



TIME, SPEED AND DISTANCE_CSAT_ANSWER_EXPLANATION

Answer 1: (c)

Distance between places A and B = 15 km

Speed of X = 1.5 km/hr

So, Distance covered by X in 5 hours = 7.5 km

Speed of Y in 1st hour = 1 km/hr

So, Distance covered by Y in 1st hour = 1 km

Similarly, Distance covered by Y in 2nd hour = 1.25 km

Distance covered by Y in 3rd hour = 1.5 km

Distance covered by Y in 4th hour = 1.75 km

Distance covered by Y in 5th hour = 2 km

Total distance covered by Y in 5 hours = 1 + 1.25 + 1.5 + 1.75 + 2 = 7.5 km

Hence, both the given statements are true.

Answer 2: (b)

Let the distance between X and Y be a km.

Total distance covered = 4a

Time taken on the first trip = $t = \frac{d}{s} = \frac{a}{v}$

Time taken on the second trip = $\frac{a}{2v}$

Time taken on the third trip = $\frac{a}{3v}$

Time taken on the fourth trip = $\frac{a}{4v}$

Total time = $\frac{a}{v} + \frac{a}{2v} + \frac{a}{3v} + \frac{a}{4v}$
 $= \frac{25a}{12v}$

Average speed = $\frac{\text{Total distance covered}}{\text{Total time taken}}$
 $= \frac{4a}{\frac{25a}{12v}} = \frac{48v}{25}$

Average speed = 1.92v km/hr.

Average speed lies between v and 2v km/hr.

Answer 3: (d)

Let,

Speed of boat = x km/hr.

Speed of stream = y km/hr.

Downstream = x + y

Upstream = x - y

Downstream : Upstream

Time 1 : 2

Speed 2 : 1

($\therefore \text{Speed} \propto \frac{1}{\text{Time}}$)

A.T.Q.

$$\Rightarrow \frac{x+y}{x-y} = \frac{2}{1}$$

$$\Rightarrow x+y = 2x-2y$$

$$\Rightarrow x = 3y$$

$$\Rightarrow \frac{x}{y} = \frac{3}{1}$$

Speed of boat in still water : Speed of stream = 3 : 1

Answer 4: (b)

Let

Total distance = x km

A.T.Q.

80% of x = 12

$\frac{4}{5}$ of x = 12

x = 15 km.

Answer 5: (b)

When,

X runs = 1000 m.

Y runs = (1000 - 40)m = 960 m

and Z runs = (1000 - 64)m = 936 m

Y runs 960 m and Z runs 936 m

So,

When y runs 1000 m,



$$\begin{aligned} Z \text{ runs} &= \frac{936}{960} \times 1000 \\ &= 975 \text{ m.} \end{aligned}$$

Hence ,

$$Y \text{ gives start to } Z = 1000 - 975$$

$$= 25 \text{ m.}$$

Answer 6: (c)

Displacement = Velocity \times Time

so, the area under velocity – time graph gives

the Displacement in the time interval OL,

Displacement of vehicle B = Area of rectangle

$$OLDC = OL \times LD$$

Distance covered by vehicle A = Area of triangle POL

$$= \frac{1}{2} \times OL \times PL$$

$$= \frac{1}{2} \times OL \times (PD + LD)$$

$$= \frac{1}{2} \times OL \times \left(\frac{1}{2} \times LD + LD \right)$$

$$= \frac{3}{4} \times OL \times LD$$

$$\text{Distance covered by vehicle A} = \frac{3}{4} \times$$

Displacement of Vehicle B.

$$\frac{\text{Distance covered by vehicle A}}{\text{Displacement of vehicle B}} = \frac{3}{4}$$

Answer 7: (d)

Speed of train = 40 km/hr.

$$= 40 \times \frac{5}{18} \text{ m/s.}$$

Length of train = 200 m

$$\begin{aligned} \text{Time} &= \frac{\text{Distance}}{\text{Speed}} \\ &= \frac{200 \times 18}{40 \times 5} \end{aligned}$$

$$= 18 \text{ sec.}$$

Answer 8: (a)

Time taken by A and B is same.

$$\text{Distance travelled by A} = \pi \times r$$

Distance travelled by B =

$$= (\pi \times r) - \frac{(\pi \times r)}{6}$$

$$= \frac{5\pi r}{6}$$

$$A : B$$

$$\pi r : \frac{5\pi r}{6}$$

$$\text{Distance} \quad 6 : 5$$

$$\text{Speed} \quad 6 : 5$$

$$(\because \text{Speed} \propto \text{Distance})$$

Answer 9: (c)

Speed of freight train = 40 km/hr.

Speed of express train = 60 km/hr.

In two hours, Distance covered by freight train

$$= 40 \times 2 = 80$$

$$\begin{aligned} \text{Relative speed} &= (60 - 40) \text{ km/hr.} \\ &= 20 \text{ km/hr.} \end{aligned}$$

$$\begin{aligned} \text{Time} &= \frac{\text{Distance}}{\text{Speed}} \\ &= \frac{80}{20} \\ &= 4 \text{ hours} \end{aligned}$$

Distance from the Delhi to the meeting point

$$= 4 \times 60 = 240 \text{ km.}$$

Alternate:-

$$\text{Distance} = \frac{a \times b}{a - b} \times t$$

$$= \frac{60 \times 40}{60 - 40} \times 2$$

$$= \frac{60 \times 40}{20} \times 2$$

$$= 240 \text{ km.}$$

Answer 10: (a)

Time taken by A, B, C and D be 1 min, 2 min, 7 min and 10 mins.

Here, A takes the shortest time to cross the bridge. 4 friends can cross the bridge in minimum time by the following ways:

First A and B will go, which will take them time 2 minutes and then A returns in 1 minute.

Total = 3 minutes

Then, A and C will go, which will take them time 7 minutes and then A returns in 1 minute.



Total = 8 minutes,
 Then, A and D will go, which will take them
 10 minutes and then A returns in 1 minutes
 Total = 11 minutes
 At last, A will cross the bridge along in 1
 minute.
 Total time = 3 + 8 + 11 + 1
 = 23 minutes

Answer 11: (c)

Train A leaves station A on 1st day at 6am.
 \Rightarrow Train B leaves station B on the 1st day at 6am.
 \Rightarrow In fact after 24 hours or 1 day, both train
 can't complete their journey.
 \Rightarrow To complete the journey both trains required
 42 hours.
 \therefore 4 trains are needed in order to maintain the
 shuttle sewa.

Answer 12: (d)

Distance covered by the competitor to collect
 the apples in the bucket are as follows:
 1st Apple = $2 \times 5 = 10$ m
 2nd Apple = $2 (5 + 3) = 16$ m
 3rd Apple = $2 (5 + 2 \times 3) = 22$ m
 4th apple = $2 (5 + 3 \times 3) = 28$ m
 5th apple = $2 (5 + 4 \times 3) = 34$ m
 6th apple = $2 (5 + 5 \times 3) = 40$ m
 Therefore, Total distance covered = $10 + 16 +$
 $22 + 28 + 34 + 40 = 150$ m

Answer 13: (b)

B is faster than A
 $B > A$
 B is as fast as C
 $B = C$
 Therefore, C is faster than A,
 $C > A$
 C runs faster than A.

Answer 14: (a)

Total distance = 500 m
 A starts the race from starting point, so the
 distance covered by A = 500 m.
 Distance covered by B = $500 - (45 + 35)$
 $= 500 - 80$
 $= 420$ m
 Hence, the ratio of distance covered by A and
 B = $500 : 420 = 25 : 21$
 Ratio of speed of A and B = 25: 21

(\therefore Speed \propto Distance)

Answer 15: (b)

$$\begin{aligned} \text{Average speed} &= \frac{2ab}{a+b} \\ &= \frac{2 \times 40 \times 60}{40 + 60} \\ &= 48 \text{ km/hr.} \end{aligned}$$

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