



Date : 9th Jan 2024

Quantitative Aptitude – Mixtures and Alligations

English

**Q:1** A tank has 20 litres of Oil and water mixture in the ratio 5 : 3. After some time, 6 litre of the mixture was taken out and replaced with another oil and water mixture but with different ratio. It was found that tank had finally 13 litres of Oil and rest water in the mixture. What was the ratio of oil and water mixture which was used as replacement?

1. 13 : 9
2. 11 : 7
3. 19 : 9
4. 17 : 7
5. None of the above

**Q:2** A vessel contains 72 litre mixture of soda and water in a ratio of 5 : 3. If 18 litres of mixture is taken out and 20 litres of pure water is added, then what is the difference between the quantity of water and soda in the final mixture?

1. 5.5 litres
2. 7.5 litres
3. 8 litres
4. 6.5 litres
5. 9 litres

**Q:3** A mixture of 50 liters contains alcohol and spirit in a ratio 7 : 3. How much alcohol (in liters) must be added to this mixture so that the ratio of alcohol and spirit becomes 3 : 1?

1. 5
2. 8
3. 12
4. 15
5. 10

**Q:4** The milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio, the liquids of both vessels be mixed to obtain a new mixture in vessel C containing half milk and half water?

1. 5 : 7
2. 8 : 5
3. 10 : 13
4. 7 : 5
5. 14 : 18

**Q:5** A container contains a mixture of 15 liters of milk and water. 3 liters of the mixture is taken out from this container and the same amount of water is filled in it, this process is repeated 2 times. Find

the final ratio of milk and water.

1. 9 : 16
2. 14 : 13
3. 17 : 20
4. 15 : 3
5. 16 : 9

**Q:6** In a mixture, the ratio of alcohol and water is 6 : 5. When a 22-liter mixture is replaced by water, the ratio becomes 9 : 13. Find the quantity of water after replacement.

1. 52 litre
2. 45 litre
3. 34 litre
4. 24 litre
5. 56 litre

**Q:7** An 18-liter mixture has alcohol and water in the ratio of 5 : 1. 9 liters of alcohol and 3 liters of water are added to this mixture. Find the new ratio of alcohol to water.

1. 5 : 1
2. 6 : 5
3. 4 : 1
4. 3 : 1
5. None of these

**Q:8** Naresh, a milkman has to add water in the milk. Find out the ratio in which water must be mixed with the milk which is of Rs 20 per litre so that he gets a mixture that he can sell for Rs15 per litre.

1. 1 : 4
2. 1 : 3
3. 2 : 3
4. 2 : 5
5. None of these

**Q:9** The ratio of milk and water in a mixture is 5 : 4. If 7 litres of water is added to the mixture, then the new ratio will become 2 : 3 . Find the initial volume of water in the mixture.

1. 4 litres
2. 6 litres
3. 8 litres
4. 12 litres
5. None of these



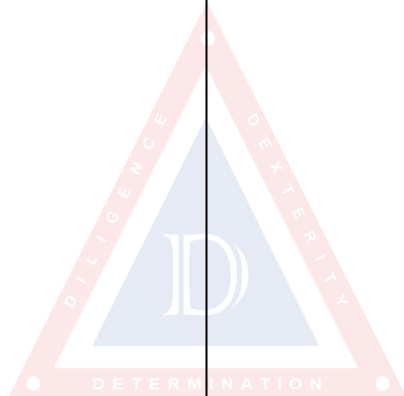
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**Q:10** A vessel contains liquid P and Q in the ratio 5 : 3. If 16 liters of the mixture are removed and the same quantity of liquid Q is added, the ratio becomes 3 : 5. What quantity does the vessel hold?

1. 35 litres
2. 45 litres
3. 40 litres
4. 50 litres
5. None of these



### Answer Key

1. (4)	2. (4)	3. (5)	4. (4)	5. (5)
6. (1)	7. (3)	8. (2)	9. (3)	10. (3)

### Answers and Solutions

**Q:1** The correct answer is **Option 4** i.e. **17 : 7**

Initially, the volume of mixture = 20 litres

Volume of Oil in the mixture =  $5/(5 + 3) \times 20 = 12.5$  litres

Volume of Water in the mixture =  $20 - 12.5 = 7.5$  litres

Now, 6 litre of mixture was taken out

Volume of oil taken out =  $5/(5 + 3) \times 6 = 3.75$  litres

Volume of Water taken out =  $6 - 3.75 = 2.25$  litres

Oil left in  $(20 - 6)$  i.e. 14 litre mixture =  $12.5 - 3.75 = 8.75$  litre

Now, When 6 litre mixture of oil and water was added, the volume of Oil in 20 litre mixture became 13 litres

Hence, the 6 litre mixture contained:  $13 - 8.75 = 4.25$  litre of oil

And,  $(6 - 4.25 = 1.75)$  litres of water

Hence, ratio of oil and water in replacement 6 litre mixture =  $4.25 : 1.75 = 17 : 7$

**Q:2** The correct answer is **Option 4** i.e. **6.5 litres**

Quantity of soda in the mixture =  $72 \times 5/8 = 45$  litres

Quantity of water in the mixture =  $72 \times 3/8 = 27$  litres

When 18 litres of mixture is taken out and 20 litres pure water is added:

Remaining soda =  $45 - 18 \times 5/8 = 33.75$

Remaining water =  $27 - 18 \times 3/8 + 20 = 20.25 + 20 = 40.25$

Hence, Required difference =  $40.25 - 33.75 = 6.5$  litres

**Q:3** The correct answer is **option 5** i.e. **10**

Total mixture = 50 Liters

Alcohol in the mixture =  $(7/10) \times 50$

$\Rightarrow 35$  Liters

Spirit in the mixture =  $(3/10) \times 50$

$\Rightarrow 15$  Liters

Let x amount of alcohol is added,

$$\Rightarrow (35 + x)/15 = 3/1$$

$$\Rightarrow 35 + x = 45$$

$$\Rightarrow x = 10 \text{ Liters}$$

**Q:4** The correct answer is **Option 4** i.e. **7 : 5**

Let the cost price of milk be Rs. 1 per litre

Milk in 1 litre mixture of A =  $4/7$  litre

Milk in 1 litre mixture of B =  $2/5$  litre

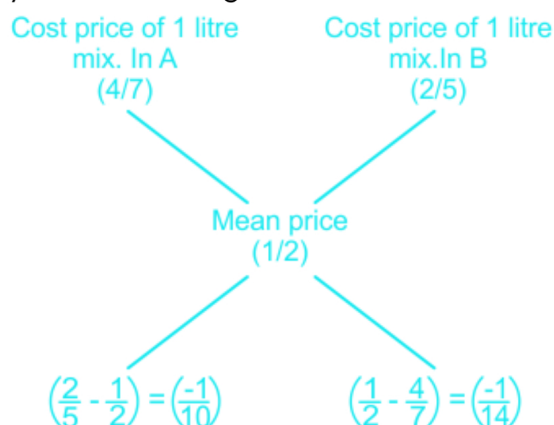
Milk in 1 litre mixture of C =  $1/2$  litre

Cost price of 1 litre mixture in A = Rs.  $4/7$

Cost price of 1 litre mixture in B = Rs.  $2/5$

Mean price = Rs.  $1/2$

By the rule of alligation,



Required ratio = **7 : 5**

**Q:5** The correct answer is **Option 5** i.e. **16 : 9**.

Quantity of milk = initial milk  $\times \left[ \frac{\text{mixture} - \text{quantity replaced}}{\text{total quantity}} \right]^{\text{number of times}}$

$$\Rightarrow 15 \times \left[ \frac{(15 - 3)/15}{15} \right]^2$$

$$\Rightarrow 15 \times \left[ \frac{3 \times 4/3 \times 5}{5} \right]^2$$

$$\Rightarrow 15 \times \left[ \frac{16}{25} \right]$$

$$\Rightarrow 3 \times 16/5$$

$$\Rightarrow 48/5 = 9.6$$

Now, Quantity of water =  $15 - 9.6 = 5.4$

Hence, Ratio =  $9.6 : 5.4 = 16 : 9$

**Q:6** The correct answer is **option 1** i.e. **52 liter.**

Let, alcohol =  $6x$ , water =  $5x$

According to the question,

$$\Rightarrow [6x - (22 \times 6/11)] : [5x - (22 \times 5/11) + 22] = 9 : 13$$



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$$\Rightarrow (6x - 12) : (5x - 10 + 22) = 9 : 13$$

$$\Rightarrow 13 (6x - 12) = 9 (5x + 12)$$

$$\Rightarrow 78x - 156 = 45x + 108$$

$$\Rightarrow 78x - 45x = 156 + 108$$

$$\Rightarrow 33x = 264$$

$$\Rightarrow x = 8$$

$$\text{Water after replacement} = 5 \times 8 - 10 + 22 = (30 + 22) = 52 \text{ litre}$$

**Q:7** The correct answer is **Option 3** i.e. **4 : 1**.

The total amount of mixture = 18 L

$$\text{Alcohol in mixture} = (18 \times 5)/6 = 15 \text{ L}$$

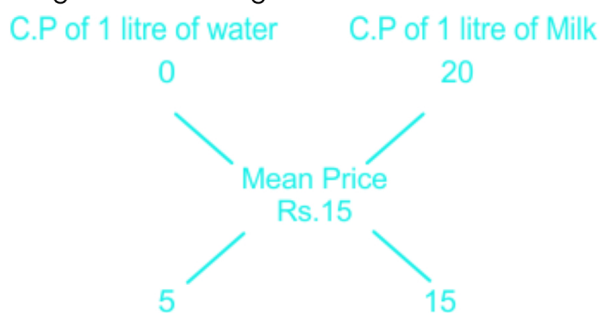
$$\text{Water in mixture} = 18 - 15 = 3 \text{ L}$$

$$\text{New ratio on adding 9 L alcohol and 3 L water} = (15 + 9) : (3 + 3)$$

$$\Rightarrow 24 : 6 = 4 : 1$$

**Q:8** The correct answer is **Option 2** i.e. **1 : 3**.

Using the rule of alligation



The required ratio of water to milk = 5 : 15 = 1 : 3

**Q:9** The correct answer is **Option 3** i.e. **8 litres**.

$$\text{If } a : b = m : n,$$

$$\text{then } a = mk, b = nk$$

where 'k' is any arbitrary constant = 1, 2, 3,...

Let the quantity of milk and water in the initial mixture be '5x' and '4x' litres respectively

If 7 litres of water is added to the mixture, then the new ratio of milk and water is 2 : 3

$$\Rightarrow 5x / (4x + 7) = 2/3$$

$$\Rightarrow 5x \times 3 = 2 \times (4x + 7)$$

$$\Rightarrow 15x = 8x + 14$$

$$\Rightarrow 15x - 8x = 14$$

$$\Rightarrow 7x = 14$$

$$\Rightarrow x = 14/7 = 2 \text{ litres}$$

Volume of water in the initial mixture =  $4 \times 2 = 8$  litres

**Q:10** The correct answer is **option 3** i.e. **40 litres**.

Let, the quantity of liquid P and Q be 5x and 3x litres respectively

$$\text{Quantity of P removed} = 5 / (5 + 3) \times 16 = 10 \text{ litres}$$

$$\text{Quantity of Q removed} = 3 / (5 + 3) \times 16 = 6 \text{ litres}$$

$$\text{Now, } (5x - 10) / (3x - 6 + 16) = 3/5$$

$$\Rightarrow 25x - 50 = 9x + 30$$

$$\Rightarrow 16x = 80$$

$$\Rightarrow x = 5$$

$$\therefore \text{Quantity that vessel hold} = 8 \times 5 = 40 \text{ litres}$$