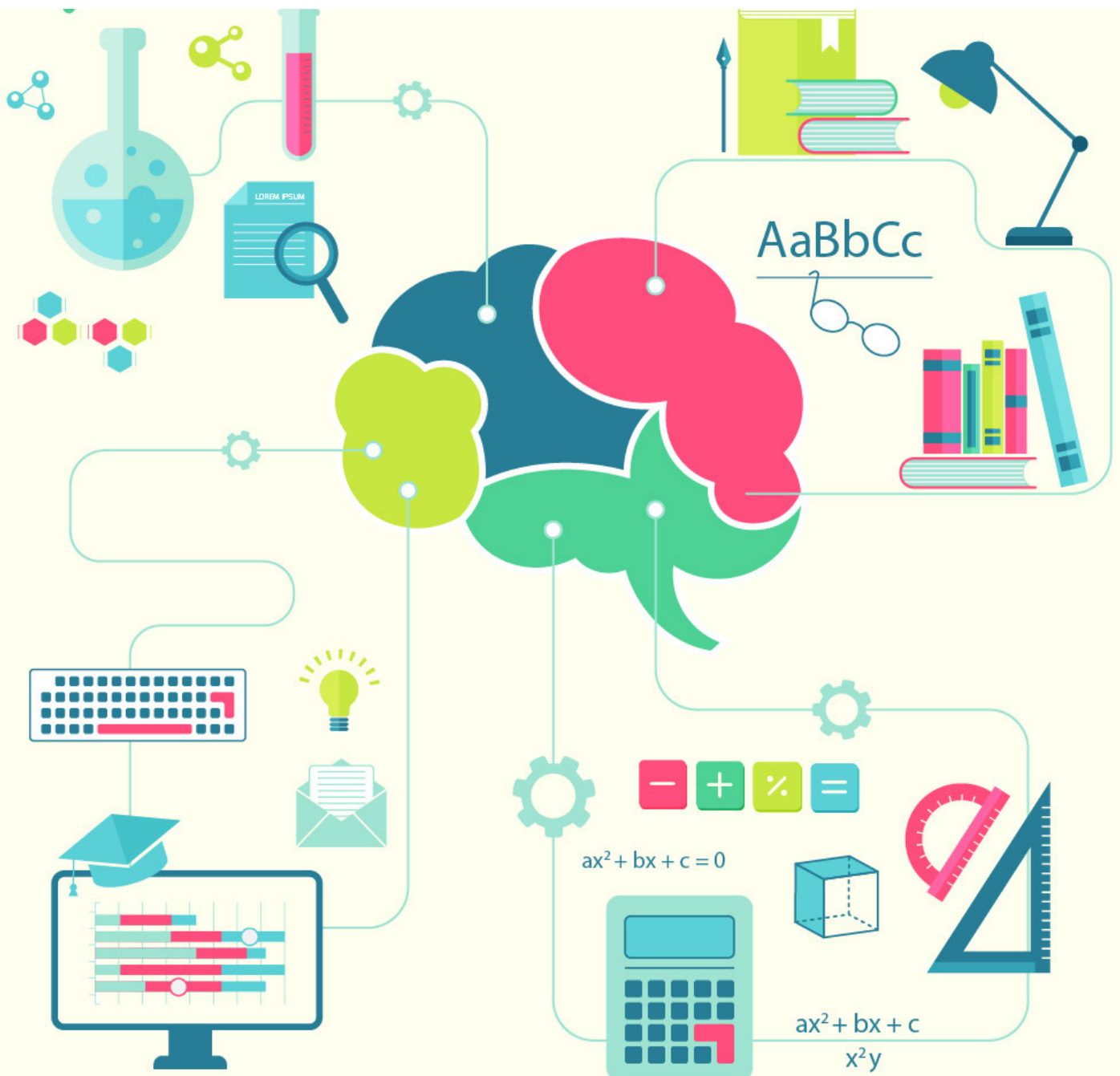


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CAT Problems on Trains

13 Nov 2017





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Question 1:

Train X departs from station A at 11 a.m. for station B, which is 180 km so far. Train Y departs from station B at 11 a.m. for station A. Train X travels at an average speed of 70 km/hr and does not stop anywhere until it arrives at station B. Train Y travels at an average speed of 50 km/hr, but has to stop for 15 min at station C, which is 60 km away from station B enroute to station A. Ignoring the lengths of the trains, what is the distance, to the nearest kilometre, from station A to the point where the trains cross each other?

- a) 112 km
- b) 118 km
- c) 120 km
- d) None of these

Question 2:

A train approaches a tunnel AB. Inside the tunnel is a cat located at a point that is $\frac{3}{8}$ of the distance AB measured from the entrance A. When the train whistles the cat runs. If the cat moves to the entrance of the tunnel A, the train catches the cat exactly at the entrance. If the cat moves to the exit B, the train catches the cat at exactly the exit. What is the ratio of speed of train and cat ?

- a) 3 : 1
- b) 4 : 1
- c) 5 : 1
- d) None of these

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Question 3:

Navjivan Express from Ahmedabad to Chennai leaves Ahmedabad at 6:30 am and travels at 50km per hour towards Baroda situated 100 kms away. At 7:00 am Howrah - Ahmedabad express leaves Baroda towards Ahmedabad and travels at 40 km per hour. At 7:30 Mr. Shah, the traffic controller at Baroda realises that both the trains are running on the same track. How much time does he have to avert a head-on collision between the two trains?

- a) 15 minutes
- b) 20 minutes
- c) 25 minutes
- d) 30 minutes

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Question 4:

Only a single rail track exists between stations A and B on a railway line. One hour after the northbound super fast train N leaves station A for station B, a south-bound passenger train S reaches station A from station B. The speed of the super fast train is twice that of a normal express train E, while the speed of a passenger train S is half that of E. On a particular day, N leaves for B from A, 20 min behind the normal schedule. In order to maintain the schedule, both N and S increased their speeds. If the super fast train doubles its speed, what should be the ratio (approximately) of the speeds of passenger train to that of the super fast train so that the passenger train S reaches exactly at the scheduled time at A on that day?

- a) 1 : 3
- b) 1 : 4
- c) 1 : 5
- d) 1 : 6

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Question 5:

An express train travelling at 80 km/hr overtakes a goods train, twice as long and going at 40 km/hr on a parallel track, in 54 s. How long will the express train take to cross a platform of 400 m long?

- a) 36 s
- b) 45 s
- c) 27 s
- d) None of these

Solutions:

1) Answer (A)

Distance between A-B , A-C, C-B is 180, 120 and 60 km respectively.

Let x be the distance from A where the 2 trains meet.

According to given condition we have

$$\frac{x}{70} = \frac{60}{50} + \frac{1}{4} + \frac{120 - x}{50}.$$

Solving the equation we get x around 112 km.

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2) Answer (B)

Let the length of the tunnel be x and distance of the train to entrance A be y . Let the speeds of train and cat be t and c respectively.

Hence, when the cat runs $3x/8$, the train covers y .

$$\Rightarrow (3x/8)/c = y/t \text{ --- (1)}$$

When the cat runs $5x/8$ to the other end, the train covers $x+y$

$$\Rightarrow (5x/8)/c = (x+y)/t \text{ --- (2)}$$

Taking ratio of (1) to (2)

$$3/5 = y/(x+y) \Rightarrow 3x = 2y \text{ --- (3)}$$

Substituting (3) in (1)

$$(2y/8)/c = y/t$$

$$\Rightarrow t = 4c$$

Hence the ratio $t:c$ is $4:1$.

3) Answer (A)

The distance between Ahmedabad and Baroda is 100 Km
Navjivan express starts at 6:30 am at 50 Km/hr and Howrah expresses starts at 7:00 am at 40 Km/hr.

Distance covered by Navjivan express in 30 minutes (by 7 am) is 25 Km/hr.

So, at 7 am, the distance between the two trains is 75 Kms and they are travelling towards each other a relative speed of $50+40=90$ Km/hr.

So, time taken them to meet is $75/90 \times 60 = 50$ minutes.

As, Mr. Shah realizes the problem after thirty minutes, time left to avoid collision is $50-30 = 20$ minutes

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4) Answer (D)

Let N and S be the old speed where we know $N=4S$ after new condition we have $N'=2*N=8S$. After calculation for new S i.e

S' we have $S' = \frac{24}{17} S$. so $\frac{S'}{N'}$ comes out to be $3/17$ i.e 1:6

approx.

5) Answer (C)

Let's say length of express train = x

So length of goods train = 2x

Total length travelled by express train

$$= 3x = ((80 - 40) \times \frac{5}{18}) \times 54 \text{ (Where } (80 - 40) \times \frac{5}{18} =$$

relative velocity of express train w.r.t. goods train in meter/sec.)

So x = 200 meter.

Now crossing a platform of length 400 m., total length

$$\text{travelled by train} = 600m = t \times (80 \times \frac{5}{18})t = 27 \text{ sec.}$$

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