

Tech Mahindra Aptitude Questions & Answers - Paper 1



Quantitative aptitude

Time & work

1. Time taken by A alone to do a piece of work is 30 days. Time taken by Calone to do same work is 30 more days than time in which B and C together will do it. If A is 25% less efficient than B, find the time taken by all of them together to complete the same work.

1. 8 days

2. 10 days

3. 6 days

4. 12 days

Solution:

Let B and C together takes x days to complete the work.

Time taken by C alone is $(30 + x)$ days.

$$\begin{aligned}\text{Efficiency of B} &= \frac{1}{x} - \frac{1}{30+x} \\ &= \frac{30+x-x}{(30+x)x} = \frac{30}{(30+x)x} \dots (i)\end{aligned}$$

$$\text{Efficiency of A} = \frac{1}{30}$$

But we know that A is 25% less efficiency than B

$$\therefore \frac{\frac{30}{(30+x)x}}{\frac{1}{30}} = \frac{100}{100-25}$$

$$\Rightarrow \frac{30}{(30+x)x} \times 30 = \frac{4}{3}$$

$$\Rightarrow 27 \times 25 = 30x + x^2$$

$$\Rightarrow x^2 + 30x - 675 = 0$$

$$\Rightarrow x^2 + 45x - 15x - 675 = 0$$

$$\Rightarrow (x + 45)(x - 15) = 0$$

$$x = 15$$

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Hence from eqn. (i)

$$\text{Efficiency of B} = \frac{2}{45}$$

$$\text{Efficiency of C} = \frac{1}{45}$$

Total unit worked per day

$$= \frac{1}{30} + \frac{1}{45} + \frac{2}{45}$$

$$= \frac{3+2+4}{90}$$

$$= \frac{1}{10} \text{ units}$$

\Rightarrow 10 days taken by them to complete the work.

Simple & compound interest

2. A man invested his savings in two schemes, first scheme offers him ROI of 10% in CI and other offers him ROI of 15% in SI. If interest obtained by him in former scheme is Rs. 300 higher than that of later, find the amount invested by him in later scheme if his total savings were Rs. 50,000.

1. 36000

2. 24000

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3. 32000

4. 20000

Solution:

Let he invest x Rs. in the first scheme and Rs($50000 - x$) in second scheme

Interest obtained from first scheme

$$= x \left[1 + \frac{10}{100} \right]^2 - x$$
$$= \frac{21x}{100} \dots(i)$$

Interest obtained from IInd scheme

$$= \frac{2 \times 15}{100} (50000 - x) = \frac{3}{10} [50000 - x] \dots(ii)$$

ATQ,

$$\frac{21x}{100} - \frac{3}{10} [50000 - x] = 300$$

$$\Rightarrow 21x - 150000 + 30x = 30000$$

$$\Rightarrow 51x = 153000$$

$$x = 30000/-$$

therefore, amount invested in second scheme is $50000 - 30000 = \text{Rs. } 20000/-$

Boats & streams

3. Speed of current is 10% of speed of ship B. At 9:00 AM, ship A was 800 meter ahead of ship B, and ship B completely crosses the ship A at 9:05 AM. Calculate in what time ship B crosses ship C when distance between them is 2300 meters and both are travelling in same direction, given that sum of length of ship B and ship A is 100 meters and speed of ship C is same as ship A and length of ship C and ship A is also same.

1. $937 \frac{1}{2}$ seconds

2. 900 seconds

3. $833 \frac{1}{3}$ seconds

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4. 800 seconds

Solution:

Let speed of ship B is $b \text{ ms}^{-1}$ and that of current is $0.1b \text{ ms}^{-1}$, and speed of ship A is $a \text{ ms}^{-1}$

When ship A was 800 meters ahead, total distance travelled by ship B is $(800 + 100)$ meters.

[As 100 meters is sum of length of ship B and ship A]

And time taken to travel this distance is 5 minutes = 5×60 seconds = 300 second

$\therefore \frac{900}{b-a} = 300 \Rightarrow b - a = 3 \text{ ms}^{-1}$ (Note that speed of current doesn't matter, as it will cancel out while calculating resulting speed)

Distance that ship B must travel to catch ship C is 2300 meters plus 100 meters which is sum of length of ship B and C

Total distance covered = 2400m

Their resultant speed will be 3 ms^{-1} as both are travelling in same direction and speed of ship C is same as that of ship A.

Hence required answer = $\frac{2400}{3} = 800$ seconds

Percentages

4. Four roommates decide to share all of candy's they have in a systematic way. Out of jar, Anurag takes 30% of candy's, after that Rahul get 40% of remaining, then Arjun get 50% of remaining and rest was taken by Vikas. Later Vikas revealed that he initially had stolen 36 Chocolates and in total he got 8 more Chocolates than Rahul. Find initial number of Chocolates with them.

1. 400

2. 436

3. 364

4. 475

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Solution:

Let initially they had $100x + 36$ chocolates and they divided $100x$ according to question.

Anurag got = $30x$

Rahul got = $\frac{40}{100}(100x - 30x) = 28x$

Arjun got = $\frac{50}{100}(42x) = 21x$

Hence Vikas also got = $21x$

But according to question

$$21x + 36 = 28x + 8$$

$$\Rightarrow 7x = 28 \text{ or } x = 4$$

Hence initially, they have $400 + 36$ chocolates.

Profit & loss

5. If a man offers 60% discount on MRP, he would earn no profit, no loss. If he had markup the price by 60% above of CP and offered 25% discount, he had earned Rs. 24. Calculate his initial mark price.

1. Rs. 240

2. Rs. 360

3. Rs. 460

4. Rs. 300

Solution:

Let his initial mark price is Rs. $100x$

Then if he offers 60% discount, his SP will be $40x$, which is his CP, as he bears no profit no loss on selling at this price.

If he mark up the price by 60% of his CP

$$= 40x \left(1 + \frac{60}{100}\right) = 64x$$

On offering 25% discount on this, his SP will be $\frac{75}{100} \times 64x = 48x$

$$\text{Profit} = 8x = 24$$

$$x = 3$$

hence initial mark price = Rs. 300

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Problems in ages

6. Ratio of present age of Mohit and his wife is 10:9 and 3 years ago ratio of age of Mohit's wife and his son is 8:1. Calculate average age of family 9 years ago, if ratio of present age of Mohit and his son is 5:1.

1. 22.5 years
2. 20 years
- 3. 19.5 years**
4. 13 years

Solution

Let present age of Mohit is $10x$ and his wife is $9x$

Let his son's age be y

ATQ,

$$\frac{10x}{y} = \frac{5}{1}$$

$$\Rightarrow y = 2x$$

ATQ,

$$\frac{9x-3}{2x-3} = \frac{8}{1}$$

$$\Rightarrow 9x - 3 = 16x - 24$$

$$\Rightarrow x = 3$$

Hence their present ages are 30, 27 and 6 years.

Average age of Family 9 years ago

$$\frac{30+27-18}{2} = 19.5 \text{ years}$$

Probability

7. 6 girls have to sit on chairs numbered 1 to 6. Find the probability that 2 siblings among them always sit on prime number.

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1. 1/5
2. 1/60
3. 1/30
4. 1/15

Solution:

Total no. of possible way = 720

There are three prime numbers between 1 to 6.

Hence chairs that 2 siblings sits on there is

${}^3P_2 = 3! = 6$ ways.

Remaining four girls can in 4 remaining 4 chairs in 4! Ways.

So total no. of ways of 2 siblings sitting on

prime numbered chairs become $6 \times 4!$.

Required probability = $\frac{6 \times 4!}{720} = \frac{1}{5}$

Areas-volumes

8. Find the number of right circular cone that can be formed by melting the cylinder of twice radius and 50% more height than that of right circular cone.

1. 12
2. 18
3. 16
4. 20

Solution:

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Let the height of cylinder is $3H$ and radius is $2r$.

Then radius of cone = r , and height is $2H$.

Let cylinder can be melted into n cones.

$$\therefore \pi(2r)^2 3H = n \frac{\pi}{3} (r)^2 \times 2H$$

$$n = \frac{4 \times 3 \times 3}{2} = 18$$

Percentages

9. A man decided to take out his 10-day expense for “evening snakes”, which he decided to spend equally on each day. It went as per his plan for 2 days but on third day, his girlfriend visited him, and he spent 154% more than his per day budget. Find what % that he must reduce in his daily budget, so that he doesn't spend extra money other than he separated.

1. 22%

2. 64%

3. 36%

4. 48%

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Solution:

Let he plan to spend $100x$ daily for 10 days.

Money spent on first 2 days = $200x$

Money spent on 3rd day = $\frac{(100+154)}{100} \times 100x = 254x$

Remaining amount with him = $1000x - (254x + 200x) = 546x$

Hence amount that he must spend/day to complete his remaining 7 days

= $\frac{546x}{7} = 78x/\text{day}$

% reduction = $\frac{100x-78x}{100x} \times 100 = 22\%$

Partnership

10. Three friends started a business which offers them a profit of 20% of their total initial investment. They can't withdraw their investments until the end of their business. Find the amount invested (in Rs) by Rahul if he invested Rs. 10,000 more than Raj while Raj and Arun invested same amount, and rahul got

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a profit share of Rs. 7000/-

1. 25000
2. 30000
3. 28000
- 4. 35000**

Solution:

Let Raj and Arun invested Rs. x each, and Rahul invested Rs. $x + 10000$.

Total money invested by them is

$$x + x + x + 10000 = 3x + 10000.$$

Hence their profit will be $= \frac{20}{100} (3x + 10000)$

$$= \frac{1}{5} (3x + 10000) \dots(i)$$

Each of them invested for same time, hence ratio of their profit would be ratio of their share.

So we can say that ratio of share of Raj, Rahul and Arun is

$$x : (x + 10000) : x$$

Share of Rahul

$$\frac{(x+10000)}{(3x+10000)} \times \frac{1}{5} [3x + 10000] = 7000$$

$$\Rightarrow \frac{x+10000}{5} = 7000$$

$$x = 35000 - 10000 = \text{Rs. } 25,000$$

$$\text{hence Rahul invested} = \text{Rs. } (25000 + 10000) = \text{Rs. } 35,000/-$$

Time & distance

11. Amit was faster driver than Rohan. It takes 45 min for Amit to catch Rohan, when Rohan starts 7.5 km ahead of Amit. On a particular day, they both start from two different cities with same speed located at 240 km apart and meet each other in 2 hours. Find the time taken by Amit to reach another city after their meeting.

1. $3\frac{9}{13}$ hours

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2. $1\frac{9}{13}$ hours

3. $4\frac{4}{11}$ hours

4. $2\frac{4}{11}$ hours

Solution:

To catch Rohan, when he is 7.5 km ahead means, Amit have to travel 7.5 km extra in the 45 minutes.

Therefore, his extra speed is

$$7.5/45 \text{ km/min} = 1/6 \text{ km/min} = 10 \text{ km/hr}$$

Let speed of Rohan is x km/hr, then speed of Amit is $(x + 10)$ km/hr.

According to next condition, as they were travelling in opposite directions, they cover a total distance of 240 km in 2 hours

i.e

$$2x + 2(x + 10) = 240$$

$$2x + 2x + 20 = 240$$

$$x = 55 \text{ km/hr}$$

Therefore, speed of Amit is 65 km/hr.

Time taken by Amit to reach in another city

$$= \frac{240}{65} = \frac{48}{13} = 3\frac{9}{13} \text{ hours}$$

Therefore, extra time that Amit will take after meeting $3\frac{9}{13} - 2 = 1\frac{9}{13}$ hours