



Name of the Bundle	PROFICIENT BUNDLE V2	Subject	APTITUDE
Topic	TIME, SPEED AND DISTANCE	Last updated on	18 March 2024

## CONCEPT 1 – UNIT CONVERSION

1) Convert 72 km/hr into m/s.

- a) 20 m/s.
- b) 30 m/s.
- c) 40 m/s.
- d) 50 m/s.

**ANS:a) 20 m/s.**

**Explanation:**

$$A*18 \text{ km/hr} = A*5 \text{ m/s}$$

$$4*18 \text{ km/hr} = 4*5 \text{ m/s} = 20 \text{ m/s.}$$

2) Convert 144 km/hr into m/s.

- a) 50 m/s.
- b) 40 m/s.
- c) 35 m/s.
- d) 25 m/s.

**ANS:b) 40 m/s.**

**Explanation:**

$$A*18 \text{ km/hr} = A*5 \text{ m/s}$$

$$8*18 \text{ km/hr} = 8*5 \text{ m/s} = 40 \text{ m/s.}$$



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3) An athlete runs a 200 m race in 24 seconds at his speed(km/hr).

- a) 20 km/hr.
- b) 24 km/hr.
- c) 28.5 km/hr.
- d) 30 km/hr.

**ANS: d) 30 km/hr.**

**Explanation:**

$$24 \text{ secs} - 200 \text{ m}$$

$$1 \text{ sec} - 25/3 \text{ m}$$

$$1 \text{ hr} - 5*(5/3) \text{ m/s} - 18*(5/3) = 30 \text{ km.}$$

4) A person crosses a 600 m long street in 5 minutes. What is his speed in km per hour?

- a) 3.6 km/hr.
- b) 7.2 km/hr.
- c) 8.4 km/hr.
- d) 10 km/hr.

**ANS: b) 7.2 km/hr.**

**Explanation:**

$$300 \text{ secs} - 600 \text{ m}$$

$$1 \text{ min} - 60 \text{ sec} - 120 \text{ m}$$

$$1 \text{ hr} - 60 \text{ min} - 120 * 60 = 7200 \text{ m} = 7.2 \text{ km.}$$



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5) A person covered a certain distance at the speed of 49 km/hr in 7 hrs. Find the distance covered by him/her?

- a) 342 km.
- b) 243 km.
- c) 343 km.
- d) 253 km.

**ANS: c) 343 km.**

**Explanation:**

Distance = Speed \* Time.

$$= 49 * 7$$

$$= 343 \text{ km.}$$

6) Ram is travelling at a speed of 72 km/hr while Ragul is travelling at a speed of 90 km/hr. Find the difference in their speeds in m/s.

- a) 4 m/s.
- b) 5 m/s.
- c) 5.5 m/s.
- d) 6 m/s.

**ANS: b) 5 m/s.**

**Explanation:**

Speed in m/s:

$$\text{Ram} = 72 \text{ km/hr} = 4 * 18 \text{ km/hr} = 4 * 5 \text{ m/s} = 20 \text{ m/s.}$$

$$\text{Ragul} = 90 \text{ km/hr} = 5 * 18 \text{ km/hr} = 5 * 5 \text{ m/s} = 25 \text{ m/s.}$$

$$\text{Difference in their speeds} = (25 \sim 20) = 5 \text{ m/s.}$$



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## CONCEPT 2 A – WHEN DISTANCE COVERED IS SAME.

7) Two persons cover the same distance at a speed of 25 km/hr and 30 km/hr respectively. Find the distance travelled if one person takes 25 min. more than the other.

- a) 62.5 km.
- b) 63.9 km.
- c) 60 km.
- d) 72 km.

**ANS: a) 62.5 km.**

**Explanation:**

Distance – Same

$SPEED \propto (1 / TIME)$

PERSON A : PERSON B

Speed                      5 : 6

Time                        6 : 5

Extra Time taken = 1 unit = 25 mins.

Time taken by Person A = 6 units =  $25 \times 6 = 150$  mins = 2 hrs 30 mins =  $5/2$  hrs.

Distance travelled = Speed \* Time =  $25 * (5/2) = 62.5$  km.



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8) A student takes 1.25 hrs to travel from home to school at 4 km/hr. By what percentage should he increase his speed to reduce the time by 25% to cover the same distance from school to house?

- a) 50%
- b) 25%
- c) 33.33%
- d) 45%

**ANS: c) 33.33%**

**Explanation:**

Time reduced by 25% means Old : New time taken = 4 : 3.

Distance – Same

SPEED  $\propto$  ( 1/ TIME)

OLD : NEW

Time    4 : 3

Speed    3 : 4

Old speed = 3 units = 4 km/hr.

New speed = 4 units =  $4 \times (4/3) = 16/3$  km/hr =  $5 \frac{1}{3}$  km/hr.

Increase in speed =  $\{ [(5 \frac{1}{3} - 4) / 4] \times 100 = 33 \frac{1}{3} \%$



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9) Two bicyclists do the same journey by travelling respectively, at the rates of 9 km/hr and 10 km/hr, find the length of the journey when one takes 32 minutes longer than the other ?

- a) 60 km.
- b) 56 km.
- c) 48 km.
- d) 64 km.

**ANS: c) 48 km.**

**Explanation:**

Distance – Same

$SPEED \propto (1/ TIME)$

BICYCLIST A : BICYCLIST B

Speed                      9 : 10

Time                        10 : 9

Extra Time taken = 1 unit = 32 mins.

Time taken by Bicyclist A = 10 units =  $32 \times 10 = 320$  mins = 5 hrs 20 mins  
=  $16/3$  hrs.

Distance travelled = Speed \* Time =  $9 * (16/3) = 48$  km.



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## CONCEPT 2 B – WHEN TIME TAKEN IS SAME.

10) If a person walks at 14 km/hr instead of 10 km/hr, he would have walked 20 km more. The actual distance travelled by him is:

- a) 56 km.
- b) 50 km.
- c) 70 km.
- d) 80 km.

**ANS: b) 50 km.**

### **Explanation:**

Time – Same (he covered more distance by increasing his speed at the same time.)

$$\text{SPEED} \propto \text{DISTANCE}$$

$$\text{OLD} : \text{NEW}$$

$$\text{Speed} \quad 5 : 7$$

$$\text{Distance} \quad 5 : 7$$

Extra distance covered = 2 units = 20 km.

Actual distance covered = 5 units = 50 km.



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11) A train covers a distance of 225 km in 2 hrs 30 minutes at a uniform speed. The time taken (in hrs) by the train to cover a distance of 630 km at the same speed is :

- a) 5 hrs.
- b) 6 hrs.
- c) 7 hrs.
- d) 4 hrs.

**ANS: c) 7 hrs.**

**Explanation:**

Time = 2 hrs 30 mins =  $\frac{5}{2}$  hrs.

5/2 hrs – 225 km

1 hr – 90 km

**7 hrs – 630 km.**





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### CONCEPT 3 – AVERAGE SPEED.

12) 30% of a certain distance was covered in 6 hrs ,45% in 5 hrs and the rest in 9 hrs. Find the average speed per hour for the whole journey.

- a) 5 km/hr.
- b) 6 km/hr.
- c) 8 km/hr.
- d) 5.5 km/hr.

**ANS: a) 5 km/hr.**

**Explanation:**

$$\text{AVERAGE SPEED} = \frac{\text{TOTAL DISTANCE TRAVELLED}}{\text{TOTAL TIME TAKEN}}$$

$$\text{Total Distance Travelled} = 30\% + 45\% + 25\% = 100$$

$$\text{Total Time Taken} = 6 + 5 + 9 = 20 \text{ hrs.}$$

$$\text{Average Speed} = 100/20 = 5 \text{ km/hr.}$$



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13) One-third of a certain distance was covered at the speed of 20 km/hr , one-fourth at the speed of 30 km/hr and the rest at the speed of 50 km/hr. Find the average speed per hour for the whole journey.

- a) 35 km/hr.
- b) 20 km/hr
- c) 30 km/hr.
- d) 25 km/hr

**ANS: c) 30 km/hr.**

**Explanation:**

$$\text{AVERAGE SPEED} = \frac{\text{TOTAL DISTANCE TRAVELLED}}{\text{TOTAL TIME TAKEN}}$$

- Total distance travelled =  $\frac{1}{3}$  ,  $\frac{1}{4}$  , rest – Take LCM of Denominator it will be your total distance.
- LCM of 3, 4 is 12.
- Total distance = 4 + 3 +5 =12
- Total time taken = Distance/Speed =  $4/20 + 3/30 + 5/50 = 4/10$ .
- Average Speed =  $12/(4/10) = 30$  km/hr.



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14) A ship sails to a certain city at the speed of 20 km/hr and sails back to the same point at the rate of 30 km/hr. What is the average speed for the whole journey?

- a) 8 km/hr.
- b) 6 km/hr.
- c) 12 km/hr.
- d) 18 km/hr.

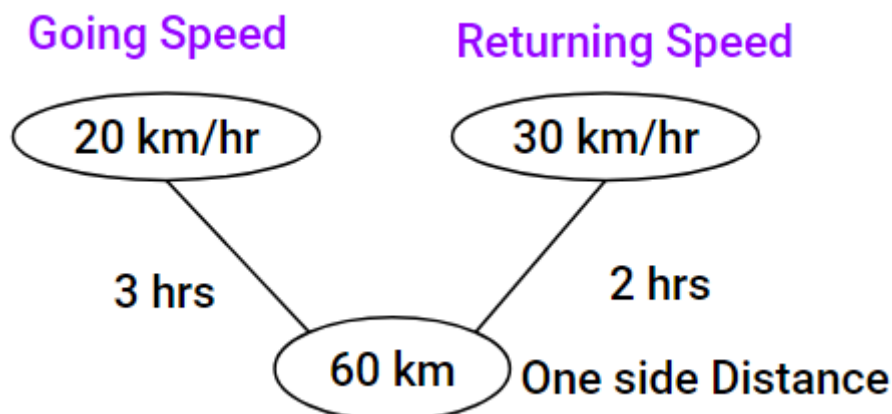
**ANS: b) 6 km/hr.**

**Explanation:** When the distance travelled is same,

$$\text{AVERAGE SPEED} = \frac{2 * S_1 * S_2}{S_1 + S_2}$$

$$\text{Average speed} = \frac{2 * 20 * 30}{50} = 24 \text{ km/hr.}$$

**ALTERNATIVE:** Use this method when Distance is asked while giving Speeds only.



Total distance travelled = 2\*60 = 120 km.

Average speed = Total distance travelled / Total Time taken

$$= 120 / (3+2) = 24 \text{ km/hr.}$$



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15) A boy goes to school at the speed of 3 km/hr and returns at the speed of 2 km/hr if he takes 5 hours in all, find the distance in kilometers between the village and the school.

- a) 8 km.
- b) 6 km.
- c) 12 km.
- d) 18 km.

**ANS: b) 6 km.**

**Explanation:**

$$\text{AVERAGE SPEED} = \frac{2 * S_1 * S_2}{S_1 + S_2}$$

$$= \frac{2 * 2 * 3}{5}$$

$$= 12/5 \text{ km/hr.}$$

$$\text{AVERAGE SPEED} = \frac{\text{TOTAL DISTANCE TRAVELLED}}{\text{TOTAL TIME TAKEN}}$$

$$\text{Total distance travelled} = (12/5) * 5 = 12 \text{ km}$$

$$\text{Distance between village and school} = 12/2 = 6 \text{ km.}$$



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16) A bicycle rider covers his onward journey from A to B at 10 km/h and during the return journey from B to A he covers the same distance at 8 km/h. if he finishes the onward and return journey in 4 hours 30 minutes, then the total distance covered by him during the entire journey is

- a) 80 km.
- b) 40 km.
- c) 20 km.
- d) 60 km.

**ANS: b) 40 km.**

**Explanation:**

$$\begin{aligned} \text{AVERAGE SPEED} &= \frac{2 * S_1 * S_2}{S_1 + S_2} \\ &= \frac{2 * 10 * 8}{18} \\ &= 80/9 \text{ km/hr.} \end{aligned}$$

$$\text{AVERAGE SPEED} = \frac{\text{TOTAL DISTANCE TRAVELLED}}{\text{TOTAL TIME TAKEN}}$$

$$\text{Total distance travelled} = (80/9) * (9/2) = 40 \text{ km.}$$



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17) A delivery boy started from his office at 10 am to deliver an article. He rode his scooter at 32 km/hr and delivered the article and waited for 15 mins to get the payment. After he reached his office at 11.25 am at the speed of 24 km/hr. Total distance covered by the boy is:

- a) 32 km.      b) 30 km.      c) 35 km.      d) 40 km.

**ANS: a)32 km.**

**Explanation:**

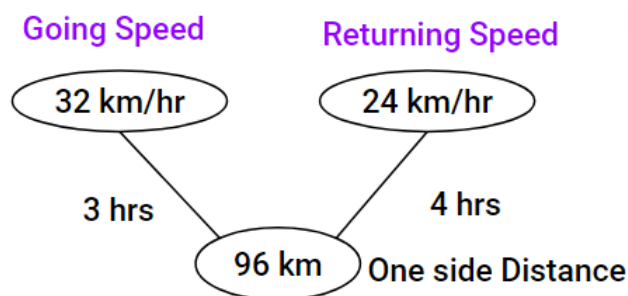
$$\text{AVERAGE SPEED} = \frac{\text{TOTAL DISTANCE TRAVELLED}}{\text{TOTAL TIME TAKEN}}$$

Time taken = 1 hr 25 mins - 15 mins = 1 hr 10 mins = 7/6 hr.

$$\begin{aligned} \text{Average speed} &= \frac{2 \times 32 \times 24}{56} \\ &= (8 \times 24) / 7 \end{aligned}$$

Total distance travelled = [(8\*24)/7] \* [7/6] = 32 km.

**ALTERNATIVE:**



Total distance travelled = 2\*96 = 192 km.

7 hrs – 192 km.

7/6 hrs – 32 km.



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18) A person travels from P to Q at the speed of 50 km/hr and returns by increasing his speed by 60%. What is his average speed for the whole journey?

- a) 16.53 km/hr.
- b) 36.51 km/hr.
- c) 35.16 km/hr.
- d) 61.53 km/hr.

**ANS: d) 61.53 km/hr.**

**Explanation:**

Return journey speed = 50 km/hr + 60% of 50 km/hr = 50 + (3/5)\*50 = 80 km/hr.

$$\text{Average speed} = \frac{2 \cdot 50 \cdot 80}{130} = 61.53 \text{ km/hr.}$$



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## CONCEPT 4 – PARTLY FOOT/PARTLY BICYCLE.

19) A man travelled a distance of 42 km in 5 hrs. He travelled partly on foot at the speed of 6 km/hr, partly on bicycle at the speed of 10 km/hr. The distance travelled on foot is

- a) 10 km.                      b) 12 km.                      c) 8 km.                      d) 18 km.

**ANS: b)12 km.**

**Explanation:**

	FOOT	BICYCLE
Distance	x	42-x
Speed	6	10

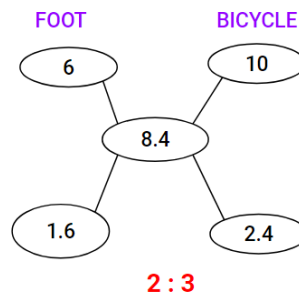
$$\frac{x}{6} + \frac{42-x}{10} = 5$$

$$5x + 3 \cdot 42 - 3x = 150$$

$$x = 12 \text{ km}$$

**ALTERNATIVE:**

Average Speed =  $42/5 = 8.4 \text{ km/hr.}$



Time, 5 units = 5 hrs

2 units = 2 hrs.

Distance travelled on foot =  $6 \cdot 2 = 12 \text{ km.}$

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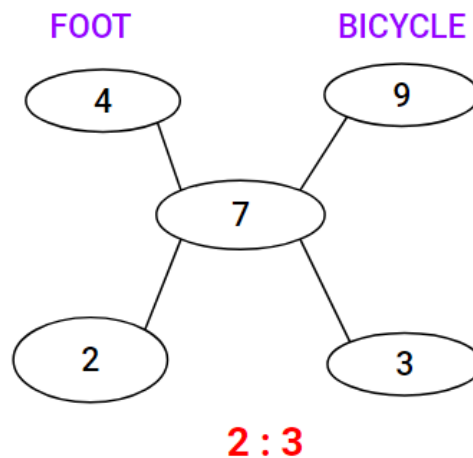
20) A man travelled a distance of 35 km in 5 hrs. He travelled partly on foot at the speed of 4 km/hr, partly on bicycle at the speed of 9 km/hr. The distance travelled on bicycle is

- a) 9 km.
- b) 12 km.
- c) 18 km.
- d) 27 km.

**ANS: d) 27 km.**

**Explanation:**

$$\text{Average Speed} = 35/5 = 7 \text{ km/hr.}$$



Time, 5 units = 5 hrs

2 units = 2 hrs.

Distance travelled on Bicycle =  $9 \times 3 = 27 \text{ km.}$



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## CONCEPT 5 – USUAL / NEW TIME.

21) By walking at  $\frac{3}{4}$ th of his usual speed, a man reaches the office 20 minutes later than usual. His usual time is ?

- a) 60 minutes.
- b) 40 minutes.
- c) 30 minutes.
- d) 80 minutes.

**ANS: a) 60 minutes.**

**Explanation:**

Distance – Same

$SPEED \propto (1 / TIME)$

USUAL : NEW

Speed                      4 : 3

Time                        3 : 4

Extra Time taken = 1 unit = 20 mins.

Usual Time = 3 units =  $3 \times 20 = 60$  mins.



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## CONCEPT 6 – EARLY / LATE.

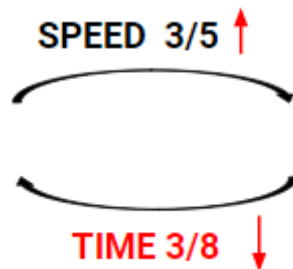
22) Ravi going to his school from his home on his bicycle at 8:20 am. If he runs his cycle at the speed of 10 km/hr, he reaches 8 mins late. If he increases the speed to 16 km/hr, he reaches 10 mins early. Ravi's school starts at

- a) 9:05 am.
- b) 9:00 am.
- c) 8:50 am .
- d) 8:55 am.

**ANS: b) 9:00 am.**

**Explanation:**

Increase in Speed = 6 km/hr, which is  $\frac{3}{5}$  of original speed.



Decrease in time  $\rightarrow 3 \rightarrow$  Difference in time =  $(10 - (-8)) = 18$  mins.

Original time  $\rightarrow 8 \rightarrow 48$  mins.

By travelling 48 mins, he is 8 mins late.

Therefore, School starts at 8:20 + 40 mins which is 9:00 am.



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23) A man covered a certain distance at a certain speed. If he had moved 3km/hr faster, he would have taken 40 minutes less. If he had moved 2 km/hr slower, he would have taken 40 mins more. The distance (in km) is :

- a) 35 km.
- b)  $36 \frac{2}{3}$  km.
- c)  $37 \frac{1}{2}$  km.
- d) 40 km.

**ANS: d) 40 km.**

**Explanation:**

Distance in both the cases are the same. Let Speed be S km/hr.

$$\frac{S(S+3)}{3} * \frac{40}{60} = \frac{S(S-2)}{2} * \frac{40}{60}$$

$$2(S+3) = 3(S-2)$$

$$S = 12 \text{ km/hr}$$

$$D = \frac{S_1 * S_2}{S_1 - S_2} * (\text{Difference of time})$$

$$D = \frac{12 * 15}{3} * \frac{40}{60}$$

**Distance = 40 km.**



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24) A person has to cover a distance of 160 km in 15 hrs. If he covers  $\frac{4}{5}$  of the distance in  $\frac{2}{3}$  of the time, then what should be his speed (in km/hr) to cover the remaining distance?

- a) 6 km/hr
- b) 6.4 km/hr
- c) 8 km/hr
- d) 6.5 km/hr

**ANS: b) 6.4 km/hr.**

**Explanation:**

$\frac{4}{5}$  distance =  $160 * (\frac{4}{5}) = 128$  km in  $\frac{2}{3}$  time i.e,

128 km in 10 hrs. Then, we have to cover 32 km in 5 hrs.

Therefore, Speed =  $\frac{32}{5} = 6.4$  km/hr.

### CONCEPT 6 – REST INBETWEEN (BREAK CONCEPT).

25) A man walks at 8 km/hr. After every km he takes a rest for 4 minutes. How much time will he take to cover a distance of 6 km?

- a) 60 minutes.
- b) 65 minutes.
- c) 70 minutes.
- d) 75 minutes.

**ANS: b) 65 minutes.**

**Explanation:**

Number of breaks = 5. Break time =  $5 * 4 = 20$  mins.

Speed = 8 km – 1 hr

$6$  km –  $\frac{3}{4}$  hr = 45 mins + Break time.

Time taken =  $45 + 20 = 65$  mins.



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26) A man walks at 20 km/hr. After every 3 kms he takes a rest for 5 minutes. How much time will he take to cover a distance of 40 km?

- a) 2 hrs.
- b) 3 hrs 12 mins.
- c) 2 hrs 40 mins.
- d) 3 hrs 5 mins.

**ANS: d) 3 hrs 5 mins.**

**Explanation:**

Number of breaks = 13. Break time =  $13 \times 5 = 65$  mins = 1 hr 5 mins.

Speed = 20 km – 1 hr

40 km – 2 hrs

Time taken = 2 hr + 1 hr 5 mins = 3 hrs 5 mins

27) The distance between places A and B is 999 km. An express train leaves place A at 6 am and runs at the speed of 55.5 km/hr. The train stops on the way for 1 hr 20 mins. It reaches B at

- a) 1:20 am.
- b) 12 am
- c) 1 am.
- d) 11 pm.

**ANS: a) 1:20 am.**

**Explanation:**

Speed = 55.5 km/hr

1 hr – 55.5 km

2 hrs – 111 km

**18 hrs – 999 km.**

Total time taken = 18 hrs + 1 hr 20 mins = 19 hrs 20 mins = 1:20 am.



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## CONCEPT 6 – WITH / WITHOUT STOPPAGE.

28) Excluding stoppages, the speed of the bus is 60 km/hr and including stoppages, it is 45 km/hr. For how many minutes does the bus stop per hour?

- a) 12 mins.
- b) 9 mins.
- c) 1/4 mins.
- d) 15 mins.

**ANS: d) 15 mins.**

**Explanation:**

$$\text{Stoppage time/min} = \frac{\text{Difference of Speeds}}{\text{Speed without stoppage}} * 60$$

$$\begin{aligned}\text{Stoppage time/min} &= (15/60)*60. \\ &= 15 \text{ mins.}\end{aligned}$$



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29) Two tourist buses start from the same point and move along 2 roads at right angles. One bus at the speed of 48 km/hr and the other at the speed of 36 km/hr. Distance between the two buses after 15 second is :

- a) 50 m.
- b) 250 m.
- c) 350 m.
- d) 200 m.

**ANS: b) 250 m.**

**Explanation:**

**Bus 1:**

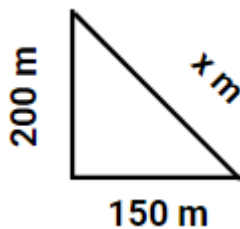
Speed in m/s =  $48 * (5/18) = 120/9$  m/s.

Distance covered in 15 seconds =  $(120/9)*15 = 200$  m.

**Bus 2:**

Speed in m/s =  $36 * (5/18) = 10$  m/s.

Distance covered in 15 seconds =  $(10)*15 = 150$  m.



$$x^2 = 200^2 + 150^2$$

$$x = 250 \text{ m. by Triplets (3,4,5)}$$





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## CONCEPT 7 – POLICE / THIEF CONCEPT

30) A thief is noticed by a policeman from a distance of 200 m. The thief starts running and the policeman chases him. The thief and the policeman run at the rate of 10 km and 11 km per hour respectively. What is the distance between them after 6 minutes?

- a) 100 m.
- b) 150 m.
- c) 190 m.
- d) 200 m.

**ANS: a) 100 m.**

**Explanation:**

Police and a thief are running in the same direction.

Therefore, Relative Speed =  $(11 - 10)$  km/hr = 1 km/hr.

$$60 \text{ mins} - 1 \text{ km} = 1000 \text{ m}$$

$$6 \text{ mins} - 100 \text{ m.}$$

$$\text{Distance between them after 6 minutes} = 200 - 100 = 100 \text{ m.}$$



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31) Two bullets are fired at an interval of 34 mins but a person approaching the firing point in his car hears the two sounds at an interval of 33 mins. If the speed of the sound is 330 m/s. Then the speed of the car is,

- a) 15 m/s.
- b) 25 m/s.
- c) 10 m/s.
- d) 30 m/s.

**ANS: c) 10 m/s.**

**Explanation:**

**NOTE:**

Distance covered by bus in 33 mins = Distance covered by the bullet in (34 - 33) mins = 1 min = 60 secs.

$$\text{Speed of bus} * (33 * 60) = 330 * 60.$$

$$\text{Speed of bus} = 10 \text{ m/s.}$$