by another car to travel the same distance with 40 km/hr (दूसरे कार द्वारा 40 कि.मी. प्रति घंटे की गति से लिया गया समय)

$$= \frac{60}{40} \Rightarrow \frac{3}{2} \text{ hr.}$$

121. (c) Method.

$$\Rightarrow \text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$\Rightarrow 10 = \frac{50+100}{\text{speed}}$$

$$\Rightarrow \text{Speed} = \frac{150}{10}$$

\Rightarrow train's speed (ट्रेन की गति) = 15 m/s

122. (a) Here length of pole is considered 0 metre

(यहाँ पर खंभे की लम्बाई 0 मीटर है)

\Rightarrow Time will be taken by train to cross the poll (खंभे को पार करने में ट्रेन द्वारा लिया गया समय)

$$\frac{300\text{m}}{54 \times \frac{5}{18} \text{ m/s}} = \frac{300}{15}$$

Required time = 20 seconds

123. (c) Let the length of train (माना कि ट्रेन की लंबाई)

= l metre

\Rightarrow Time

$$\frac{\text{Distance}}{\text{Relative speed in opp. direction}}$$

$$\Rightarrow 4 \text{ sec} = \frac{l+0}{(84+6) \times \frac{5}{18} \text{ m/s}}$$

$$\Rightarrow 4 = \frac{l}{90 \times \frac{5}{18}}$$

\Rightarrow length of train = 100 metres

124. (b) In such type of question follow the below given method. (इस प्रकार के प्रश्नों में नीचे दी गई विधि का प्रयोग करें)

$$\begin{array}{rcl} S & \times & T \quad d(s \times t) \\ +10 & \times & -1 \rightarrow 10 \\ +20 & \times & -7 \rightarrow 35 \\ & & \hline & & 4 \end{array}$$

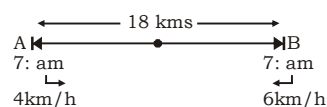
$$-s + 10t = 10 \dots\dots(i)$$

$$-\frac{7}{4}s + 20t = 35 \dots\dots(ii)$$

On solving equation (i) and (ii) we get $S = 60$ km/hr and $T = 7$ hours

Total distance = $60 \times 7 = 420$ km

125. (c)



Their relative speed in opp. direction

(विपरीत दिशा में उनकी सापेक्ष गति)

$$= 4 + 6 = 10 \text{ km/hr}$$

\Rightarrow Time will be taken to cover 20 km with relative speed 10 km/hr

(10 कि.मी. प्रति घंटे की सापेक्ष गति से 20 कि.मी. दूरी तय करने में लगा समय)

$$\Rightarrow \text{Time} = \frac{20\text{km}}{10\text{km/h}} = 2 \text{ hours}$$

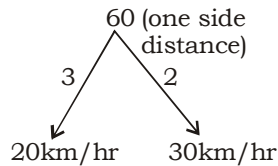
$$\Rightarrow \text{Meeting time} = 7 \text{ am} + 2 \text{ hr.} = 9 \text{ am}$$

126. (c) Average speed of train

(ट्रेन की औसत गति)

$$= \frac{2s_1s_2}{s_1+s_2} = \frac{2 \times 20 \times 30}{30+20} \text{ avg. speed} = 24 \text{ km/h}$$

Alternative:-



$$\Rightarrow \text{Total distance} = 60 \times 2 = 120 \text{ km}$$

$$\Rightarrow \text{Total time} = 3 + 2 = 5 \text{ hour}$$

$$\Rightarrow \text{Avg speed} = \frac{120}{5}$$

$$\left\{ \begin{array}{l} \text{speed} = \frac{\text{distance}}{\text{time}} \end{array} \right\}$$

$$= 24 \text{ km/hr}$$

127. (a) Let the lengths of trains

(माना कि ट्रेनों की लंबाई)

$= l$ metre (equal)

\Rightarrow Relative speed in the same direction

(समान दिशा में सापेक्ष गति)

$$= 46 - 36 = 10 \text{ kmph}$$

$$\left\{ \begin{array}{l} \text{time} = \frac{\text{distance}}{\text{speed}} \end{array} \right\}$$

$$\Rightarrow 36 \text{ sec} = \frac{(l + l) \text{ metre}}{10 \times \frac{5}{18} \text{ m/s}}$$

$$\Rightarrow 36 = \frac{2l \times 18}{50}$$

$$\Rightarrow \text{length} = 50 \text{ metres}$$

128. (d) Second train covers the 120 kms more distance only because of its exceed speed of $(60-50)\text{km} = 10 \text{ kmph}$

(दूसरी ट्रेन 120 कि.मी. अधिक दूरी मिलने में ट्रेनों द्वारा लिया गया समय)

$$= \frac{90\text{kms}}{10\text{km/h}} \Rightarrow 9 \text{ hours}$$

\Rightarrow Distance covered by first train

(पहली ट्रेन द्वारा तय की गई दूरी)

$$= 9 \times 50 = 450 \text{ km}$$

\Rightarrow Distance covered by the second train

(दूसरी ट्रेन द्वारा तय की गई दूरी)

$$= 9 \text{ hours} \times 60 \text{ kmph}$$

$$\Rightarrow 540 \text{ km.}$$

\Rightarrow Total distance between A and B

(A तथा B के बीच की कुल दूरी)

$$\Rightarrow 540 + 450 = 990 \text{ km.}$$

129. (c) Total distance = Speed \times Time

$$= 55 \text{ km/h} \times 4 \text{ hours}$$

$$= 220 \text{ kms}$$

\Rightarrow New speed after increasing

(वृद्धि के बाद नयी गति)

$$= 55 + 5 = 60 \text{ kmph}$$

\Rightarrow Time taken with new speed

(नयी गति से लिया गया समय)

$$= \frac{220\text{km}}{60\text{km/hr}}$$

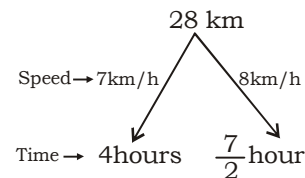
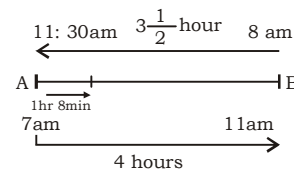
$$= 3\frac{4}{6} \text{ hr} = 3 \text{ hours} + \frac{2}{3} \times 60 \text{ min}$$

$$= 3 \text{ hours} + 40 \text{ min.}$$

\Rightarrow Diff. of time = 40 hours - (3 hours + 40 min)

$$= 20 \text{ min}$$

130. (d)



Distance covered by train started from point A before 8 am with 7 km/hr

(8 am से पहले 7 कि.मी. प्रति घंटे की गति से A बिंदु से चलने वाली ट्रेन द्वारा तय की गई दूरी)

$$\Rightarrow \text{Distance} = 7 \times 1$$

$$= 7 \text{ km}$$

Remaining distance

$$(\text{शेष दूरी}) = 28 - 7 = 21 \text{ km}$$

⇒ After 8 am

Their relative speed in oppo. direction

(विपरीत दिशा में उनकी सापेक्ष गति)

$$= (7 + 8) \text{ km/hr}$$

$$= 15 \text{ kmph}$$

⇒ Time will be taken to cover 21 km

(21 कि.मी. दूरी तय करने में लगा समय)

$$= \frac{21}{15} \Rightarrow \frac{7}{5} \Rightarrow 1\frac{2}{5}$$

$$= 1 \text{ hour} + \frac{2}{5} \times 60 \text{ min}$$

$$= 1 \text{ hour} + 24 \text{ min}$$

⇒ Therefore they will cross each other at

(अतः वे एक दूसरे को पार करेंगे)

$$= 8 \text{ am} + 1 \text{ hour} + 24 \text{ min}$$

$$= 9 : 24 \text{ am}$$

131. (a) We know that,

$$1 \text{ km/hr} = \frac{5}{18} \text{ m/s}$$

$$\text{So, } 45 \text{ km/hr} =$$

$$45 \times \frac{5}{18} \text{ m/s} = 12.5 \text{ m/s}$$

132. (a) Distance covered in 1 min

(1 मिनट में तय की गई दूरी)

$$= 50 \text{ m}$$

Distance covered in 2 min

(2 मिनट में तय की गई दूरी)

$$= 90 \text{ m}$$

Similary, 1st min IIInd IIIrd min.....15th min

$$\text{Distance} \rightarrow 50 \text{ m} + 90 \text{ m} + 130 \text{ m} + \dots\dots\dots$$

By using A.P,

$$a = 50, d = (90 - 50) = 40 \text{ m}$$

$$T_n = a + (n - 1)d$$

$$= 50 + (15 - 1) \times 40$$

$$= 50 + 560$$

$$= 610 \text{ m}$$

133. (d) According to the question,

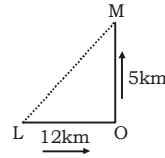
⇒ Using pythagoras theo-rem

(पाइथागोरस प्रमेय का प्रयोग करने पर)

$$\Rightarrow (ML)^2 = (MO)^2 + (LO)^2$$

$$\Rightarrow (ML)^2 = (12)^2 + 5^2$$

$$\Rightarrow ML = 13 \text{ km}$$



134. (d) Given

⇒ Speed of train

$$(\text{ट्रेन की चाल}) = 75 \text{ km/hr}$$

⇒ Distance that is to cover

$$(\text{दूरी}) = 1050 \text{ km}$$

⇒ time taken by train to cover the distance

(पार करने में लिया गया समय)

$$= \frac{1050 \text{ km}}{75 \text{ km/hr}}$$

$$\left(\text{Time} = \frac{\text{Distance}}{\text{Speed}} \right)$$

$$\text{time} = \frac{350}{25}$$

$$\text{time} = 14 \text{ hours}$$

135. (c) We know that

$$\Rightarrow 1 \text{ m/s} = \frac{18}{5} \text{ km/h}$$

$$\Rightarrow 1 \text{ km/h} = \frac{5}{18} \text{ m/s}$$

$$\Rightarrow 90 \text{ km/h} = 90 \times \frac{5}{18} \text{ m/s}$$

$$\text{speed} = 25 \text{ m/s}$$

⇒ time taken by train to pass a post

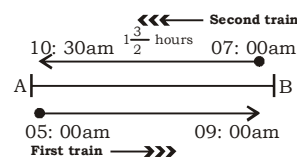
(खंभे को पार करने में लगा समय)

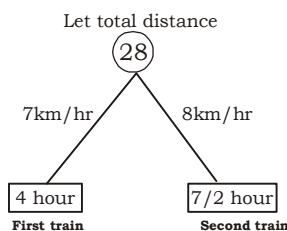
$$\Rightarrow \text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\Rightarrow \text{time} = \frac{180 \text{ metres}}{25 \text{ m/s}}$$

$$\Rightarrow \text{time} = 7.2 \text{ second}$$

136. (b)





Distance covered by first train in

(प्रथम ट्रेन द्वारा तय दूरी)

(7am – 5am) = 2 hours before starting the second train

(द्वितीय ट्रेन द्वारा शुरू करने से दो घंटे पहले)

$$= 2 \times 7 = 14 \text{ km.}$$

⇒ Remaining distance

$$(बची हुई दूरी) = 28 - 14 = 14 \text{ km.}$$

⇒ After 07:00 a.m. their relative speed in opposite direction

$$(सात बजे के बाद विपरीत दिशा में सापेक्ष चाल) = 7 + 8 = 15 \text{ km/hr}$$

⇒ Time taken by both to cover 14 km

$$(दोनों के द्वारा 14 km दूरी तय करने में लगा समय) = \frac{14}{15} \text{ km.}$$

$$= \frac{14}{15} \times 60 \text{ km} = 56 \text{ minutes}$$

⇒ The time at which the two trains cross each other

(दोनों ट्रेनों को आपस में पार करने में लगा समय)

$$= 07:00 \text{ a.m.} + 56 \text{ minutes} = 07:56 \text{ a.m.}$$

137. (b) According to first situation total distance covered by man

(प्रथम शर्तानुसार व्यक्ति द्वारा कुल दूरी)

$$= \text{speed} \times \text{time}$$

$$= 4 \text{ km/hr} \times (2 \text{ hr} + 45 \text{ min})$$

$$= 4 \text{ km/hr} \times \left(2 + \frac{45}{60}\right)$$

$$= 4 \times \left(2 + \frac{3}{4}\right) = 4 \times \frac{11}{4}$$

Total distance

$$(कुल दूरी) = 11 \text{ km}$$

⇒ time will be taken by man with speed of 16.5 km/hr to cover a distance of 11 km

(व्यक्ति द्वारा 11 किमी. दूरी को 16.5 किमी/घंटा की चाल से तय करने में लगा समय)

$$\Rightarrow \text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\Rightarrow \text{time} = \frac{11 \text{ km}}{16.5 \text{ km/h}}$$

$$= \frac{11}{33} \times 2$$

$$= \frac{2}{3} \text{ hours} = \frac{2}{3} \times 60 \text{ min}$$

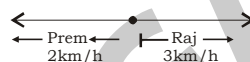
$$\text{time} = 40 \text{ min}$$

138. (b) Their relative speed in opposite direction

(विपरीत दिशा में सापेक्ष चाल)

$$= (2 + 3)$$

$$= 5 \text{ km/h}$$



⇒ Therefore distance between Raj and Prem after 2 hours

$$(दो घंटे बाद राज और प्रेम के बीच की दूरी) = 2 \times 5$$

$$= 10 \text{ km (distance} = \text{speed} \times \text{time)}$$

139. (b) We know, 1 km = 1000 metre

$$\Rightarrow 2 \text{ km } 5 \text{ metre} = 2 \text{ km } 5 \text{ metre}$$

$$= 2 \text{ km} + \frac{5}{1000} \text{ km}$$

$$= 2 \text{ km} + .005 \text{ km}$$

$$= 2.005 \text{ km}$$

140. (a) Let the required time

$$(\text{समय}) = x \text{ second}$$

According to the question,

$$\text{Time} = \frac{\text{Total distance}}{\text{speed}}$$

$$x = \frac{\text{Length of train} + \text{length of bridge}}{\text{speed of train}}$$

$$\Rightarrow x = \frac{(120 + 360) \text{ metres}}{36 \times \frac{5}{18} \text{ metres}}$$

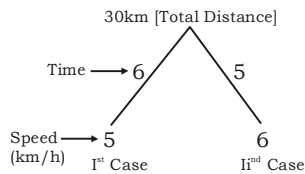
$$\left[\because 1 \text{ km} = \frac{5}{18} \text{ mts.} \right]$$

$$\Rightarrow x = \frac{48 \text{ metres}}{10 \text{ metres}}$$

$$\Rightarrow x = 48 \text{ seconds}$$

$$\Rightarrow \text{Required time} = 48 \text{ seconds}$$

141. (c)



Diff. of time is

(समय का अंतर) = (6 - 5) hours

⇒ 1 hour

Actual diff. of time

(समय का वास्तविक अंतर)

= 7 min - (- 5 min)

⇒ (7+5) min

⇒ 12 min

1 hour $\xrightarrow{1/5}$ 12 min

30 km $\xrightarrow{1/5}$ 6 km

142. (d) Let distance be 60km

(माना की दूरी 60 किमी. है।)

(LCM of (ल.स.) 10, 20, 30 & 60)

Average speed (औसत चाल)

$$= \frac{\text{Total distance}}{\text{Total time}}$$

Total time (कुल समय)

$$= \frac{60\text{km}}{10\text{ km/h}} + \frac{60\text{km}}{30\text{km/h}} +$$

$$\frac{60\text{km}}{60\text{km/h}}$$

$$= 6 + 3 + 2 + 1 = 12 \text{ hrs}$$

Average Speed (औसत चाल)

$$\frac{60 + 60 + 60 + 60}{12} = \frac{240}{12}$$

$$= 20 \text{ km/hrs}$$

Note:- If we do it by taking 7 km. our answer will remain same, because average speed will same irrespective to distance

(हम यदि 7km को मान कर हल करें तो हमारा उत्तर समान रहेगा क्योंकि औसत चाल दूरी के सापेक्ष समान रहेगी)A

143. (d) Let speed of train travelling from P to Q

(माना P से Q तक की चाल)

= a

Speed of train travelling from Q to P

(माना Q से P तक की चाल) = b

$$(a+b) \text{ speed} = \frac{162}{6} = 27 \text{ km/h}$$

Diff. in their speed

(चाल का अंतर) $(a - b) = 8 \text{ km/h}$

$$\therefore a + b = 27$$

$$a - b = 8$$

from both equation

$$b = 9\frac{1}{2} \text{ km/h}$$

144. (c) Circumference of wheel

(पहिए की परिधि) = $2\pi r$

$$\Rightarrow 2 \times \frac{22}{7} \times \frac{70}{2} = 220 \text{ cm}$$

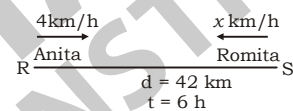
Speed per hour (चाल)

$$= \frac{220 \times 400 \times 60}{1000 \times 100} = 52.8 \text{ km/h}$$

145. (c) Let speed of Romita be x km

(माना रोमिता की चाल)

ATQ:



$$(4 + x) = \frac{42}{6} \left(S = \frac{d}{t} \right)$$

$$4 + x = 7$$

$$x = 3 \text{ km/h}$$

146. (a) According to the question.

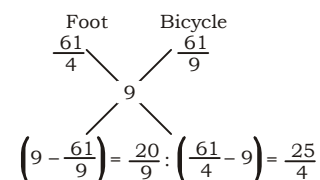
Distance (दूरी) = 61 km

Time on foot (पैदल समय)

$$= \frac{61}{4} \text{ hour}$$

$$\text{Time on bicycle (साइकिल से समय)} = \frac{61}{9} \text{ hour}$$

Now using allegation.



Distance ratio (दूरी का अनुपात) $80 + 225 = 305$ units

300 units — 61

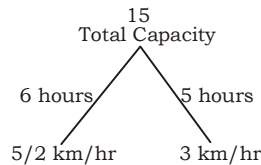
$$1 \text{ unit} = \frac{61}{305}$$

$$80 \text{ units} = \frac{61}{305} \times 80$$

$$= 16 \text{ km.}$$

distance travelled on foot (पैदल तय दूरी) = 16 km.

147. (b)



⇒ Diff. between time

(समय का अंतर) = 6 - 5 = 1 hour = 60 min

$$\Rightarrow 60 \text{ min} \rightarrow \begin{cases} \text{early+late} \\ 6+10 \end{cases}$$

$$\Rightarrow 60 \text{ units} \rightarrow 16 \text{ min}$$

$$\Rightarrow 1 \text{ unit} \rightarrow \frac{16}{60}$$

$$\Rightarrow 1 \text{ unit} \rightarrow \frac{4}{15}$$

$$\Rightarrow \text{Total distance (कुल दूरी)} 15 \text{ units} = \frac{15 \times 4}{15} = 4 \text{ km.}$$

Alternate:-

$$\text{Distance} = \frac{s_1 s_2}{(s_1 - s_2)} \times$$

$$\frac{(\text{diff. between time})}{60}$$

$$= \frac{5/2 \times 3}{(3 - 5/2)} \times \frac{16}{60} = 4 \text{ km.}$$

148. (a) Let the length of train B l metres (माना ट्रेल B की लम्बाई l मीटर है)

⇒ While crossing a pole (खंभे को पार करने में लगा समय)

$$\Rightarrow 20 = \frac{l}{\text{speed of train}}$$

$$\Rightarrow \text{speed of train (ट्रेन की चाल)} = \frac{l}{20} \text{ min.(i)}$$

⇒ Again while train crosses platform (जब ट्रेन

प्लेटफार्म को पार करती है)

$$\Rightarrow 45 = \frac{l + \text{Platform length}}{\text{speed of train}}$$

$$\Rightarrow 45 = \frac{l + 250}{\text{speed}}$$

$$\Rightarrow \text{speed} = \frac{l + 250}{45} \text{(ii)}$$

equation (i) = (ii)

$$\Rightarrow \frac{l}{20} = \frac{l + 250}{45}$$

$$\Rightarrow \frac{l}{4} = \frac{l + 250}{9}$$

$$\Rightarrow 9l = 4l + 1000$$

$$\Rightarrow 5l = 1000$$

$$\Rightarrow \text{length} = 200 \text{ mt.}$$

149. (c) As we know

$$\Rightarrow 1 \text{ m/s} = \frac{18}{5} \text{ km/hr}$$

$$\Rightarrow 20 \text{ m/s} = \frac{18}{5} \times 20 \text{ km/hr}$$

$$= 72 \text{ km/h}$$

150. (a) Let the length of train be l metre.

(माना की ट्रेन की लम्बाई l मीटर है)

According to the question

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\Rightarrow 100 =$$

$$\Rightarrow \text{speed} = \frac{500 + l}{100}$$

Again,

$$60 = \frac{250 + l}{\text{speed of train}}$$

$$\text{speed} = \frac{250 + l}{60}$$

Equating (i) & (ii)

$$\Rightarrow \frac{500 + l}{100} = \frac{250 + l}{60}$$

$$\Rightarrow 1500 + 3l = 1250 + 5l$$

$$\Rightarrow 2l = 250$$

$$\Rightarrow \text{length of train} = 125 \text{ m}$$