Time, Speed & Distance

Solution

1. **Answer: (D)**
Let the speed of Rajiv be 4n km/hr and speed of Rahul be 5n km/hr.
Total distance covered by Raul till 2: 00 a.m. = 5n km
Relative speed of Rahul with respect to Rajiv = (5n + 4n) = 9n km/hr
Total distance covered by both of them in 5 hours
(2 a.m. to 7 a.m.) = (9n × 5) km = 45n km
Therefore total distance between A and B
= (45n + 5n) km = 50n km
So, time taken by Rajiv to travel from station A to station B = 50n/4n = 12.5 hours

2. **Answer: (C)**
According to the question; "A can give a head start of 20 meter to B in a race of 100 meters and still both finish the race at the same time."
Hence ratio of speeds of; A : B = 100 : 80 = 5 : 4.. (1)
Similarly; B : C = 100 : 75 = 4 : 3 .. (2)
From (1) and (2) we will get; A : C = 5 : 3
It means when A can run 5 meters then in the same time C can run 3 meters.
Or when A can run 100 m then C can only run 60 m.
Hence it is clear that A can give a head start of 40 m to C.

3. **Answer: (B)**
Distance between 22" floor and 42st floor
= 42 - 22 = 20
Also, relative speed of both the escalators
= (40+ 60) = 100 floors per minute
Therefore, time taken
= 20/100 = 1/5 min or 12 sec.
Distance travelled by 1st elevator in 12 sec
= 40/5 = 8 floors. Thus, the elevators will meet at 22 + 8 = 3th floor

4. **Answer: (A)**
Let the initial speed and distance be s and d, so ATQ

So d/s + 40/60 = (d-5)/1/4s + 5/s---(1)
d/s + 10/60 = (d-8)/(1/4s) + 8/s-----(2)
Solving, 1 and 2 together, we get
D = 9 and s = 18. Hence, option a.

5. **Answer: (C)**
Circumference of the track = 2 × (22/7) × 147 = 924 m.
Distance to be covered for the first meeting (by both of them) = 462 m.
Speed of Akshay = 924/168 = 5.5 m/s.
Speed of Bobby = 11 m/s.
Time taken from the start to the first meeting = 462/(16.5) = 924/33 = 28s.
Time taken by Akshay and Bobby to meet again at that point 28 + 84 × 8 = 700 seconds.

6. **Answer: (D)**
Initial distance of police from the criminal = 400m.
In 10 seconds, police covers 150 meters.
Hence the distance of police from the criminal after 10 seconds = 250m.
In the next 10 seconds, relative speed of the criminal = (20-15)= 5 m/s.
The distance become 300 metres.
After a total of 20 seconds, relative speed of police to the criminal = (25-20) = 5 m/s.
Hence time taken to catch him = 60 seconds.
Total time elapsed = 80 seconds.
Therefore, police jeep caught the criminal after 70 seconds of the criminal seeing the jeep.

7. **Answer: (E)**
Total time taken by car to reach the top of the hill = 1170/90 = 13 hours.
Average speed of the rabbit
= (2 × 140 × 120)/(140 + 120) = 1680/13 km/h
Total distance covered by the rabbit
= (1680/13 × 13) = 1680 km

8. **Answer: (E)**

First day, he covers 1/10 of the distance, second day he covers 1/15, third day he covers 1/12, fourth day he covers 1/6 of the distance, fifth day he covers 7/120 of the distance and on sixth day he covers 19/60 of the distance.

Adding all the distances, he covers 95/120 of the total distance in 6 days.

Remaining distance = 25/120 = 5 kilometres.

Thus total distance = 24 km.

9.   Answer: (E)
Let the distance from the airport to club be 'x'.

The distance he travel in chopper will be '150 - x'

$T_1 = D_1 / S_1 = (150 - x)/40$

$T_2 = D_2/S_2 = x/30$

$T_1 + T_1 = T_3$

$(150 - x)/40 + x/30 = 4$

$450 - 3x + 4x = 480$

$x = 30$ miles

10. Answer: (A)
Distance covered by Charlie in the 1st 3 minutes = 210 m.

Time taken by Damon to overtake Charlie:

Let the distance travelled by them until they meet = x+210

x/70 = (x+210)/80

x= 1470

Total distance travelled= 1470+210 = 1680

Time in which Bob overtook Charlie
= 1680/120 = 14 minutes

So, time at which Bob started = 7:46 pm

11. Answer: (B)
Considering option (b):

Adam starts walking at 9:00, so every one hour he completes 6km.

By 19 hrs in the evening he completes 60 km.

Now, Ben starts cycling at 11:30 and completes 8km in one hour.

By 18:30 in the evening he completes 56kms.

In another 30 min he travels 4 km.

Thus by 19 hrs in the evening he also travels 60 km.

12. Answer: (A)
Let the speed of X be x km/h.

Distance travelled by X in 2 hours = 2x km.

Suppose X takes t hours to travel $\frac{1^{th}}{5}$ of the distance AB.

Y would take (t − 2) hours to travel $\frac{1^{th}}{5}$ of the distance AB.

As Y's speed is thrice that of X's speed.

$\frac{t-2}{t} = \frac{1}{3}$

t = 3

$\frac{1^{th}}{5}$ of the distance AB = 3x km.

AB = 15x km

Time taken by X to cover 15x km = $\frac{15x}{x}$

$= 15 \ hours$

Time taken by Y to cover 15x km

$= \frac{15x}{x} = 5 \ hours$

∴ Difference in the times = 10 hours.

13. Answer: (C)
Let speed be S, distance be D & time be T

$S = \frac{D}{T}$

ATQ,

$S + X = \frac{D}{5}$ ……………..(i)

$S - X = \frac{D}{8}$ ………………..(ii)

On adding both the equations, we get

$2S = D\left[\frac{1}{5} + \frac{1}{8}\right]$

$2S = D\left[\frac{8+5}{40}\right]$

$T = \frac{D}{S} = \frac{80}{13} = 6\frac{2}{13} hours$

14. Answer: (D)
Speed $= 1 \times \frac{5}{18} \times 60 = \frac{50}{3} m/min$

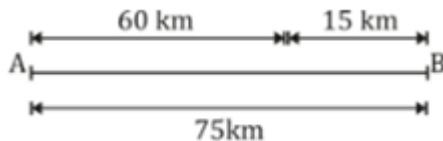Time taken to reach station (time to catch train) $= \frac{500}{\frac{50}{3}} = 30 \ min$

Time left to catch train $= 30 - 4 - 4 = 22min$

In this time, he is going back to home and has to reach station

Total distance to be covered = 500m

Required speed = $\frac{500}{2} \times \frac{60}{1000} = 1.36 km/h$

15. **Answer: (A)**

Ratio of distance travelled by Priya and Sheetal = 60 : 90 = 2 : 3

Ratio of their speed = 2 : 3

Difference in speed = 1 ratio

ATQ,

1 ratio = 12 km/hr

Priya's speed = 2 ratio = 24 km/hr

And Sheetal's speed = 3 ratio = 36 km/hr

Required time = $\frac{75}{24} - \frac{75}{36} = 75\left[\frac{3-2}{72}\right]$

$= \frac{75}{72} hr = 62.5$ min.

16. **Answer: (E)**

ATQ,

$S = \frac{D}{T}$ …(i)

$(s + 10) = \frac{D}{T-2}$ …(ii)

$(s - 15) = \frac{D}{T-6}$ …(iii)

On solving (i), (ii) & (iii)

D = 400 km, s = 40 km/ hr. T = 10 hour

Statement 1,2 and 4 can be found out from the given data but statement 3 can't be solved as length of tunnel is not given.

17. **Answer: (A):**

Time taken by bus = Distance/speed = 186/45 = 62/15 hrs. = 4 hrs. 8 min.

Time taken by train = 256/96 = 8/3 hrs. = 2 hrs. 40 min.

Let total distance travelled be 490 km (option A),

⇒ Distance travelled by taxi = 490 – 186 – 256 = 48 km

⇒ Time taken by taxi = 48/40 = 1.2 hrs. = 1 hr. 12 min.

⇒ Total time taken in journey = 8 hrs.

⇒ Time of completing journey = 4:00 PM

Let total distance travelled be 500 km (option B),

⇒ Distance travelled by taxi = 500 – 186 – 256 = 58 km

⇒ Time taken by taxi = 58/40 = 1.45 hrs. = 1 hr. 27 min.

⇒ Total time taken in journey = 8 hrs. 15 min.

⇒ Time of completing journey = 4:15 PM

Let total distance travelled be 530 km (option C),

⇒ Distance travelled by taxi = 530 – 186 – 256 = 88 km

⇒ Time taken by taxi = 88/40 = 2.2 hrs. = 2 hr. 12 min.

⇒ Total time taken in journey = 9 hrs.

⇒ Time of completing journey = 5:00 PM

Let total distance travelled be 554 km (option D),

⇒ Distance travelled by taxi = 554 – 186 – 256 = 112 km

⇒ Time taken by taxi = 112/40 = 2.8 hrs. = 1 hr. 48 min.

⇒ Total time taken in journey = 9 hrs. 36 min.

⇒ Time of completing journey = 5:36 PM

∴ Options A, B & C satisfies the two blanks in the question

18. **Answer: (A)**

Let the distance between Raju's house and the camp on the 1st day be x Km.

=> The distance between Raju's house and the camp on the 2nd day be (x+ 2) Km.

Time taken by Raju on the 2nd day= 3hrs.

(X+ 2) / 3 =12

=> X + 2 = 12 × 3

=> X + 2 = 36

=> X = 34Km

Time taken by Raju to reach the camp on the fourth day = [x + (3 × 2)] / 12

=> [34 + 6] / 12

=> 40/12

=> 10/3 hrs

Now 1 hr = 60 minutes

=> (10 /3) hrs = (10/3) × 60 minutes

=> 200 minutes

=> 3 hrs and 20minutes

=> He will reach camp at 3 hrs and 20 minutes from 10:15 A.M

=> 1:35 P.M.

19. Answer: (D)

Let the distance from P to R be x and from R to Q be y

Total distance travelled by Abhi=x+y

Total time taken by Abhi=4+5=9hrs

Total distance travelled by Bunny=3x+y

Total time taken by Bunny=7+5=12hrs

Average speed of Abhi=(x+y)/9

Average speed of Abhi=(3x+y)/12

Average speed of Abhi and Bunny is equal

(x+y)/9=(3x+y)/12

=> (x+y)/3=(3x+y)/4

=> 4x+4y=9x+3y

=> y=5x

Ratio of the distance between P to R to the distance between R to Q=x/y=1/5

20. Answer: (E)

Let the usual speed of Mohit be v km per hour.

He travels the first 50 km with this speed.

He travels the next 50 km with speed v+10, and takes 10/3 minutes less than if he had travelled with his usual speed.

Thus, (Time taken at v) – (time taken at v+10) = 1/18 hours.

$50/(v) – 50/(v+10) = 1/18$

$50 \times 10/ (v \times (v+10)) = 1/18$

=> $v^2 + 10v – 9000 = 0$

=> v = 90, -100

Therefore, his usual speed = 90 km per hour.