**Time, Speed and Distance**

Ans 1 : Option a

If their speeds are in the ratio 5:3, the time taken by them will be in the ratio 3:5. Since one of them takes 20 minutes more than the other to cover the same distance, the respective time taken by them will be 30 minutes and 50 minutes.

Ans 2 : Option d

To overtake A, B has to cover 25x4 = 100m more than A. This is done in 10 seconds.

Therefore, 100/(x-25) = 10

100 = 10x-250

10x=350

or, x=35 m/sec

Ratio of the speeds of B to A = 35:25 = 7:5

Ans 3 : Option b

72 kmph = (72 x 5)/18 = 20 m/sec

(Length of Train/ 20) = 10

Length of the Train = 200 m

In the second case, speed of the man = 5 m/sec

200/20-5 = 200/15 = 40/3 = 13.33 sec

Ans 4 : Option b

He normally takes 360/30 = 12 hours for the journey and so today he would have taken 10 hours for the same journey.

His normal speed is 30 kmph and his speed today is 36 kmph.

Required value is ((36-30)/30)\*100 = 20 %

Ans 5 : Option a

Speed of the first train is 54 kmph ie 15 m/sec while the speed of the man is 5 m/sec. The speed of the man inside the train = 20 m/sec

200/(20+x) = 5

200 = 100 + 5x

5x=100 x=20 m/sec

ie 72 kmph

Ans 6 : Option b

The train normally takes 9 hours for it’s journey. Today it has covered 40% of the journey in 40 % of the time.

Remaining time is 60% of 540 mins ie 324 minutes and this will be covered at half the speed ie double the time ie 648 minutes ie 10 hours and 48 minutes after 40% of the journey is covered.

First 40% of the journey is covered in 3 hours and 36 minutes ie till 9.36 am

The train will be late by 5 hours and 24 minutes

Ans 7 : Option c

Let the total length of the corridor be x. They first meet 45 m from one of the ends ie one person has covered 45 m while the other has covered (x-45) m.

In the 2nd case, they meet 25 m from the other end.

This question can be done using the logic that for the first meeting if they have to together cover one length, for every subsequent meeting they will have to cover twice the length with each person covering double the distance as covered for the first meeting.

Therefore, if we take the first person, distance covered for the first meeting is 45 m.

Also distance covered after the first meeting till the 2nd meeting is x-45+25 ie x-20.

Now, x-20 is twice of 45.

x-20 = 90

or, x=110 m.

Ans 8 : Option c

In this question the speed of the two people will be inversely proportional to the square root of the time taken by each one to reach the other end after they cross each other.

ie Sa : Sb = √tb/√ta

ie Sa : Sb = √36/√25 = 6:5

Ans 9 : Option a

Train from A takes 10 hours for the journey while the train from B takes 6 hours for the journey.

Let the total distance be 30 km such that their speeds will be 3 kmph and 5 kmph.

Let the first train travel for 3 hours such that the time for both the trains will then be equal and we can use the concept of relative speed.

Distance covered by the first train = 3 kmph x 3 = 9 km

Remaining distance = 30-9 = 21 km

Relative speed = 3+5 = 8kmph

Time required = 21/8 = 2 and 5/8 hours after 8 am.

Ans 10 : Option d

Let the total distance be d. The respective time taken will be d/60, d/90 and d/120 respectively.

Average speed will be = d/(d/60+d/90+d/120)

Average speed = d/(6d+4d+3d)/360

Average speed = 360/13

Ans 11 : Option c

Let x be the time taken in hours while walking and y be the time taken in hours while riding.

x+y= 345 min.

also, 2y = 345-120

2y= 225 min

y = 112.5 min

Therefore x = 345-112.5 = 232.5

or, 2x=232.5 x 2 = 465 min ie 420 + 45 min ie 7 hours and 45 mins.

Ans 12 : Option d

Let the speed of the two trains be x and y m/sec respectively. As per the problem,

(150/x) = 15

or, x=10 m/sec.

In the second case, (150+150)/(10+y) = 8

300 = 80 + 8y

8y = 220

y=220/8 = 55/2 m/sec

y=(55/2) \* 18/5

y=99 kmph

Ans 13 : Option b

Let their lengths be L1 and L2 and their speeds be x and y m/sec.

As per the problem, L1/x = 27 and L2/y = 17

Also, (L1+L2)/(x+y) = 23

L1+L2 = 23x+23y

L1=27x and L2=17y

27x+17y=23x+23y

4x=6y ie 2x=3y

x:y = 3:2

Ans 14 : Option b

As per the problem, 2/(x-y) = 1 and 2/(x+y) = 1/6

or, x-y = x/6+y/6

5x/6 = 7y/6

5x=7y

or, y=5x/7

2/(x-5x/7) = 1

2/(2x/7) = 1

x=7 kmph.

Therefore to travel 5 Km in still water time taken = 7/7 hrs = 1 hr ie 60 mins.

Ans 15 : Option a

Let the place be d km away.

d/6 + d/4 = 1

2d+3d/12 = 1

D=12/5 = 2.4 km

Ans 16 : Option c

24/(x-y) + 36/(x+y) = 6

36/(x-y) + 24/(x+y) = 6.5

24x+24y+36x-36y = 6(x^2-y^2)

60x-12y=6(x^2-y^2)---------------1

Also, 36x+36y+24x-24y = 6.5(x^2-y^2)

60x+12y=6.5(x^2-y^2)---------------2

Adding 1 and 2 we get

120x = 12.5 (x^2-y^2)

240x=25 (x^2-y^2)

48x = 5 (x^2-y^2)

Solving for x we can get the value.

Ans 17 : Option b

16/(x+y) = 2

or, x+y =8

16/(x-y) = 4

or, x-y = 4

2x = 12

or, x=6 and y=2

Ans 18 : Option d

Required value = 47.5/38 = 95/38 = 5/2 = 2.5

Ans 19 : Option d

Ans 20 : Option c

Since A is four times as fast as C therefore A will take 1/4th of the time.

Ans 21 : Option b

In order to easily understand a problem like this, we need to know that 14.28% is the reciprocal of 1/7.

Also, if the distance is constant, speed and time taken have to be inversely proportional.

Let the initial speed be 7 m/s and so the new speed will be 7+7\*1/7=8 m/sec.

If the speed changes from 7 m/s to 8 m/s, the time taken has to change from 8 sec to 7 sec.

% change in time taken =100/8 = 12.5 % decrease.

Ans 22 : Option d

For each meeting after the first meeting, they will have to cover twice the length while for the first meeting they will have to cover the length once.

Total distance covered till the 5th meeting = 4 x 200 + 100 = 900

Relative speed = 25 m/sec

Time taken from the start for the 5th meeting = 900/25 = 36 sec.

Distance covered by the slower person = 36 x 10 = 360 m.

Ans 23 : Option a

The upstream speed of the man = 18/3 = 6 kmph.

Speed downstream = 6/0.4 = 60/4 = 15 kmph

The distance covered by the man in 5 hours while travelling downstream = 15 x 5 = 75 km.

Ans 24 : Option c

In such questions, the total time required by the man to reach the log of wood is same as the time travelled by the man upstream. This will always be true in a problem like this.

Ans 25 : Option a

Since A can beat B by 12 m or 3 seconds in a 100 m race, it would mean that B can run 12m in 3 seconds ie the speed of B is 4m/s.

Therefore B will take 25 seconds to cover 100 m and so A will take 22 seconds to cover 100 m.

A will therefore finish a 200 m race in 44 seconds.

Ans 26 : Option b

Speed of A = 54 Kmph = 15 m/sec.

Distance covered by A in 40 sec = 40 x 15 = 600 m.

The speed of A is now increased by 20%.

The new speed of A = 15+3 = 18 m/sec.

Remaining distance to be covered = 400 m.

Time taken to cover 400 m = 400/18 = 200/9 = 18.18 sec

Total time taken by A = 40+18.18 = 58.18 sec.

Speed of B = 72 kmph = 20 m/sec.

Distance covered by B in 30 seconds = 20 x 30 = 600 m

The speed of B is now decreased by 10% = 20-2 = 18 m/sec.

Remaining distance to be covered = 400 m.

Time taken to cover 400 m = 400/18 = 200/9 = 18.18 sec.

Total time taken by B =30+18.18 = 48.18 sec.

Difference between the time taken = 10 sec.

Ans 27 : Option c

Relative speed = 40-25 = 15 m/sec

Time taken for them to meet for the first time since the start

= 400/15 = 80/3 = 26.66 sec

Ans 28 : Option c

We will be looking at a ratio = relative speed/Speed of faster

Ratio = 50+20/50 = 70/50 = 7/5.

This means if the faster one covers 5 rounds, they will meet 7 times.

During the race the faster one will cover 10 rounds and so they will meet 14 times during the race.

Ans 29 : Option a

The speeds of A and B is in the ratio 2:3 while the speeds of B and C is in the ratio 4:3.

We need to first equate and make the value of B equal.

A:B:C will be 8:12:9.

Now speed of A/speed of C = 8/9

If speed of A is 40 m/sec, then the speed of C will be 45 m/sec.

Distance covered by C in 10 seconds = 45 x 10 = 450 m.

Ans 30 : Option d

Let the speed of C be x and so the speed of A will be 1.2x.

Now B \* 150/100 = 1.2x

or, B = 0.8x.

we need to find out by what % is C more than B.

((x-0.8x)/0.8x) \* 100 = 25%