

MIXTURE AND ALLIGATIONMixture $\rightarrow$ CombinedAlligation $\rightarrow$ RuleThe quantity of cheaper quality = x kgThe quantity of superior quality = y kgThe cost price of cheaper quality per kg = c The cost price of superior quality per kg = d The total cost price of cheaper quality = cx The total cost price of superior quality = dy The total cost price of the mixture = $cx + dy$ The cost price of mixture per kg = $\frac{cx + dy}{x + y} = m = \text{mean cost price}$

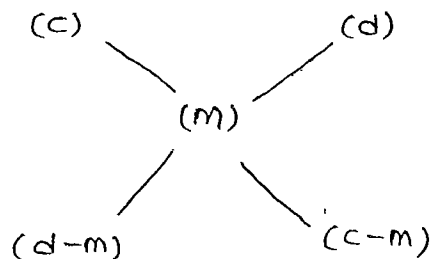
$$\frac{cx + dy}{x + y} = m$$

$$cx + dy = mx + my$$

$$dy - my = mx - cx$$

$$y(d - m) = x(m - c)$$

$$\boxed{\frac{y}{x} = \frac{(m - c)}{(d - m)}}$$



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1. Type - 1

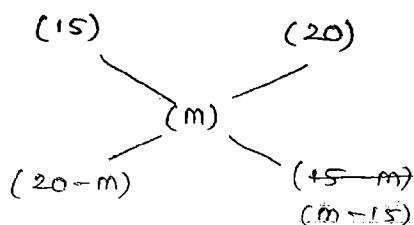
Rs. 15

2

Type - 2

Rs. 20

3



$$\frac{(m - 15)}{(20 - m)} = \frac{3}{2} \quad (\text{relevant to superior})$$

$$m = 18$$

2. $? \rightarrow 9/-$

$27 \text{ kg} \rightarrow 7/-$

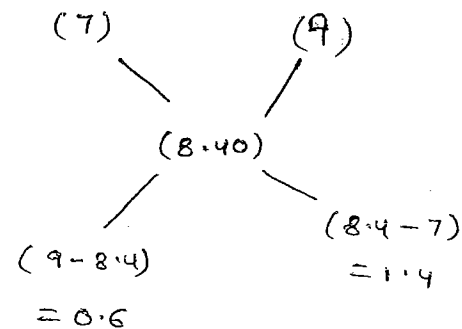
gain = 10%

S.P = 9.24 RS

$$\frac{S.P - C.P}{C.P} \times 100 = \text{Gain}$$

$$C.P = \frac{100}{110} \times 9.24$$

$$= 8.40$$



$$\frac{1.40}{0.6} = \frac{y}{27} \quad (\text{based on superior cost})$$

$y = 63 \text{ kg}$

3.

A

$$\frac{S}{5} : \frac{W}{2}$$

$$\frac{S}{7=(5+2)}$$

$$= 0.714$$

B

$$\frac{S}{7} : \frac{W}{6}$$

$$\frac{7}{13}$$

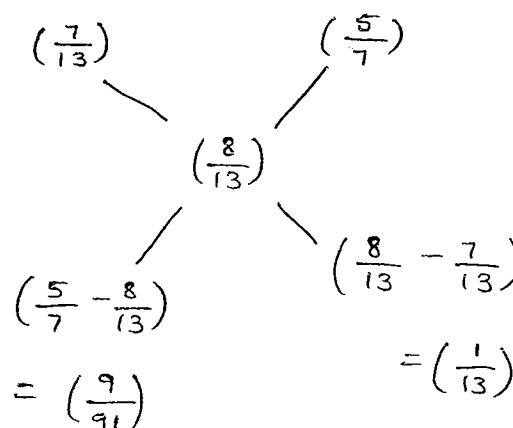
$$= 0.538$$

C

$$\frac{S}{8} : \frac{W}{5}$$

$$\left(\frac{8}{13}\right)$$

$$=$$



$$\frac{\frac{1}{13}}{\left(\frac{9}{91}\right)} \Rightarrow \frac{7}{9} \Rightarrow 7:9$$

Level-2:-

1.

$$\begin{array}{c} \text{1st} \\ \hline \text{M} \\ \frac{3}{4} \end{array}$$

$$\begin{array}{c} \text{W} \\ \frac{1}{4} \end{array}$$

$$\begin{array}{c} \text{2nd} \\ \hline \text{M} \\ \frac{1}{2} \end{array}$$

$$\begin{array}{c} \text{W} \\ \frac{1}{2} \end{array}$$

$$\begin{array}{l} \text{W} : \text{M} \\ 3 : 5 \end{array}$$

$$\begin{array}{c} \left(\frac{1}{2}\right) \quad \left(\frac{3}{4}\right) \\ \diagdown \quad \diagup \\ \left(\frac{5}{8}\right) \\ \diagup \quad \diagdown \\ \left(\frac{3}{4} - \frac{5}{8}\right) \quad \left(\frac{5}{8} - \frac{1}{2}\right) \\ = 6.42 \text{ lit} \quad = 6.1 \text{ lit} \end{array}$$

2.

$$9.30/-$$

?

$$8 : 7$$

$$\text{Mixture} = 10 \text{ Rs.}$$

$$\begin{array}{c} (9.30) \quad (d) \\ \diagdown \quad \diagup \\ (10) \\ \diagup \quad \diagdown \\ (d-10) \quad (10-9.30) \\ = 0.70 \end{array}$$

$$\frac{0.7}{d-10} = \frac{7}{8}$$

$$d = 10.80$$

3.

$$126 \text{ Rs}$$

$$135 \text{ Rs}$$

x

$$\text{Mixture} = 153 \text{ Rs.}$$

1

;

1

;

2

x

2

$$\frac{126 \times 1 + 135 \times 1}{2}$$

2

$$= 130.50$$

$$\begin{array}{c} 130.50 \quad d \\ \diagdown \quad \diagup \\ (153) \\ \diagup \quad \diagdown \\ (d-153) \quad (153-130.50) \\ = 22.50 \end{array}$$

$$\frac{22.50}{d-153} = \frac{2}{2} = 1 \Rightarrow d = 175.50$$

Replacement of pure liquid:-

The amount of purely fit liquid = x lit

The amount of replaced liquid = a lit

No. of operations = n (taken out + fill it)

The amount of pure liquid remained = $x(1 - \frac{a}{x})^n$

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4. Given $x = 40$ lit, $a = 4$, $n = 3$

$$x(1 - \frac{a}{x})^n$$

$$40(1 - \frac{4}{40})^3$$

$$= 29.16 \text{ lit.}$$

5. Given $x = ?$ $n = 4$ $a = 8$ lit

16:65

$$x(1 - \frac{a}{x})^n$$

$$x(1 - \frac{8}{x})^4$$

$$\frac{x(1 - \frac{8}{x})^4}{x}$$

=

$$\frac{16}{81} = (\frac{2}{3})^4$$

$\Rightarrow (16:65)$

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

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

$$\frac{1}{3} = \frac{8}{x}$$

$$x = 24 \text{ lit.}$$