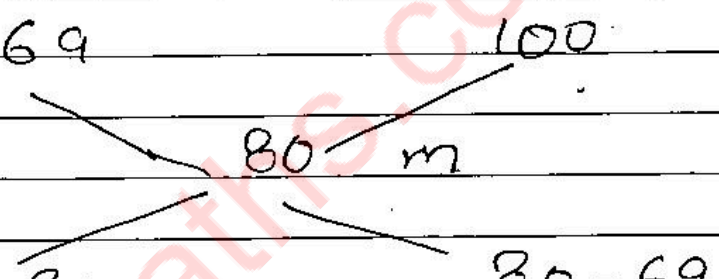
ALLIGATION & MIXTURE

Ex-3 . Pg 1.19

Q1 In what ratio must rice ₹ 69 per Kg be mixed with rice ₹ 100 per Kg so that the mixture be worth ₹ 80 per Kg?

Solution



∴ Ratio is 20 : 11

Q2 The average salary per head of the entire staff of a small factory including the supervisor and labours is ₹ 5750. The average salary per head of the supervisor is ₹ 20,000 and that of the labours is ₹ 5000. Find the number of labours in the factory if there are 4 supervisors

Solution No. of Supervisors = 4

Let the number of labours be y

Average salary of supervisor & labours = 5750

Salary of 1 Labour = 5000

Salary of 1 Supervisor = 20,000

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Page No.:
Date: / /

$$\frac{\text{Sum of terms}}{\text{Total terms}} = \text{Average}$$

$$\frac{4 \times 20,000 + 5000y}{4+y} = 5750$$

$$5000\,[4 \times 4 + y] = 5750\,(4+y)$$

$$20\,[16 + y] = 23\,(4+y)$$

$$320 + 20y = 92 + 23y$$

$$320 - 92 = 23y - 20y$$

$$228 = 3y$$

$$76 = \frac{228}{3} = y$$

No. of labours = 76

Q3 A container contains 70 l of orange squash. The squash being too concentrated is 7 l of squash was taken out from this container and replaced by water. This process was repeated thrice to reduce the concentration of squash. How much quantity of orange squash is left in the container.

Solution Total orange squash = 70 l = x

Squash taken out = 7 l = y

No. of times process repeated = z = n

∴ Orange squash is left $= x\left(1 - \frac{y}{x}\right)^n$

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$= 70\left(1-\frac{7}{70}\right)^3$

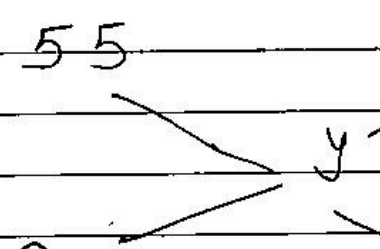
$= 70\left(\frac{70-7}{70}\right)^3 = 70 \times \left(\frac{63}{70}\right)^3$

$= 70\left(\frac{9}{10}\right)^3 = \frac{70 \times 9 \times 9 \times 9}{10 \times 10 \times 10}$

$= 51.03$ l

84 Cost of two types of pulses is ₹55 per kg and ₹90 per kg. If both the pulses are mixed together in the ratio 2:3 what should be the price of the mixed variety of pulses per kg.

Solution Cost of I type pulse = 55 ₹/Kg
Cost of II type pulse = 90 ₹/Kg
Cost of mixed variety = y ₹/Kg



2 : 3 (given)

$\frac{90-y}{y-55} = \frac{2}{3}$

$270 - 3y = 2y - 110$

$270 + 110 = 2y + 3y$

$380 = 5y$

$76 = \frac{380}{5} = y$

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Page No.:
Date: / /

Q5 A shopkeeper has 1 quintal of wheat, part of which she sells at 18% gain and the rest at 28% gain. In total she gains 24%. Find the quantity of wheat sold at 18% and 28%.

Solution

I	II
18%	28%
24%	
4%	6%
2	3

Wheat sold at 18% $= \frac{2}{5} \times 100$

$= 40\text{Kg}$

Wheat sold at 28% $= \frac{3}{5} \times 100$

$= 60\text{Kg}$

Q6 600gm of jaggery syrup has 40% jaggery in it. How much jaggery should be added to make it 50% in the syrup?

Solution Total jaggery = 600gm

Syrup = 40%

Syrup = 40% of 600

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Page No.:
Date: / /

$= \frac{40}{100} \times 600 = 240$

240 g of jaggery is present in 600 gm syrup

$\frac{240+x}{600+x} = \frac{1}{2}$

$2(240+x) = 600+x$

$480 + 2x = 600 + x$

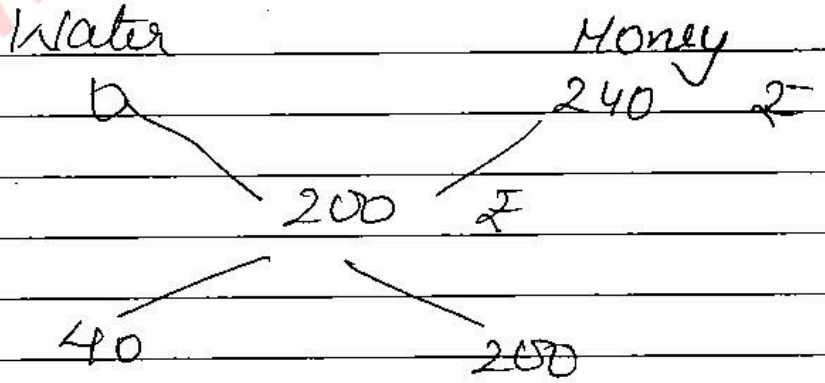
$2x - x = 600 - 480$

$x = 120$

Q7 In what ratio, water must be added to dilute honey costing ₹ 240/litre so that resulted syrup would be worth ₹ 200 per l?

Solution

Value of water is taken as zero



Therefore required ratio 40 : 200

4 : 20

1 : 5

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Page No.
Date / /

Q8 A container has 50 l of juice in it. 5 l juice is taken out and is replaced by 5 l of water. This process is repeated 4 more times what is the amount of juice in the container after final replacement

Solution. Total juice = 50 l
Juice taken out = 5 l
No. of times process repeated = 5
Juice is replaced with water

Juice ~~is~~ contained by the container
$= x\left(1-\frac{y}{x}\right)^n$ unit

where x is the total quantity,
y is the quantity removed,
n is number of times operation repeated

$= 50\left(1-\frac{5}{50}\right)^5$

$= 50 \times \left(\frac{45}{50}\right)^5$

$= 50 \times \left(\frac{9}{10}\right)^5$

$= 50 \times \frac{9\times9\times9\times9\times9}{100\times100\times10}$

$= 29.5$ l

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