TIME, SPEED AND DISTANCE

Dear students we welcome you in another chapter in series of Mahendra Study Notes. Last topic we discussed was time and Work.

So lets start..

Whenever any one says that I was driving at 45 km/s then what comes in your mind immediately?

It simply means that person was driving at such speed so that he could travel a distance of 45 kms in one hour. Right??

So in simple word we can say that distance moved in unit time is called speed.

Distance = Time × Speed

Distance = Speed x Time

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

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

Distance travelled is proportional to the speed of the object if the time is kept constant.

Distance travelled is proportional to the time taken if speed of object is kept constant.

Speed is inversely proportional to the time taken if the distance covered is kept constant.

If the ratio of two speeds for same distance is a:b then the ratio of time taken to cover the distance is b:a

Average speed = Total Distance travelled / Total Time Taken

When Distance is equal - **Average speed = 2xy/(x + y)**

Where x and y are the speeds at which distance is travelled.

Distance Constant

If the distance traveled for each part of the journey, ie d1=d2=d3=...=dn=d, then average speed of the object is Harmonic Mean of speeds.

Let each distance be covered with speeds s1,s2,...sn in t1,t2,...tn times respectively.

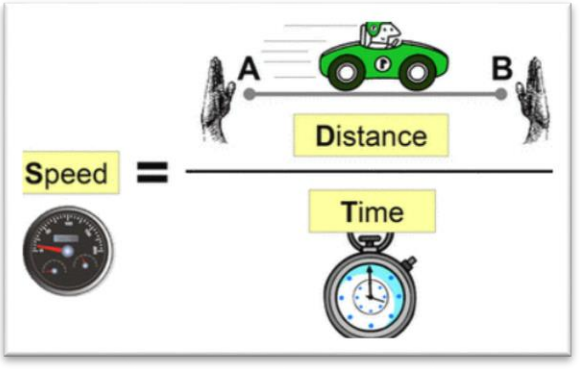
Then **t1 =d/s1**

t2 = d/s2

tn =d/sn

Then, Average Speed= [(d + d + d+ ... ntimes)]/ [d/s1 + d/s2+ d/s3+ ... d/sn

Average Speed= (n)/[(1/s1 + 1/s2+ .... 1/sn)]



Time Constant

If time taken to travel each part of the journey, ie t1=t2=t3=…tn=t, then average speed of the object is Arithmetic

Let distance of parts of the journey be d1,d2,d3,...dn and let them be covered with speed s1,s2,s3,...sn respectively.

Then d1=s1 t , d2=s2t, d3=s3t, ... dn=snt

then , Average Speed= [(s1/t+ s2/t+ .... sn/t)/(t + t+ ... n times)]

Average Speed=(s1+ s2+s3+ ... + sn)/n

- **Conversion from kph (km/h) to mps(m/sec)**

For converting kph(kilometer per hour) to mps(meter per second) we use following formula

x km/hr=(x∗5/18) **m/sec**

- **Conversion from mps(m/sec) to kph(km/h)**

For converting mps**(meter per second)** to kph**(kilometer per hour)** we use following formula

x **m/sec**= x ×(18/5) **km/h**

Relative Speed⟶

- If two objects are moving in the same direction with speeds *a* and *b* then their relative speed is **|a-b|**
- If two objects are moving in opposite direction with speeds *a* and *b* then their relative speed is **(a+b)**

(c) When two bodies moving towards each other than time taken by them to meet.

D ⟶ Distance between two bodies.

S_1, S_2 ⟶ Speed of two bodies.

T (Time taken to meet other) = D/(S_1 + S_2)

(d) When two bodies are moving in opposite direction, time taken to meet.

T (Time taken) = D/(S_1 – S_2)

(e) If two persons A & B, start at the same time from P and Q towards each other and after crossing they take T_1 & T_2 hrs in reaching Q & P

$$\frac{S_1}{S_2} = \sqrt{\quad}$$

Problems on Trains

(a) If a train of length l meters passes a platform or bridge of length m metres, then distance travelled is

Distance = l + m

(b) If a train of length l meters passes a pole, man, tree etc, then Distance travelled is

Distance = l meters

(c) If two trains of lengths L_1 & L_2 are travelling in the same direction with speeds S_1 & S_2 then. Time taken by faster train to cross slower train is given by

T=(L_1+L_2)/(S_1-S_2)

(d) If two trains of length L_1 & L_2 are travelling is opposite direction with speeds S_1 & S_2, then time taken by trains to cross each other is

T=(L_1+L_2)/(S_1-S_2)

(e) Two trains of length L_1 & L_2 run on parallel tracks. When running is same direction, the faster train passes slower train in T_1 secs, but when they are running in opposite direction with same speeds, they passes each other in T_2 sec. Then,

Speed of faster train= $\frac{+L_2}{2}\left(\frac{}{T_1}+\frac{1}{T}\right)$

Speed of slower train= $\frac{+L_2}{2}\left(\frac{}{T_1}-\frac{1}{T}\right)$

Boat & Stream

(a) Downstream⟶ When boat & stream moves in the same direction.

Downstream Speed = u + v

Where u ⟶ speed of boat

v ⟶ speed of stream

(b) Upstream⟶ When boat & stream moves in the opposite direction.

Upstream speed = u – v

(c) If D ⟶ is downstream speed , U⟶ is upstream speed.Then,

Speed of boat = (D + U)/2

Speed of stream = (D - U)/2

Solved Exercise

1. Two trucks travel the same distance at the speed of 50 kmph and 60 kmph. Find the distance when the distance when the time taken by both trucks has a difference of 1 hour.

Sol:

Let's say S_1 = 50 kmph,

S_2 = 60 kmph

$T_1 - T_2 = 1$

Distance = [(50×60)/(60-50)]×1 = 300km

2. Busses 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?

(1) 3 km/hr (2) 4 km/hr (3) 5 km/hr

(4) 7 km/hr (5) None of these

Sol: Distance covered in 10 minutes at 20 kmph = distance covered in 8 minutes at (20+x) kmph

20× 10/60=8/60(20+x)

200 = 160 + 8x

8x = 40

x=40/8=5 kmph

3. The distance between two cities A and B is 330km. A train starts from A at 8 (a)m. and travels towards B at 60 km/hr. Another train starts from B at 9 (a)m. and travels towards A at 75 km/hr. At what time do they meet?

(1) 10 am. (2) 10 : 30 am. (3) 11 am.

(4) 11 : 30 am. (5) None of these

Sol: Distance travelled by first train in one hour

= 60 x 1 = 60 km

Therefore, distance between two train at 9 a.m.

= 330 – 60 = 270 km

Now, Relative speed of two trains

= 60 + 75 = 135 km/hr

Time of meeting of two trains =270/135=2 hrs.

Therefore, both the trains will meet at 9 + 2 = 11 A.M.

4. Two trains are moving on two parallel tracks but in opposite directions. A person sitting in the train moving at the speed of 80 km/hr passes the second train in 18 seconds. If the length of the second train is 1000 m, its speed is?

(1) 100 km/hr (2) 120 km/hr (3) 140 km/hr

(4) 150 km/hr (5) None of these

Sol: Let the speed of second train be x m/s.

80 km/h = (80×5)/18 m/s

According to the question 1000/(x+(80×5)/18)=18

100 – 18x + 400

x=666/18 m/s

= 600/18×18/5 km/h = 120 km/h

5. In covering a distance of 30 km, Abhay takes 2 hours more than Sameer. If Abhay doubles his speed, then he would take 1 hour less than Sameer. Abhay's speed is?

(1) 5 kmph (2) 6 kmph (3) 6.25 kmph

(4) 7.5 kmph (5) None of these

Sol: Let Abhay's speed be x km/hr.

Then, 30/x-30/2x= 3

6x = 30

x = 5 km/hr.

6. It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the cars is?

(1) 2 : 3 (2) 3: 2 (3) 3 : 4

(4) 4 : 3 (5) None of these

Sol: Let the speed of the train be x km/hr and that of the car be y km/hr.

Then, 120/x+480/y= 8 1/x+4/y=1/15 ....(i)

And, 200/x+400/y=25/3 1/x+2/y=1/24 ....(ii)

Solving (i) and (ii), we get: x = 60 and y = 80.

Ratio of speeds = 60 : 80 = 3 : 4.

7. Walking at 7/8th of his usual speed, a man reached his destination 16 minutes later than the time he usually takes to reach his destination. Find the usual time taken by him to reach his destination.

(1) 1 hour, 44 minutes

(2) 1 hour, 52 minutes

(3) 1 hour, 36 minutes

(4) 1 hour, 40 minutes

(5) None of these

Sol: Ratio

Speed 8 : 7

Time 7 : 8

1 = 16

7 = 7 X 16 = 112 min

= 1 hr 52 min

8. **A person goes to office by train. He walks to the railwy station closest to his home to catch the train. One day, he walked at 4 km/hr and missed the train by 5 minutes. The next day, he walked at 6 km/hr and reached the station 7 minutes before the arrival of the train. find the distance between his home and the station.**

(1) 2.4 km (2) 1.8 km (3) 3.6 km

(4) 3 km (5) None of thse

Sol: Let S1 = 4 kmph, S2 = 6 kmph

Distance = (S1 × S2)/ (S1-S2) X total time in hr

Distance = (4 ×6)/ (6- 4) x (7+5)/60

= (4 ×6)/2 × 1/5 = 2.4 km

9. **Ashok covered a distance of 225 km as follows. He covered the first 15 km at 45 km/hr, the next 120 km at 60 km/hr and the remaining journey at 90 km/hr. Find his average speed for the journey of 225 km.**

(1) 65 km/hr (2) 67.5 km/hr (3) 70 km/hr

(4) 73.5 km/hr (5) None of these

Sol: Average speed = Total distance / Total time

= 225/(15/45 + 120/60 + 90/90) = 67.5 km/h

10. **Car P starts from town X toward town y. Car Q stars from Y towards X. Both the cars start simultaneously and travel their meet after journeys at uniform speeds. XY = 200 km. Both cars meet after 2 hours. If P and Q had travelled in the same direction both the cars would have met in 4 hours. Find the speed of P.**

(1) 60 kmph (2) 85 kmph (3) 75 kmph

(4) 80 kmph (5) None of these

Sol: Let speed of car P = S1

& speed of car Q = S2

From Ist case:

2S1 + 2S2 = 200 - (i)

From 2nd case, When cars travelled in Same direction

200/ (S1 - S2) = 4

4 S1 - 4 S2 = 200 (ii)

From Equation (i) & (ii)

S1 = 75 kmph

11. **Train P overtakes train Q double its length and travelling at half of speed of train P in 36 seconds. Train P crosses train R going in the opposite direction at double its speed in 8 seconds. If the speed of train P is 72 kmph then the length of train R is .....**

(1) 330 m (2) 360 m (3) 390 m

(4) 420 m (5) None of these

Sol: For Train P

length = L, Speed = 72 kmph

For train Q

length = 2L, Speed = 36 kmph

(L + 2L)/(72 - 36)X5/18

L= 120 meter

For train R

Speed = 2 X 72 = 144 kmph

& length = x meter

(120 + x) / (144 + 72)X5/18 = 8

x = 360 meter

12. **A 480 m long train was travelling at 72 km/hr. It took 32 seconds to cross a cyclist travelling in the same direction as the train. Find the speed of the cyclist.**

(a) 12 km/ph

(b) 15 km/ph

(c) 18 km/ph

(d) 9 km/ph

Sol: Let speed of cyclist = x kmph

480/(72 - x) X 5/18 = 32

x = 18 kmph

13. A train, 180m long, crossed a 120 m long platform in 20 seconds, and another train travelling at the same speed crossed an electric pole in 10 seconds. In how much time will they cross each other when they are travelling in the opposite direction.?

(a) 11 sec

(b). 13 sec

(c) 12 sec

(d) 14 sec

Sol: Let speed of 1st train = x kmph

(180 + 120)/(x X 5/18) = 20

x = 54 kmph

T/(54 X 5/18) = 10, T = 150 meter

So, (180 + 150) / (54 + 54) X5/18 = 11 sec

14. **On a circular track, time taken by A and B to meet when travelling in the opposite directions is 1/4 of time taken when they travel in the same direction. Find the ratio of their speeds?**

(a) 5: 3

(b) 6 : 5

(c) 4 : 3

(d) 3 : 2

Sol: Let speed of A = x kmph

& speed of B = y kmph & x > y

When they are travelling in same direction, time taken be t

2PiR/ (x - y) = t ..... (i)

When they are travelling in opposite direction

2PiR/(x + y) = t/4 ..... (ii)

From Eq (i) & (ii)

x + y /x - y = 4

By C & D

x/y = (4 + 1)/(4 -1) = 5/3

x : y = 5 : 3

15. **How long will three persons starting at the same point and travelling at 4 km/hr, 6 km/hr and 8 km/hr around a circular track 2 km long take to meet at the starting point?**

(a) 1/2hr

(b) 1hr

(c) 1.5 hrs

(d) 2 hrs

Sol: Time taken for the three people meet in hours

= LCM (2/4, 2/6, 2/8)

= 1 hours

16. The length of the two trains are 60 m and 90 m are running at the speed of 58 km/hr and 50km/hr respectively on parallel tracks in opposite direction. In how many seconds will they pass each other?

(1) 10 (2) 8 (3) 5

(4) 3 (5) None of these

Sol: The relatives speed = (58+50) km/hr

= 108km/hr

m/sec = 30 m/s

The distance covered to pass each other

= 60+90 = 150m

∴ The time taken to pass each other

= 150/30 = 5 second

17. A, B and C decide to have a 'x' m race. C completes the race 14 m ahead of A. B finishes 20 m ahead of C and 32 m ahead of A. What is A's speed?

(1) 2/3 of B's speed (2) 9/10 of C's speed

(3) 7/8 of C' speed (4) 3/4 of B' s speed

(5) None of these

Solution:

Speed = distance/time

Given, A, B and C decide to have a 'x' m race. C completes the race 14 m ahead of A.

Thus, when C covers 'x' m, A covers (x – 14)m

Ratio of speeds of A and C will be equal to the distance covered by them in the same time.

⇒A's speed : C's speed = (x – 14) : x --------- (1)

Also, B finishes 20 m ahead of C and 32 m ahead of A

Thus, when C covers (x – 20)m, A covers (x – 32)m.

Ratio of speeds of A and C will be equal to the distance covered by them in the same time.

∴A's speed : C's speed = (x – 32) : (x – 20) ------- (2)

From eq(1) and eq(2).

(x – 14) : x = (x – 32) : (x – 20)

(1) 75 km/hr (2) 80 km/hr (3) 85 km/hr
(4) 88 km/hr (5) 90 km/hr

Solution :

Time = speed/distance

Given, Car A trails car B by 60 meters. Car B travels at 55km/hr. Car C travels from the opposite direction at 65km/hr. Car C is at a distance of 240 meters from Car B.

Let the speed of car A be a km/hr.

Relative speed of car A with respect to B

= a – 55 km/hr

Relative speed of car B with respect to C

= 55 + 65 = 120 km/hr

Now, car A decides to overtake Car B before cars B and C cross each other.

Thus for minimum speed required the time taken by car A to overtake B would be equal to the time taken for car B and C to cross each other.

$$\frac{60}{a-55} = \frac{240}{120}$$

$\Rightarrow a - 55 = 30$

$\Rightarrow a = 85$ km/hr

18. **A car travels from P to Q at a constant speed. If its speed were increased by 20km/hr, it would have taken two hour lesser to cover the distance. It would have taken further 30 minutes lesser if the speed was further increased by 10 km/hr. The distance between the two cities**

(1) 100 km (2) 120 km (3) 150 km
(4) 180 km (5) None of these

Solution :

Let the distance between two cities = D,

D = x×t (x = usual speed and t is the actual time)

D = (X + 20)×(T -2) and D = (X +30)×(T – 2.5)

Solve the above equation, u will get T = 5 and X = 30, so distance = 30×5 = 150 km

19. **A train, running at the speed of 54 km per hour, can cross a platform double its length, in 20 sec. What is the length of the platform?**

(1) 50m (2) 100m (3) 150m
(4) 200m (5) 300m

Solution :

Time taken to cross the bridge = $\frac{X + 2X}{54 \times \frac{5}{18}} = 20$

Solving for X, we get X=100

Thus length of the platform = 200m

20. **A car driver leaves Delhi at 8 A.M. and expects to reach a place 300 km from Delhi at 12.30 P.M. 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?**

(1) 45 km/hr (2) 42 km/hr (3) 35 km/hr
(4) 30 km/hr (5) None of these

Solution :

Distance by car driver in 2.5 hours

= 300 ×40/100 = 120 km

Speed (1) = 120×2/5 = 48 km/hr

Distance to be covered in next 2 hrs = 180

Speed (2) = 180/2 = 90 km/hr

Required difference = 90-48 = 42 km/hr

21. **It takes 15s for a train travelling at 60 km/hr to cross entirely another train half its length and travelling in opposite direction at 48 km /hr. It also passes a platform in 51s. The length of the platform is**

(1) 550 m (2) 450 m (3) 500 m
(4) 600 m (5) None of these

Solution :

Let the length of the longer train is L and that of the shorter train be l

Since another train is half of length of first train

$\therefore L = 2l$

Since, Length of the trains = Time require to cross both train × Sum of the speed (as both trains are moving in same direction)

$$L + l = 15x \times \left\{(60 + 48) \times \frac{5}{18}\right. \text{ m/s}$$

$\Rightarrow 3l = 450$

$\Rightarrow l = 150$ m

∴Length of the longer train = 300 m

In order to cross the platform, the train has to traverse the distance equal to the sum of the length of the longer train and the length of the platform.

Let the length of the platform is x.

$$L + x = 51x \times \frac{\left(60 \times \frac{5}{18}\right) m}{s} = 850m$$

⇒x = 850 – 300 = 550 m

∴The length of the platform is 550 m

22. **A train is running at a uniform speed of 60 km/hr. If the length of the train is 73 m, then the time taken by the train in crossing 77m ling bridge is**

(1) 9 sec (2) 12 sec (3) 15 sec

(4) 18 sec (5) None of these

Solution :

Speed of the train = 60km/hr = 60 × 5/18 = 50/3 m/sec

Length of train = 73m

Length of bridge= 77

Time taken =150 ÷ 50/3 = 9 sec

23. **If a distance of 60 m is covered in 1 minute, that 80 m in 2 minutes and 100 m in 3 minutes find the distance covered in 25 minutes**

(1) 520 (2) 480 (3) 540

(4) 430 (5) None of these

Solution :

Distance covered in 1st minute is 60 m

Distance covered in 2nd minute = 80 – 60 = 20 m

Distance covered in 3rd minute = 100 – 80 = 20 m

Required distance = 60 + 20 × 24

= 60 + 480

= 540 m

24. **P and Q are 54 km away. Two trains with speed of 32 km /hr and 26 kmph respectively start simultaneously from P and Q and travel in the same direction. They meet at a point R beyond Q. Distance QR is**

(1) 126 km (2) 234 km (3) 148 km

(4) 136 km (5) None of these

Solution :

Let trains meet after t hours then

32t – 26t = 54

6t = 54

t = 9 hours

QR = 26t = 26 × 9 =234km

25. **If a walks at 5/6 of its usual speed ,he reaches its destination 10 min late. find its usual time:**

(1) 10 min (2) 20min (3) 60min

(4) 50 min (5) None of these

Solution :

new speed =5/6 of usual speed

new time=6/5 of usual time

6/5 of usual time- usual time =10min

usual time=50min

26. **I walk a certain distance and ride back taking a total time of 37 min. I could walk both ways in 55 min. How long would it take me to ride both ways?**

(1) 15 min (2) 19 min (3) 10 min

(4) 25 min (5) None of these

Solution :

Let the given distance be x km. Then,

(Time taken to walk x km) + (Time taken to ride x km) = 37 min

⇒(Time taken to walk 2x km) + (Time taken to ride 2x km) = 74 min

⇒55 min + (Time taken to ride 2x km)

= 74 min

⇒Time taken to ride 2x km = 19 min

27. **A man covers the journey from a station A to station B at a uniform speed of 36 km/hr and returns to A with a uniform speed of 45 km/hr. His average speed for the whole journey is:**

(1) 40 km/hr (2) 50 km/hr (3) 41 km/hr

(4) 42 km/hr (5) None of these

Solution :

Here same distances are covered at different speeds.

∴Average speed

$$= \left(\frac{2xy}{x+y}\right) \text{kmph}$$

$$= \left(\frac{2 \quad 36 \times 45}{35+45}\right) \text{kmph}$$

$$= \frac{2 \times 36 \quad 45}{81} \quad 40\text{kmph}$$

28. **Two trains 108 m and 112 m in length are running towards each other on the parallel lines at a speed of 45 km/hr and 54 km/hr respectively. To cross each other after they meet, it will take**

(1) 12 sec (2) 9 sec (3) 8 sec

(4) 10 sec (5) None of these

Solution :

Relative Speed = 45 + 54 = 99 kmph

= 99×5/18 = 55/2 m/sec

Required time $\frac{108+112}{\frac{55}{2}} = \frac{220 \quad 2}{55} \quad 8$ seconds

29. **A train is running at a speed of 90 km/hr. If it crosses a signal in 10 sec., the length of the train in metres is**

(1) 150 (2) 324 (3) 900

(4) 250 (5) None of these

Solution :

Speed of the train = 90km/hr = 25m/sec

Length of train = distance covered

= 25 × 10 = 250metre

30. **A man starts from a place P and reaches the place Q in 7 hours. He travels one-fourth of the distance at 10 km/hr and the remaining distance at 12 km/hr. What is the distance (in km) between P and Q?**

(1) 70 (2) 80 (3) 72

(4) 90 (5) None of these

Solution :

If the distance between P and Q be k km, then

$$\frac{\frac{x}{4}}{10} + \frac{\frac{3x}{4}}{12} = 7$$

$$\Rightarrow \quad \frac{x}{40} + \frac{x}{16} = 7$$

$$\Rightarrow \quad \frac{2x+5x}{80} = 7$$

$$\Rightarrow \quad 7x = 7 \times 80 \Rightarrow \; x = 80 \text{ km}$$

31. **A motorist travels 100 miles on an expressway at an average speed of 80 mph and another 45 minutes on other roads. The average speed for his whole journey is 65 mph. How far did he travel on the other roads?**

(1) 10 miles (2) 20 miles (3) 30 miles

(4) 40 miles (5) None of these

Time on the expressway is 100 miles / 80 mph

= 1.25h (1h:15m)

He spent another 45 minutes on other roads, so his whole journey was 1h:15m plus 45m = 2 hours.

If his average speed over the 2 hours was 65 mph, then he must have traveled 2h × 65 mph = 130 miles

So he must have driven 130 - 100 = 30 miles on the other roads.

32. **A 210 metre long train crosses a man running at 9 kmph in opposite direction in 6 seconds. Find the speed of the train.**

(1) 98 kmph (2) 97 kmph (3) 107 kmph

(4) 117 kmph (5) None of these

Solution :

T= 6 sec

D= 210 m

Vr= VT+Vm = 210/6 = 35 m/sec = 35×18/5 kmph

= 126 kmph

$\Longrightarrow$VT =126- Vm = 126-9 =117 kmph

33. **A passenger train covers the distance between stations X and Y 50 minutes faster than a goods train. Find this distance if the average speeds of the passenger train is 180 kmph and that of goods train 60 kmph.**

(1) 75km (2) 64 km (3) 55km

(4) 80km (5) None of these

Solution :

Required distance = (180×60)/(180-60)× 50/60 = 75 km

34. **A car runs at the speed of 120 kms per hour when not serviced and runs at 144 kms per hour when serviced. After servicing the car covers a certain distance in 24 hours. How much time will the car take to cover the same distance when not serviced?**

(1) 26.4 hours (2) 23.5 hours (3) 26 hours

(4) 28.8 hours (5) None of these

Solution :

Required number of hours = (144×24)/120 = 28.8

35. **A carriage driving in a fog passed a man who was walking at the rate of 6 kmph in the same direction. He could see the carriage for 4 minutes and it was visible to him upto a distance of 200 meters Find the speed of the carriage.**

(1) 8.75 kmph (2) 8.5 kmph (3) 8 kmph

(4) 9 kmph (5) None of these

Solution :

Relative distance travelled by carriage

= 200 m ; t = 4 min

Relative speed Vr =200/4×60 =5/6 (m/sec)

=5/6×18/5 kmph

= 3kmph Vr=Vc-6 $\Longrightarrow$Vc = 3+6 = 9 kmph

36. A train 100 m long is running at the speed of 30 km/h. The time (in second) in which it will pass a man standing near the railway line is how much?

(1) 10 (2) 11 (3) 12

(4) 15 (5) None of these

Solution :

Required time = $\frac{100}{30 \times 1000}h = \frac{100 \times 60 \quad 60}{30 \quad 1000}$

= 12s

37. **Tanya walks to the market and comes back in a taxi. It takes her 90 min to make the round trip. If she takes a taxi both ways it takes him 30 min. On a Sunday, she decides to walk both ways. How long would it take her?**

(1) 100 min (2) 120 min (3) 140 min

(4) 150 min (5) None of these

Solution :

Let's assume that T is the time taken by a taxi in one direction and W is the time taken by her to walk in one direction, then

T + W = 90 …. (I)

T + T = 30 …. (II)

From equation (I) and (II), we get

T = 15 and W = 75

∴ W + W = 150 min

38. **A truck covers a distance of 640 kms in 10 hrs. A car covers the same distance in 8 hrs. What is the respective ratio between the speed of the truck and the car?**

(1) 3 : 4 (2) 1 : 2 (3) 5 : 6

(4) 6 : 7 (5) None of these

Solution :

Speed = distance/time

Speed of the Truck = 640/10

Speed of the car = 640/8

Required Ratio = 640/10 : 640/8

= 8 : 10 = 4 : 5

39. **The sum of length of two trains is 864 m. the ratio between the speed of the first and the second train is 6:4. The ratio between time to cross a piller by first and second train is 5: 6. Find the difference between the length of both the trains.**

(1) 80 (2) 64 (3) 96

(4) 112 (5) None of these

Solution :

Short trick:

1st : 2nd

Speed ratio= 6 : 4

Time ratio = 5 : 6

So length of the trains should be in ratio of, speed × time

1st:2nd = 30:24

= 5:4 total 9 equals to 864 (96×9)

Diff of 1 =96(which is difference between lengths of train)

Basic method:

Let the length of the first and the second train is x and y respectively.

$\therefore \frac{x}{6} = 5k$ (for first train)

$\frac{y}{4} = 6k$

$\therefore x = 30k$ and $y = 24k$

$54k = 864$

$k = 16$

Required $30k - 24k = 6k = 6 \times 16 = 96$ m.

40. **Two places A and B are 80 km apart. Ram and Shyam starts moving from A towards B . Speed of Ram is 2 km/h more than that of Shyam. Ram reached to B and while moving back to A, Ram meets to Shyam at 10 km distance from B. Find the speed of Ram?**

(1) A5 km/h (2) B7 km/h (3) C9 km/h

(4) D10 km/h (5) None of these

Solution :

Total distance covered by Ram = 80 + 10 = 90 km

Total distance covered by Shyam = 80 – 10 = 70 km

Let speed of Shyam be x km/h

Speed of Ram = x + 2 km/h

According to question

$\frac{90}{x+2} = \frac{70}{x}$

$90x = 70x + 140$

$20x = 140$

$\therefore x = 7$ km/h

Speed of Ram = 7 + 2 = 9 km/h

41. **A monkey climbing up a greased pole ascends 12 meters in one minute and slips down 5 meters in alternate minutes. If the pole is 63 meters high, how long will it take him to reach the top?**

(1) 18 minutes (2) 16 minutes

(3) 16 minutes 35 seconds (4) 18 minutes 20 seconds

Solution :

In 1 minute the monkey climbs 12 meters but then he takes 1 minute to slip down 5 meters. So, at the end of 2 minutes the net ascending of the monkey is 12 - 5 = 7 meters

So, to cover 63 meters the above process is repeated 63/7 = 9 times.

Obviously, in 9 such happenings the monkey will slip 8 times because on 9th time it will climb to the top

Thus in climbing 8 times and slipping 8 times, he covers $8 \times 7 = 56$ meters

$= \frac{56 \times 2}{7} = 16$ minutes

Remaining distance = 63 – 56 = 7 meters

Time taken to ascend 7 meters = 7/12 meters

Total time taken = 16 + 7/12 minutes

= 16 minutes 35 seconds

42. **A lives at P and B at Q. A usually goes to meet B at Q. He covers the distance in 3 hours at 150 km/h. On a particular day B started morning away from Q and A took total 5 hour to meet B at C. The find speed of B and ratio of speed of A & B ?**

(1) 60 km/hr, 5 : 2 (2) 60 km/h 2:5

(3) 60 km/hr, 3 : 5 (4) 60 km/hr 5 : 3

(5) None of these

Solution :

Speed of A= 150km/hr

Distance between P and Q= 150×3= 450 km

Distance travel by A while meeting B in the second case, when B is moving away from Q= 150×5= 750 km

Thus the distance between Q and C= 750-450=300

300 km is covered by B in 5 hour , so speed of B= 300/5= 60km/hr

Required ratio= 150:60= 5:2