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SOLUTION OF TRAIN WITH EXPLANATION

1D

The distance to be covered = Sum of their lengths = 200 + 300 = 500 m.
Relative speed = 72 -36 = 36 kmph = 36 x 5/18 = 10 mps.
Time required = d/s = 500/10 = 50 sec.

2A

It is given train X leave station A at 6:30 am, here it is asked to calculate the distance from A when the trains meet, the
Distance traveled by train left at 6:30 am upto 7:40 am i.e. in 1 hr. 10 min. or 7/6 hours = 30 x 7/6 = 35 km
So train leaving at 7:40 am will meet first train after covering a distance of 35 km. with relative speed of 40-30=10 km/hr.
Hence time taken = 35/10 = 3.5 hours or 3 hours 30 minutes
So distance from A = Distance traveled by 2nd train in 3 hr. 30 min
= 40 x 3.5 = 140 km.

3A

Speed of the train relative to man
= (125/10) m/sec = (25/2) m/sec.
[(25/2) x (18/5)] km/hr = 45 km/hr.
Let the speed of the train be 'x' km/hr
Then, relative speed = (x - 4) km/hr.
x - 4 = 45 => x = 49 km/hr.

4D

Then Distance = 130 + x mts
given speed = 45 kmph = 45 x5/18 m/s
Time = 30 sec
T = D/S
=> 30 = 130+x/(45x5/18)
=> x = 245 mts.

5C

While flying from Engine to end, relative speed = (x+10) m/s
from end to engine, flying speed = (2x - 10) mtr/sec
so
1000/(x+10) + 1000/(2x-10) = 187.5 secs
solving it, we get
so x = 8.728 m/sec and 2x= 17.456 m/sec
x = 31.4208 km/hr and 2x = 62.8416 km/hr.

6A

Speed = 78 x 5/18 = 65/3 m/sec.
Time = 1 min = 60 sec.
Let the length of the train be x m
Then, (900 + x)/60 = 65/3
x = 400 m.

7C

Relative speed of train and man = 74 - 8 = 66 kmph = 66 x 5/18 m/s
=> 66 x 5/18 = L/9
=> L = 165 mts.

8B

Total time taken = k/40 + 2k/20 hours
= 5k/40 = k/8 hours
Average speed = 3k/(k/8) = 24 kmph.

9B

Man's rate in still water = (15 - 2.5) km/hr = 12.5 km/hr.
Therefore, Man's rate against the current = (12.5 - 2.5) = **10 km/hr.**

10B

Relative speed =280/9 m / sec = (280/9*18/5) kmph = 112 kmph.

Speed of goods train = (112 - 50) kmph = 62 kmph.

11B

Distance covered = 120+120 = 240 m

Time = 12 s

Let the speed of each train = v. Then relative speed = v + v = 2v

2v = distance/time = 240/12 = 20 m/s

Speed of each train = v = 20/2 = 10 m/s

= 10 × 36/10 km/hr = 36 km/hr

12C

Relative speed = 60 + 6 = 66 kmph (Since both the train and the man are in moving in opposite direction)

= (66*5/18) m/sec = 55/3 m/sec

Time=110x3/55=6

13B

the speeds of two trains = $\sqrt{9} : \sqrt{4}$ = 3 : 2

14B

Total distance covered = $\left(\frac{7}{2} + \frac{1}{4}\right)$ miles = $\frac{15}{4}$ miles

Time taken = $\left(\frac{15}{4*75}\right)$ hrs = $\frac{1}{20}$ hrs = $\left(\frac{1}{20} * 60\right) min$ = 3 mi

15B

	$Cogs$	$Time$	$Turns$
A	54	45	80
B	32	8	?

Number of turns required=80 × 54/32 × 8/45 = 24 times

16B

Distance covered by train starting from P in x hours = 20x km

Distance covered by train starting from Q in (x-1) hours = 25(x-1)

Total distance = 110

=> 20x + 25(x-1) = 110

=> 45x = 135

=> x= 3

Means, they meet after 3 hours after 7 am, ie, they meet at 10 am

17A

Relative Speed = 60 -40 = 20 x 5/18 = 100/18
Time = 50
Distance = 50 x 100/18 = 2500/9
Relative Speed = 60 + 40 = 100 x 5/18
Time = 2500/9 x 18/500 = 10 sec.

18D

Speed of the Train K is given by s = d/t = 240/20 = 12 m/s
Distance covered by Train K in 50 seconds = 12 x 50 = 600 mt
But it crosses Train L in 50 seconds
Therefore, the length of the Train L is = 600 - 240 = 360 mts.

19B

Distance/time = speed
=>3x/12 = 25 ⇒ (25*12)/3
Length of the first train = 2x = 200 meter
Time taken to cross the platform= 45 s

Speed of train 1 = 48 kmph = 480/36 = 40/3 m/s

Distance = 200 + y [where y is the length of the platform]
x =100m => 200+y = 45* 40/3
⇒ y = 400m

20B

$\sqrt{b} : \sqrt{a} = \sqrt{16} : \sqrt{9} = 4:3$

21D

Let the length of each train be x mts.
Then, distance covered = 2x mts.
Relative speed = 36 - 26 = 10 km/hr.
= 10 x 5/18 = 25/9 m/sec.
2x/36 = 25/9 => x = 50 mts.

22C

Speed =[78 x (5/18)] m/sec = 65/3 m/sec.

Time = 1 minute = 60 sec.

Let the length of the tunnel be x metres.

Then, [(800 + x)/ 60]= 65/3

$\Rightarrow$ 3(800 + x) = 3900

$\Rightarrow$ x = 500.

23D

Relative Speed = 16 + 21 = 37 kmph
T = 12 hrs
D = S x T = 37 x 12 = 444 kms.

24B

Relative speed = 42 + 36 = 78 km/hr = $\frac{65}{3}$ m/s
Distance = (520 + 520) =1040 mts.
Time = $1040 \times \frac{3}{65}$ = 48 sec

25B

Let the length of the train be x metres and its speed be y m/s
Then, (x/y)= 15 $\Rightarrow$ y =(x/15)

(x+100)/25 = x/15

=> 15(x + 100) = 25x

=> 15x + 1500 = 25x

=> 1500 = 10x

=> x = 150 m.