

## Quant Quiz on Mixture & Alligation For SSC Exam



19421943 attempts 13 upvotes 35 comments

### Question 1

Three vessels having volumes in the ratio of 2:3:5 are full of a mixture of water and Alcohol. In the first vessel ratio of water and Alcohol is 1:3, in second 2:3 and in third vessel, 2:5. If all the three vessels were poured out in a large container, what is the resulting ratio of Alcohol and water?

☐ A 43:96

☐ B 438:962

☐ C 348:962

☒ D 962:438  
skipped

For first Vessel, Ratio of  $W_1 A_1 = 1:3$

For second Vessel, Ratio of  $W_2 A_2 = 2:3$

For second Vessel, Ratio of  $W_3 A_3 = 2:5$

$$\text{Proportion of water in three vessels} = \frac{1}{4} : \frac{2}{5} : \frac{2}{7} = \frac{35}{140} : \frac{56}{140} : \frac{40}{140}$$

Now since all these three mixtures are mixed into the ratio of 2:3:5

$$\therefore \text{New ratio} = \frac{35 \times 2}{140 \times 2} : \frac{56 \times 3}{140 \times 3} : \frac{40 \times 5}{140 \times 5} = \frac{70}{280} : \frac{168}{420} : \frac{200}{700}$$

$\therefore$  Amount of water =  $70 + 168 + 200 = 438$

$\therefore$  Amount of Alcohol =  $(280 + 420 + 700) - 438 = 962$

$\therefore$  Ratio of Alcohol to water = 962:438

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### Question 2

A bucket contains a mixture of two liquids A and B in the proportion 7: 5 . If 9 litres of the mixture is replaced by 9 litres of liquid B, then the ratio of the two liquid becomes 7: 9. How much of the liquid A was there in the bucket ?

(A) 21 litres  
skipped

(B) 15 litres

(C) 23 litres

(D) 18 litres

Suppose the two liquids A and B are  $7x$  litres and  $5x$  litres respectively  
Now, when 9 litres of mixture are taken out,

$$A \text{ remains } 7x - 9\left(\frac{7}{7+5}\right) = 7x - \frac{9 \times 7}{12} = \left(7x - \frac{21}{4}\right) \text{ litres}$$

$$B \text{ remains } 5x - 9\left(\frac{5}{7+5}\right) = 5x - \frac{9 \times 5}{12} = \left(5x - \frac{15}{4}\right) \text{ litres}$$

Now, when 9 liters of liquid B are added

$$\left(7x - \frac{21}{4}\right) : \left(5x - \frac{15}{4} + 9\right) = 7 : 9$$

$$\text{or } \frac{7x - \frac{21}{4}}{5x - \frac{15}{4} + 9} = \frac{7}{9}$$

$$\text{or } 63x - \frac{189}{4} = 35x - \frac{105}{4} + 63$$

$$28x = \frac{189}{4} - \frac{105}{4} + 63 = 21 + 63 = 84$$

$$x = \frac{84}{28} = 3$$

$$\therefore 7x = 7 \times 3 = 21 \text{ litres}$$

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### Question 3

The ratio of the volumes of water and glycerine in 240cc of a mixture is 1 : 3.  
The quantity of water (in cc) that should be added to the mixture so that the new ratio of the volumes of water and glycerine becomes 2 : 3 is

(A) 55

(B) 60

(C) 62.5

(D) 64

**Correct answer**

The ratio of the volumes of the water and glycerine in 240cc of a mixture is 1 : 3.

$$\therefore \text{Quantity of water in mixture} = \frac{1}{4} \times 240 = 60 \text{ cc}$$

Let the quantity of water to added to mixture be x cc.

$$\frac{2}{5} \times (240 + x) = (60 + x)$$

$$2 \times (240 + x) = 5 \times (60 + x)$$

$$480 + 2x = 300 + 5x$$

$$\therefore 5x - 2x = 480 - 300$$

$$3x = 180$$

$$x = \frac{180}{3} = 60$$

Thus, 60 cc of water should be added.

Hence, option B is correct.

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**Question 4**

From a container of milk, a thief has stolen 15 litres of milk and replaced it with same quantity of water. He again repeated the same process. Thus in three attempts the ratio of milk and water became 343:169. The initial amount of milk in the container was:

(A) 75 litres

(B) 100 litres

(C) 150 litres

(D) 120 litres

According to the question

$$\Rightarrow \frac{\text{Milk (left)}}{\text{water (added)}} = \frac{343}{169}$$

General Formula

Final or reduced concentration

$$= \text{Initial concentration} - \left( 1 - \frac{(\text{amount being replaced in each operation})}{\text{total amount}} \right)^n$$

Where n is the number of times the same operation is being repeated. The "amount being replaced" could be pure or mixture as per the case.

Similarly, "total amount" could be either pure or mixture. Here amount being replaced denotes the quantity which is to be withdrawn each time.

$$\therefore \frac{\text{Milk (left)}}{\text{Milk (initial amount)}} = \frac{343}{512} (\because 343 + 169 = 512)$$

$$\therefore 343x = 512x \left( 1 - \frac{15}{K} \right)^3$$

$$\Rightarrow \frac{343}{512} = \left( \frac{7}{8} \right)^3 = \left( 1 - \frac{15}{K} \right)^3$$

$$\Rightarrow \left( 1 - \frac{15}{K} \right) = \frac{7}{8} = \left( 1 - \frac{1}{8} \right)$$

$$\Rightarrow K = 120$$

$\therefore$  Initial amount of milk = 120 litres.

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### Question 5

In 330 litres of mixtures of milk and water, water is only 24%. The milkman sold 80 litres of this mixture and then he added 60 litres of pure milk and 26 litres of pure water in the remaining mixture. What is the percentage of water in the final mixture?

☐ A 39.70%

☒ B 25.59%

☐ C 34.68%

☐ D 37.34%

Since, milkman sold 80 litre of mixture

So, remaining mixture =  $330 - 80 = 250$  litre

Quantity of water =  $250 \times 24/100 = 60$  litre

Quantity of milk =  $250 - 60 = 190$  litre.

Now, milkman made new mixture in which

water =  $60 + 26 = 86$  litre

milk =  $190 + 60 = 250$  litre

Percentage of water in the new mixture =  $86/(86 + 250) * 100$

$$= \frac{86}{336} * 100 = 25.59\%$$

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#### Question 6

A jar contains a mixture of two liquids A and B in the ratio 4 : 1. When 10 litre of the mixture is replaced with liquid B, the ratio becomes 2 : 3. The volume of liquid A present in the jar earlier was:

☐ A 20 litre

☐ B 10 litre

☒ C 16 litre  
skipped

☐ D 15 litre

Let mixture of two liquid contains A liter of first liquid and B ltr of second liquid.

$$A : B = 4 : 1$$

$$\tilde{A} \frac{A}{B} = \frac{4}{1} \Rightarrow B = \frac{A}{4}$$

$$A+B = V$$

Let V be the total volume of Jar

$$\text{Then } A = 4/5V; B = 1/5 V$$

If 10 litre of the mixture is replaced with liquid B, the ratio becomes 2 : 3

Hence portion of A and B in 10 ltr of mixture =  $(4/5) \times 10$  and  $(1/5) \times 10$

$$\Rightarrow A's \text{ portion} = 8 \text{ ltr}$$

$$\Rightarrow B's \text{ portion} = 2 \text{ ltr}$$

Newer portions of A and B are

Newer portions of A and B are  $(A - 8)$  ltr and  $(B - 2 + 10) = (B + 8)$  ltr

Therefore  $(A - 8) : (B + 8) = 2 : 3$

$$\frac{A - 8}{B + 8} = \frac{2}{3} \quad (\because B = A / 4)$$

$$\frac{A - 8}{\frac{A}{4} + 8} = \frac{2}{3}$$

$$3(A - 8) = 2\left(\frac{A}{4} + 8\right)$$

$$3A - \frac{A}{2} = 16 + 24$$

$$\frac{5}{2}A = 40$$

$$A = 16 \text{ ltr}$$

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### Question 7

A mixture of 40 litres of milk and water contains 10% of water. How much water must be added to make the water 20% in the new mixture?

☐ A 10 litres

☐ B 7 litres

☒ C 5 litres

☐ D 3 litres

Correct answer

$$\begin{aligned} \text{Quantity of water to be added} &= \frac{20 - 10}{100 - 20} \times 40 \\ &= \frac{10 \times 40}{80} = 5 \text{ litres} \end{aligned}$$