

Mixture Allegation

Solution

1. **Answer: (B)**

When X liter milk is taken out

Quantity of milk left = $(240 - X)$ liter

Quantity of water = X liter

When 20% of mixture taken out

Remaining quantity of water

$$= \frac{80}{100} \times (240 - X) = (192 - 0.8X) \text{ liter}$$

Remaining quantity of water

$$= \frac{80}{100} \times X + \frac{20}{100} \times 240 = (0.8X + 48) \text{ liter}$$

ATQ,

$$(192 - 0.8X) - (0.8X + 48) = 128$$

$$16 = 1.6X$$

$$X = 10$$

2. **Answer: (A)**

Ratio of milk of water in final mixture

$$= \left(\frac{3}{5} \times 3 + \frac{5}{9} \times 4 \right) : \left(\frac{2}{5} \times 3 + \frac{4}{9} \times 4 \right)$$

$$= 181 : 134$$

3. **Answer: (D)**

Pot 1

Ratio of Milk and Water = 4 : 1

\therefore Quantity of Milk = $\frac{4}{5}$

Quantity of Water = $\frac{1}{5}$

Pot 2

Ratio of Milk and Water = 2 : 3

\therefore Quantity of Milk = $\frac{2}{5}$

Quantity of Water = $\frac{3}{5}$

Two equal pots are mixed in the ratio 7 : 6

$$\Rightarrow \{(7 \times \frac{4}{5}) + (6 \times \frac{2}{5})\} / \{(7 \times \frac{1}{5}) + (6 \times \frac{3}{5})\} = 40/25 = 8/5$$

\therefore Ratio of Milk and water in the mixture is 8 : 5

Required Percentage

$$= \{(8 - 5)/5\} \times 100 = 60\%$$

\therefore Quantity of milk in the mixture is greater than water by 60%

4. **Answer: (C)**

Percentage of milk in the mixture = 60%

\therefore Quantity of milk in 80 gm mixture

$$\Rightarrow \text{Quantity of milk} = (60/100) \times 80$$

$$\Rightarrow \text{Quantity of milk} = 48 \text{ gm}$$

Quantity of water in the mixture

$$= 80 - 48 = 32 \text{ gm}$$

Now, 20 gm of mixture is removed and 6 gm of water is added

\therefore Quantity of milk in mixture

$$= 48 - (20 \times 48/80) = 48 - 12 = 36$$

Quantity of water in mixture

$$= 32 - (20 \times 32/80) + 6 = 38 - 8 = 30$$

Ratio of milk and water in the new mixture

$$\Rightarrow \text{Ratio} = 36/30 = 6/5 = 6 : 5$$

\therefore Ratio of milk and water in the new mixture is 6 : 5

5. **Answer: (B)**

$$\begin{array}{ccc} \frac{3}{5} & & \frac{4}{9} \\ & \searrow \quad \swarrow & \\ & \frac{1}{2} & \\ & \swarrow \quad \searrow & \\ \left(\frac{1}{2} \cdot \frac{4}{9} = \frac{1}{18} \right) & & \left(\frac{3}{5} \cdot \frac{1}{2} = \frac{1}{10} \right) \end{array}$$

$$\text{Ratio} = \frac{1}{18} : \frac{1}{10}$$

$$= 10 : 18 = 5 : 9$$

$$\text{Required Quantity} = \frac{3}{5} \times 9$$

$$= \frac{27}{5} = 5 \frac{2}{5} \text{ litre}$$

6. **Answer: (A)**

Capacity of C = 70L

Let milk in C = X L

ATQ,

$$x + \frac{250}{100} \times x = 70$$

$$3.5x = 70$$

$$x = 20$$

So, milk in C = 20L

Water in C = 50L

So Ratio of milk and water in C = 2 : 5

7. **Answer: (B):**

The correct answer is Option 2 i.e. 1 : 1

Initial volume of acid in the solution
= $360 \times \frac{8}{9} = 320$ ml
Suppose Final volume of acid in solution be
P ml.

Applying formula for replacement:
Quantity of acid left after replacing 90 ml
acid by water twice

$$P = 320 \times (1 - (90/360))^2$$

$$P = 320 \times 9/16$$

$$P = 180 \text{ ml}$$

Since total mixture = 360 ml

Hence,

Volume of water in the final mixture

$$= 360 - 180 = 180 \text{ ml}$$

Hence,

$$\text{Ratio} = 180 : 180 = 1 : 1$$

8. **Answer: (D):**

Let the two alloys be mixed in the ratio of
x:y

\therefore Brass and Aluminum content in mixture
from Alloy X will be $(8x/17)$ and $(9x/17)$
respectively.

Similarly, Brass and Aluminum content in
mixture from alloy Y will be $(y/7)$ and
 $(6y/7)$ respectively.

\Rightarrow Total Brass content in mixture

$$= (8x/17) + (y/7)$$

\Rightarrow Total Aluminum content in mixture

$$= (9x/17) + (6y/7)$$

According to the condition given in the
problem, Brass content in mixture = 25%

\therefore Aluminum content in mixture

$$= 100 - 25 = 75\%$$

Ratio of Brass to Aluminium in the final
mixture = $25 : 75 = 1 : 3$

$$\therefore [(8x/17) + (y/7)] / [(9x/17) + (6y/7)] = 1 / 3$$

$$\Rightarrow 3 \times [(8x/17) + (y/7)] = [(9x/17) + (6y/7)]$$

$$\Rightarrow [(24x/17) + (3y/7)] = [(9x/17) + (6y/7)]$$

$$\Rightarrow x \times [(24/17) - (9/17)] = y \times [(6/7) - (3/7)]$$

$$\Rightarrow (15/17)x = (3/7)y$$

$$\Rightarrow x/y = 17/35$$

$$\therefore x : y = 17 : 35$$

Let the quantity of the first mixture be x and
the second mixture be y.

Quantity of brass in the first mixture = $8x/17$

Quantity of brass in the second mixture
= $y/7$

Quantity of mixture in resultant mixture
= $(1/4) \times (x + y)$

$$\text{Then, } 8x/17 + y/7 = (1/4) \times (x + y)$$

$$\text{Or, } 15x/(17 \times 4) = 3y/(7 \times 4)$$

$$\text{Then, } x/y = 17/35.$$

\therefore The two alloys should be mixed in the
ratio of 17 : 35

9. **Answer: (B):**

Initial quantity = 170 liters

After 20% mixture was taken out

$$\text{Quantity} = 170 - 20\% \text{ of } 170 = 136 \text{ liters}$$

$$\text{Milk : water} = 12 : 5$$

$$\text{Water} = 136 \times 5/17 = 40 \text{ liter}$$

After adding 10 liters more

$$\therefore \text{required quantity} = 40 + 10 = 50 \text{ liter}$$

10. **Answer: (E)**

Let the quantity of mixture be 100x lit

Quantity of milk = $76x$ lit

And quantity of water = $24x$ lit

Quantity of water taken = $12x$ lit

Quantity of milk taken = $38x$ lit

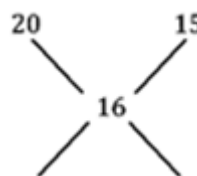
ATQ,

$$26x = 78$$

$$x = 3 \text{ lit}$$

Required quantity of milk = 114 lit

11. **Answer: (D)**



$$(16 - 15) = 1 \quad (20 - 16) = 4$$

Required ratio = 1 : 4

12. **Answer: (B)**

$$\text{Milk} \rightarrow \frac{4}{5} \times 40 = 32 \text{ litre}$$

$$\text{Water} \rightarrow \frac{1}{5} \times 40 = 8 \text{ litre}$$

Let x liters mixture take out

$$\therefore \frac{32 - \frac{4}{5} \times x + 4}{8 - \frac{1}{5} \times x + 4} = \frac{8}{3}$$

$$540 - 12x = 480 - 8x$$

$$4x = 60$$

$$x = 15 \text{ litres.}$$

13. **Answer: (A)**

In 1000 ml of mixture,

Alcohol = 700 ml

Water = 300 ml

Let x ml of alcohol is mixed.

According to question

$$\frac{300}{1000 + x} = \frac{15}{100}$$

$$6000 = 3000 + 3x$$

$$x = 1000 \text{ ml}$$

14. **Answer: (B)**

ATQ

$$\frac{(120 - X)}{Y} = \frac{20}{1}$$

$$120 - X = 20Y \dots\dots\dots(i)$$

And

$$\frac{(120 - 2X)}{Y} = \frac{16}{1}$$

$$120 - 2X = 16Y \dots\dots\dots(ii)$$

From (i) and (ii)

$$X = 20 \text{ \& } Y = 5$$

$$X + Y = 25$$

15. **Answer: (D)**

ATQ

$$\frac{(80 + X)}{4X} = \frac{3}{4}$$

$$320 + 4X = 12X$$

$$\Rightarrow X = 40 \text{ lit}$$

And

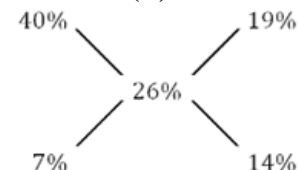
$$\frac{40 + Z}{120 + Z} = \frac{4}{9}$$

$$360 + 9Z = 480 + 4Z$$

$$\Rightarrow Z = 24 \text{ lit}$$

$$X + Z = 64 \text{ lit}$$

16. **Answer: (B)**



$$1 : 2$$

Part of whisky replaced is $\frac{2}{3}$

17. **Answer: (A)**

$$\text{Liters of milk removed} = \frac{1}{5} \times 10 = 2 \text{ltr.}$$

Liters of water removed

$$= \frac{1}{5} \times 2.5 = 0.5 \text{ltr.}$$

$$\frac{2 + x}{8} = \frac{4}{1}$$

$$\Rightarrow x = 30$$

$$\frac{32}{8 + y} = \frac{1}{4} \Rightarrow y = 128 - 8 = 120 \text{ ltr.}$$

18. **Answer: (B)**

$$\text{C.P. of mixture} = 49 \times \frac{6}{7} = 42 \text{Rs/kg}$$

$$\frac{2}{3} = \frac{y - 42}{42 - x}$$

$$84 - 2x = 3y - 126$$

$$3y + 2x = 210 \dots\dots\dots(i)$$

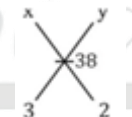
New cost price of mixture after reverting the quantity in which they are mixed.

$$\left(1 + \frac{11}{38}\right) \times \text{new CP} = 49$$

$$\text{New CP} = 49 \times \frac{38}{49}$$

$$= 38 \text{ Rs./kg}$$

So,



$$\frac{3}{2} = \frac{y - 38}{38 - x}$$

$$114 - 3x = 2y - 76$$

$$190 = 2y + 3x \dots\dots\dots(ii)$$

Solving (i) and (ii)

$$x = 30 \text{ Rs/kg}$$

19. **Answer: (E)**

Quantity I:

Let vessel A contains 3x litres milk and x litres water and initial quantity of mixture in vessel A be 4x liters.

Half of the content of vessel A is first poured into vessel B, then content of vessel B is poured into vessel C and finally contents of vessel C is poured into vessel A. So, vessel A finally contains contents of all the three vessels.

Final ratio of milk and water in vessel A:

$$\frac{\text{Quantity of milk in all three vessels}}{\text{Quantity of water in all three vessels}} = \frac{9}{4}$$

$$\frac{3x + 30}{x + 20} = \frac{9}{4}$$



$$\Rightarrow x = 20$$

Initial quantity of mixture in vessel A = $4x = 80$ liters

Quantity I = Quantity II

20. **Answer: (B)**

$$\frac{4x + 15}{x} = \frac{19}{4}$$

$$x = 20$$

Total milk = 20

Milk in jar B = $\frac{1}{5} \times 20 = 4L$