



THE MATH HUB

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MIXTURE & ALLIGATION MCQs

100 FULLY SOLVED MCQs

PPSC, FPSC & ONE PAPER EXAMS

NTS • CSS MPT • PMS • Government Job Tests

Mixture • Alligation • Concentration • Replacement • Mean Price

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MIXTURE & ALLIGATION MCQs | 100 FULLY SOLVED MCQs**Fast Foundation for One-Paper Exams****Weighted mixture**

$$\text{Mean} = \frac{q_1 c_1 + q_2 c_2}{q_1 + q_2}$$

Alligation rule

$$\text{Low : High} = (H - M) : (M - L)$$

One replacement

$$\text{Original left} = V \left(1 - \frac{r}{V} \right)$$

Repeated replacement

$$\text{Original left} = V \left(1 - \frac{r}{V} \right)^n$$

Dilution

$$\text{Solute before} = \text{Solute after}$$

Fast check The mean concentration or mean price must lie between the two original values.

Weighted Concentration**MCQ 1**

10 L of a 20% solution is mixed with 30 L of a 40% solution. Find the concentration of the mixture.

- A. 35% B. 40%
C. 30% D. 36%

Solution

$$M = \frac{10(20) + 30(40)}{10 + 30}$$

$$M = \frac{1400}{40} = 35\%$$

Final Answer

35%

MCQ 2

12 L of a 25% solution is mixed with 18 L of a 45% solution. Find the concentration of the mixture.

- A. 42% B. 37%
C. 32% D. 35%

Solution

$$M = \frac{12(25) + 18(45)}{12 + 18}$$

$$M = \frac{1110}{30} = 37\%$$

Final Answer

37%

MCQ 3

15 L of a 30% solution is mixed with 25 L of a 50% solution. Find the concentration of the mixture.

- A. 95/2% B. 75/2%
C. 85/2% D. 40%

Solution

$$M = \frac{15(30) + 25(50)}{15 + 25}$$

$$M = \frac{1700}{40} = \frac{85}{2}\%$$

Final Answer $\frac{85}{2}\%$ **MCQ 4**

8 L of a 15% solution is mixed with 12 L of a 35% solution. Find the concentration of the mixture.

- A. 32% B. 22%
C. 25% D. 27%

Solution

$$M = \frac{8(15) + 12(35)}{8 + 12}$$

$$M = \frac{540}{20} = 27\%$$

Final Answer

27%

MCQ 5

20 L of a 10% solution is mixed with 30 L of a 30% solution. Find the concentration of the mixture.

- A. 22% B. 27%
C. 17% D. 20%

Solution

$$M = \frac{20(10) + 30(30)}{20 + 30}$$

$$M = \frac{1100}{50} = 22\%$$

Final Answer

22%

MCQ 6

14 L of a 40% solution is mixed with 21 L of a 20% solution. Find the concentration of the mixture.

- A. 33% B. 28%
C. 23% D. 30%

Solution

$$M = \frac{14(40) + 21(20)}{14 + 21}$$

$$M = \frac{980}{35} = 28\%$$

Final Answer

28%

MCQ 7

25 L of a 24% solution is mixed with 15 L of a 44% solution. Find the concentration of the mixture.

- A. 73/2% B. 53/2%
C. 63/2% D. 34%

Solution

$$M = \frac{25(24) + 15(44)}{25 + 15}$$

$$M = \frac{1260}{40} = \frac{63}{2}\%$$

Final Answer

$$\frac{63}{2}\%$$

MCQ 8

16 L of a 12% solution is mixed with 24 L of a 32% solution. Find the concentration of the mixture.

- A. 29% B. 19%
C. 22% D. 24%

Solution

$$M = \frac{16(12) + 24(32)}{16 + 24}$$

$$M = \frac{960}{40} = 24\%$$

Final Answer

$$24\%$$

MCQ 9

18 L of a 50% solution is mixed with 12 L of a 20% solution. Find the concentration of the mixture.

- A. 38% B. 43%
C. 33% D. 35%

Solution

$$M = \frac{18(50) + 12(20)}{18 + 12}$$

$$M = \frac{1140}{30} = 38\%$$

Final Answer

$$38\%$$

MCQ 10

9 L of a 60% solution is mixed with 21 L of a 30% solution. Find the concentration of the mixture.

- A. 44% B. 39%
C. 34% D. 45%

Solution

$$M = \frac{9(60) + 21(30)}{9 + 21}$$

$$M = \frac{1170}{30} = 39\%$$

Final Answer

$$39\%$$

MCQ 11

30 L of a 15% solution is mixed with 10 L of a 45% solution. Find the concentration of the mixture.

- A. 55/2% B. 35/2%
C. 45/2% D. 30%

Solution

$$M = \frac{30(15) + 10(45)}{30 + 10}$$

$$M = \frac{900}{40} = \frac{45}{2}\%$$

Final Answer

$$\frac{45}{2}\%$$

MCQ 12

11 L of a 20% solution is mixed with 22 L of a 35% solution. Find the concentration of the mixture.

- A. 35% B. 25%
C. 55/2% D. 30%

Solution

$$M = \frac{11(20) + 22(35)}{11 + 22}$$

$$M = \frac{990}{33} = 30\%$$

Final Answer

$$30\%$$

MCQ 13

24 L of a 25% solution is mixed with 16 L of a 55% solution. Find the concentration of the mixture.

- A. 37% B. 42%
C. 32% D. 40%

Solution

$$M = \frac{24(25) + 16(55)}{24 + 16}$$

$$M = \frac{1480}{40} = 37\%$$

Final Answer

37%

MCQ 14

13 L of a 40% solution is mixed with 27 L of a 10% solution. Find the concentration of the mixture.

- A. 99/4% B. 79/4%
C. 59/4% D. 25%

Solution

$$M = \frac{13(40) + 27(10)}{13 + 27}$$

$$M = \frac{790}{40} = \frac{79}{4}\%$$

Final Answer $\frac{79}{4}\%$ **MCQ 15**

35 L of a 20% solution is mixed with 15 L of a 50% solution. Find the concentration of the mixture.

- A. 34% B. 24%
C. 29% D. 35%

Solution

$$M = \frac{35(20) + 15(50)}{35 + 15}$$

$$M = \frac{1450}{50} = 29\%$$

Final Answer

29%

MCQ 16

20 L of a 35% solution is mixed with 30 L of a 15% solution. Find the concentration of the mixture.

- A. 28% B. 18%
C. 25% D. 23%

Solution

$$M = \frac{20(35) + 30(15)}{20 + 30}$$

$$M = \frac{1150}{50} = 23\%$$

Final Answer

23%

MCQ 17

12 L of a 10% solution is mixed with 28 L of a 40% solution. Find the concentration of the mixture.

- A. 31% B. 36%
C. 26% D. 25%

Solution

$$M = \frac{12(10) + 28(40)}{12 + 28}$$

$$M = \frac{1240}{40} = 31\%$$

Final Answer

31%

MCQ 18

32 L of a 30% solution is mixed with 8 L of a 70% solution. Find the concentration of the mixture.

- A. 43% B. 38%
C. 33% D. 50%

Solution

$$M = \frac{32(30) + 8(70)}{32 + 8}$$

$$M = \frac{1520}{40} = 38\%$$

Final Answer

38%

MCQ 19

18 L of a 25% solution is mixed with 42 L of a 45% solution. Find the concentration of the mixture.

- A. 44% B. 34%
C. 39% D. 35%

Solution

$$M = \frac{18(25) + 42(45)}{18 + 42}$$

$$M = \frac{2340}{60} = 39\%$$

Final Answer**39%****MCQ 20**

27 L of a 20% solution is mixed with 33 L of a 50% solution. Find the concentration of the mixture.

- A. 83/2% B. 63/2%
C. 35% D. 73/2%

Solution

$$M = \frac{27(20) + 33(50)}{27 + 33}$$

$$M = \frac{2190}{60} = \frac{73}{2}\%$$

Final Answer **$\frac{73}{2}\%$** **Alligation Ratio****MCQ 21**

In what ratio should a 10% solution be mixed with a 40% solution to obtain a 25% solution?

- A. 1:1 B. 1:2
C. 2:1 D. 1:3

Solution

$$\text{Low : High} = (H - M) : (M - L)$$

$$= (40 - 25) : (25 - 10) = 15 : 15$$

$$= 1 : 1$$

Final Answer**1 : 1****MCQ 22**

In what ratio should a 20% solution be mixed with a 50% solution to obtain a 35% solution?

- A. 1:2 B. 1:1
C. 2:1 D. 1:3

Solution

$$\text{Low : High} = (H - M) : (M - L)$$

$$= (50 - 35) : (35 - 20) = 15 : 15$$

$$= 1 : 1$$

Final Answer**1 : 1****MCQ 23**

In what ratio should a 30% solution be mixed with a 70% solution to obtain a 50% solution?

- A. 1:2 B. 2:1
C. 1:1 D. 1:3

Solution

$$\text{Low : High} = (H - M) : (M - L)$$

$$= (70 - 50) : (50 - 30) = 20 : 20$$

$$= 1 : 1$$

Final Answer**1 : 1****MCQ 24**

In what ratio should a 15% solution be mixed with a 45% solution to obtain a 25% solution?

- A. 1:2 B. 3:1
C. 2:3 D. 2:1

Solution

$$\text{Low : High} = (H - M) : (M - L)$$

$$= (45 - 25) : (25 - 15) = 20 : 10$$

$$= 2 : 1$$

Final Answer**2 : 1**

MCQ 25

In what ratio should a 25% solution be mixed with a 65% solution to obtain a 45% solution?

- A. 1:1 B. 1:2
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (65 - 45) : (45 - 25) = 20 : 20 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 26**

In what ratio should a 12% solution be mixed with a 42% solution to obtain a 30% solution?

- A. 3:2 B. 2:3
C. 3:3 D. 2:5

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (42 - 30) : (30 - 12) = 12 : 18 \\ &= 2 : 3\end{aligned}$$

Final Answer**2 : 3****MCQ 27**

In what ratio should a 18% solution be mixed with a 48% solution to obtain a 28% solution?

- A. 1:2 B. 3:1
C. 2:1 D. 2:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (48 - 28) : (28 - 18) = 20 : 10 \\ &= 2 : 1\end{aligned}$$

Final Answer**2 : 1****MCQ 28**

In what ratio should a 20% solution be mixed with a 60% solution to obtain a 40% solution?

- A. 1:2 B. 2:1
C. 1:3 D. 1:1

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (60 - 40) : (40 - 20) = 20 : 20 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 29**

In what ratio should a 35% solution be mixed with a 75% solution to obtain a 55% solution?

- A. 1:1 B. 1:2
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (75 - 55) : (55 - 35) = 20 : 20 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 30**

In what ratio should a 5% solution be mixed with a 35% solution to obtain a 20% solution?

- A. 1:2 B. 1:1
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (35 - 20) : (20 - 5) = 15 : 15 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1**

MCQ 31

In what ratio should a 40% solution be mixed with a 80% solution to obtain a 50% solution?

- A. 1:3 B. 4:1
C. 3:1 D. 3:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (80 - 50) : (50 - 40) = 30 : 10 \\ &= 3 : 1\end{aligned}$$

Final Answer**3 : 1****MCQ 32**

In what ratio should a 10% solution be mixed with a 70% solution to obtain a 30% solution?

- A. 1:2 B. 3:1
C. 2:3 D. 2:1

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (70 - 30) : (30 - 10) = 40 : 20 \\ &= 2 : 1\end{aligned}$$

Final Answer**2 : 1****MCQ 33**

In what ratio should a 22% solution be mixed with a 52% solution to obtain a 37% solution?

- A. 1:1 B. 1:2
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (52 - 37) : (37 - 22) = 15 : 15 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 34**

In what ratio should a 16% solution be mixed with a 56% solution to obtain a 36% solution?

- A. 1:2 B. 1:1
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (56 - 36) : (36 - 16) = 20 : 20 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 35**

In what ratio should a 30% solution be mixed with a 90% solution to obtain a 60% solution?

- A. 1:2 B. 2:1
C. 1:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (90 - 60) : (60 - 30) = 30 : 30 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1****MCQ 36**

In what ratio should a 25% solution be mixed with a 55% solution to obtain a 40% solution?

- A. 1:2 B. 2:1
C. 1:3 D. 1:1

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (55 - 40) : (40 - 25) = 15 : 15 \\ &= 1 : 1\end{aligned}$$

Final Answer**1 : 1**

MCQ 37

In what ratio should a 8% solution be mixed with a 68% solution to obtain a 28% solution?

- A. 2:1 B. 1:2
C. 3:1 D. 2:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (68 - 28) : (28 - 8) = 40 : 20 \\ &= 2 : 1\end{aligned}$$

Final Answer

2 : 1

MCQ 38

In what ratio should a 45% solution be mixed with a 75% solution to obtain a 60% solution?

- A. 1:2 B. 1:1
C. 2:1 D. 1:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (75 - 60) : (60 - 45) = 15 : 15 \\ &= 1 : 1\end{aligned}$$

Final Answer

1 : 1

MCQ 39

In what ratio should a 14% solution be mixed with a 44% solution to obtain a 24% solution?

- A. 1:2 B. 3:1
C. 2:1 D. 2:3

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (44 - 24) : (24 - 14) = 20 : 10 \\ &= 2 : 1\end{aligned}$$

Final Answer

2 : 1

MCQ 40

In what ratio should a 32% solution be mixed with a 62% solution to obtain a 47% solution?

- A. 1:2 B. 2:1
C. 1:3 D. 1:1

Solution

$$\begin{aligned}\text{Low : High} &= (H - M) : (M - L) \\ &= (62 - 47) : (47 - 32) = 15 : 15 \\ &= 1 : 1\end{aligned}$$

Final Answer

1 : 1

Mean Price Mixtures**MCQ 41**

Rice costing Rs. 60/kg and Rs. 90/kg is mixed in the ratio 2:3. Find the mean price per kg.

- A. Rs. 78 B. Rs. 83
C. Rs. 73 D. Rs. 75

Solution

$$\begin{aligned}\text{Mean price} &= \frac{2(60) + 3(90)}{2 + 3} \\ &= \text{Rs. 78}\end{aligned}$$

Final Answer

Rs. 78

MCQ 42

Rice costing Rs. 50/kg and Rs. 80/kg is mixed in the ratio 3:2. Find the mean price per kg.

- A. Rs. 67 B. Rs. 62
C. Rs. 57 D. Rs. 65

Solution

$$\begin{aligned}\text{Mean price} &= \frac{3(50) + 2(80)}{3 + 2} \\ &= \text{Rs. 62}\end{aligned}$$

Final Answer

Rs. 62

MCQ 43

Rice costing Rs. 40/kg and Rs. 70/kg is mixed in the ratio 1:2. Find the mean price per kg.

- A. Rs. 65 B. Rs. 55
C. Rs. 60 D. Rs. 61

Solution

$$\begin{aligned}\text{Mean price} &= \frac{1(40) + 2(70)}{1 + 2} \\ &= \text{Rs. } 60\end{aligned}$$

Final Answer

Rs. 60

MCQ 44

Rice costing Rs. 75/kg and Rs. 105/kg is mixed in the ratio 4:1. Find the mean price per kg.

- A. Rs. 86 B. Rs. 76
C. Rs. 90 D. Rs. 81

Solution

$$\begin{aligned}\text{Mean price} &= \frac{4(75) + 1(105)}{4 + 1} \\ &= \text{Rs. } 81\end{aligned}$$

Final Answer

Rs. 81

MCQ 45

Rice costing Rs. 55/kg and Rs. 85/kg is mixed in the ratio 3:5. Find the mean price per kg.

- A. Rs. 295/4 B. Rs. 315/4
C. Rs. 275/4 D. Rs. 70

Solution

$$\begin{aligned}\text{Mean price} &= \frac{3(55) + 5(85)}{3 + 5} \\ &= \text{Rs. } \frac{295}{4}\end{aligned}$$

Final AnswerRs. $\frac{295}{4}$ **MCQ 46**

Rice costing Rs. 30/kg and Rs. 60/kg is mixed in the ratio 5:3. Find the mean price per kg.

- A. Rs. 185/4 B. Rs. 165/4
C. Rs. 145/4 D. Rs. 45

Solution

$$\begin{aligned}\text{Mean price} &= \frac{5(30) + 3(60)}{5 + 3} \\ &= \text{Rs. } \frac{165}{4}\end{aligned}$$

Final AnswerRs. $\frac{165}{4}$ **MCQ 47**

Rice costing Rs. 65/kg and Rs. 95/kg is mixed in the ratio 2:5. Find the mean price per kg.

- A. Rs. 640/7 B. Rs. 570/7
C. Rs. 605/7 D. Rs. 80

Solution

$$\begin{aligned}\text{Mean price} &= \frac{2(65) + 5(95)}{2 + 5} \\ &= \text{Rs. } \frac{605}{7}\end{aligned}$$

Final AnswerRs. $\frac{605}{7}$ **MCQ 48**

Rice costing Rs. 45/kg and Rs. 75/kg is mixed in the ratio 7:3. Find the mean price per kg.

- A. Rs. 59 B. Rs. 49
C. Rs. 60 D. Rs. 54

Solution

$$\begin{aligned}\text{Mean price} &= \frac{7(45) + 3(75)}{7 + 3} \\ &= \text{Rs. } 54\end{aligned}$$

Final Answer

Rs. 54

MCQ 49

Rice costing Rs. 80/kg and Rs. 120/kg is mixed in the ratio 3:1. Find the mean price per kg.

- A. Rs. 90 B. Rs. 95
C. Rs. 85 D. Rs. 100

Solution

$$\begin{aligned}\text{Mean price} &= \frac{3(80) + 1(120)}{3 + 1} \\ &= \text{Rs. 90}\end{aligned}$$

Final Answer

Rs. 90

MCQ 50

Rice costing Rs. 35/kg and Rs. 65/kg is mixed in the ratio 4:6. Find the mean price per kg.

- A. Rs. 58 B. Rs. 53
C. Rs. 48 D. Rs. 50

Solution

$$\begin{aligned}\text{Mean price} &= \frac{4(35) + 6(65)}{4 + 6} \\ &= \text{Rs. 53}\end{aligned}$$

Final Answer

Rs. 53

Alligation with Total Quantity**MCQ 51**

A mixture of 60 kg is to cost Rs. 55/kg using materials costing Rs. 40/kg and Rs. 70/kg. How many kg of the cheaper material are required?

- A. 35 kg B. 25 kg
C. 30 kg D. 31 kg

Solution

$$\text{Low : High} = (70 - 55) : (55 - 40) = 1 : 1$$

$$\text{Low quantity} = 60 \left(\frac{1}{2} \right) = 30$$

Final Answer

30 kg

MCQ 52

A mixture of 48 kg is to cost Rs. 35/kg using materials costing Rs. 20/kg and Rs. 50/kg. How many kg of the cheaper material are required?

- A. 29 kg B. 19 kg
C. 25 kg D. 24 kg

Solution

$$\text{Low : High} = (50 - 35) : (35 - 20) = 1 : 1$$

$$\text{Low quantity} = 48 \left(\frac{1}{2} \right) = 24$$

Final Answer

24 kg

MCQ 53

A mixture of 80 kg is to cost Rs. 50/kg using materials costing Rs. 30/kg and Rs. 90/kg. How many kg of the cheaper material are required?

- A. 160/3 kg B. 80/3 kg
C. 175/3 kg D. 145/3 kg

Solution

$$\text{Low : High} = (90 - 50) : (50 - 30) = 2 : 1$$

$$\text{Low quantity} = 80 \left(\frac{2}{3} \right) = \frac{160}{3}$$

Final Answer $\frac{160}{3}$ kg**MCQ 54**

A mixture of 72 kg is to cost Rs. 45/kg using materials costing Rs. 25/kg and Rs. 65/kg. How many kg of the cheaper material are required?

- A. 41 kg B. 36 kg
C. 31 kg D. 37 kg

Solution

$$\text{Low : High} = (65 - 45) : (45 - 25) = 1 : 1$$

$$\text{Low quantity} = 72 \left(\frac{1}{2} \right) = 36$$

Final Answer

36 kg

MCQ 55

A mixture of 50 kg is to cost Rs. 65/kg using materials costing Rs. 50/kg and Rs. 80/kg. How many kg of the cheaper material are required?

- A. 30 kg B. 20 kg
C. 25 kg D. 26 kg

Solution

$$\text{Low : High} = (80 - 65) : (65 - 50) = 1 : 1$$

$$\text{Low quantity} = 50 \left(\frac{1}{2} \right) = 25$$

Final Answer

25 kg

MCQ 56

A mixture of 36 kg is to cost Rs. 25/kg using materials costing Rs. 10/kg and Rs. 40/kg. How many kg of the cheaper material are required?

- A. 23 kg B. 13 kg
C. 19 kg D. 18 kg

Solution

$$\text{Low : High} = (40 - 25) : (25 - 10) = 1 : 1$$

$$\text{Low quantity} = 36 \left(\frac{1}{2} \right) = 18$$

Final Answer

18 kg

MCQ 57

A mixture of 70 kg is to cost Rs. 50/kg using materials costing Rs. 35/kg and Rs. 75/kg. How many kg of the cheaper material are required?

- A. $175/4$ kg B. $105/4$ kg
C. $195/4$ kg D. $155/4$ kg

Solution

$$\text{Low : High} = (75 - 50) : (50 - 35) = 5 : 3$$

$$\text{Low quantity} = 70 \left(\frac{5}{8} \right) = \frac{175}{4}$$

Final Answer $\frac{175}{4}$ kg**MCQ 58**

A mixture of 64 kg is to cost Rs. 65/kg using materials costing Rs. 45/kg and Rs. 85/kg. How many kg of the cheaper material are required?

- A. 37 kg B. 32 kg
C. 27 kg D. 33 kg

Solution

$$\text{Low : High} = (85 - 65) : (65 - 45) = 1 : 1$$

$$\text{Low quantity} = 64 \left(\frac{1}{2} \right) = 32$$

Final Answer

32 kg

MCQ 59

A mixture of 44 kg is to cost Rs. 35/kg using materials costing Rs. 15/kg and Rs. 55/kg. How many kg of the cheaper material are required?

- A. 27 kg B. 17 kg
C. 22 kg D. 23 kg

Solution

$$\text{Low : High} = (55 - 35) : (35 - 15) = 1 : 1$$

$$\text{Low quantity} = 44 \left(\frac{1}{2} \right) = 22$$

Final Answer

22 kg

MCQ 60

A mixture of 90 kg is to cost Rs. 70/kg using materials costing Rs. 60/kg and Rs. 100/kg. How many kg of the cheaper material are required?

- A. $45/2$ kg B. $145/2$ kg
C. $125/2$ kg D. $135/2$ kg

Solution

$$\text{Low : High} = (100 - 70) : (70 - 60) = 3 : 1$$

$$\text{Low quantity} = 90 \left(\frac{3}{4} \right) = \frac{135}{2}$$

Final Answer $\frac{135}{2}$ kg**One-Step Replacement**

MCQ 61

A vessel contains 40 L of milk. 10 L is removed and replaced with water. How much milk remains?

- A. 30 L B. 10 L
C. 40 L D. 20 L

Solution

$$\text{Fraction left} = 1 - \frac{10}{40} = \frac{30}{40}$$

$$\text{Milk left} = 40 \left(\frac{30}{40} \right) = 30 \text{ L}$$

Final Answer

30 L

MCQ 62

A vessel contains 50 L of milk. 10 L is removed and replaced with water. How much milk remains?

- A. 10 L B. 40 L
C. 50 L D. 30 L

Solution

$$\text{Fraction left} = 1 - \frac{10}{50} = \frac{40}{50}$$

$$\text{Milk left} = 50 \left(\frac{40}{50} \right) = 40 \text{ L}$$

Final Answer

40 L

MCQ 63

A vessel contains 60 L of milk. 15 L is removed and replaced with water. How much milk remains?

- A. 15 L B. 60 L
C. 45 L D. 30 L

Solution

$$\text{Fraction left} = 1 - \frac{15}{60} = \frac{45}{60}$$

$$\text{Milk left} = 60 \left(\frac{45}{60} \right) = 45 \text{ L}$$

Final Answer

45 L

MCQ 64

A vessel contains 80 L of milk. 20 L is removed and replaced with water. How much milk remains?

- A. 20 L B. 80 L
C. 40 L D. 60 L

Solution

$$\text{Fraction left} = 1 - \frac{20}{80} = \frac{60}{80}$$

$$\text{Milk left} = 80 \left(\frac{60}{80} \right) = 60 \text{ L}$$

Final Answer

60 L

MCQ 65

A vessel contains 100 L of milk. 25 L is removed and replaced with water. How much milk remains?

- A. 75 L B. 25 L
C. 100 L D. 50 L

Solution

$$\text{Fraction left} = 1 - \frac{25}{100} = \frac{75}{100}$$

$$\text{Milk left} = 100 \left(\frac{75}{100} \right) = 75 \text{ L}$$

Final Answer

75 L

MCQ 66

A vessel contains 30 L of milk. 6 L is removed and replaced with water. How much milk remains?

- A. 6 L B. 24 L
C. 30 L D. 18 L

Solution

$$\text{Fraction left} = 1 - \frac{6}{30} = \frac{24}{30}$$

$$\text{Milk left} = 30 \left(\frac{24}{30} \right) = 24 \text{ L}$$

Final Answer

24 L

MCQ 67

A vessel contains 45 L of milk. 9 L is removed and replaced with water. How much milk remains?

- A. 9 L B. 45 L
C. 36 L D. 27 L

Solution

$$\text{Fraction left} = 1 - \frac{9}{45} = \frac{36}{45}$$

$$\text{Milk left} = 45 \left(\frac{36}{45} \right) = 36 \text{ L}$$

Final Answer

36 L

MCQ 68

A vessel contains 72 L of milk. 12 L is removed and replaced with water. How much milk remains?

- A. 12 L B. 72 L
C. 48 L D. 60 L

Solution

$$\text{Fraction left} = 1 - \frac{12}{72} = \frac{60}{72}$$

$$\text{Milk left} = 72 \left(\frac{60}{72} \right) = 60 \text{ L}$$

Final Answer

60 L

MCQ 69

A vessel contains 90 L of milk. 18 L is removed and replaced with water. How much milk remains?

- A. 72 L B. 18 L
C. 90 L D. 54 L

Solution

$$\text{Fraction left} = 1 - \frac{18}{90} = \frac{72}{90}$$

$$\text{Milk left} = 90 \left(\frac{72}{90} \right) = 72 \text{ L}$$

Final Answer

72 L

MCQ 70

A vessel contains 120 L of milk. 30 L is removed and replaced with water. How much milk remains?

- A. 30 L B. 90 L
C. 120 L D. 60 L

Solution

$$\text{Fraction left} = 1 - \frac{30}{120} = \frac{90}{120}$$

$$\text{Milk left} = 120 \left(\frac{90}{120} \right) = 90 \text{ L}$$

Final Answer

90 L

MCQ 71

A vessel contains 64 L of milk. 16 L is removed and replaced with water. How much milk remains?

- A. 16 L B. 64 L
C. 48 L D. 32 L

Solution

$$\text{Fraction left} = 1 - \frac{16}{64} = \frac{48}{64}$$

$$\text{Milk left} = 64 \left(\frac{48}{64} \right) = 48 \text{ L}$$

Final Answer

48 L

MCQ 72

A vessel contains 75 L of milk. 15 L is removed and replaced with water. How much milk remains?

- A. 15 L B. 75 L
C. 45 L D. 60 L

Solution

$$\text{Fraction left} = 1 - \frac{15}{75} = \frac{60}{75}$$

$$\text{Milk left} = 75 \left(\frac{60}{75} \right) = 60 \text{ L}$$

Final Answer

60 L

MCQ 73

A vessel contains 54 L of milk. 9 L is removed and replaced with water. How much milk remains?

- A. 45 L B. 9 L
C. 54 L D. 36 L

Solution

$$\text{Fraction left} = 1 - \frac{9}{54} = \frac{45}{54}$$

$$\text{Milk left} = 54 \left(\frac{45}{54} \right) = 45 \text{ L}$$

Final Answer

45 L

MCQ 74

A vessel contains 84 L of milk. 21 L is removed and replaced with water. How much milk remains?

- A. 21 L B. 63 L
C. 84 L D. 42 L

Solution

$$\text{Fraction left} = 1 - \frac{21}{84} = \frac{63}{84}$$

$$\text{Milk left} = 84 \left(\frac{63}{84} \right) = 63 \text{ L}$$

Final Answer

63 L

MCQ 75

A vessel contains 96 L of milk. 24 L is removed and replaced with water. How much milk remains?

- A. 24 L B. 96 L
C. 72 L D. 48 L

Solution

$$\text{Fraction left} = 1 - \frac{24}{96} = \frac{72}{96}$$

$$\text{Milk left} = 96 \left(\frac{72}{96} \right) = 72 \text{ L}$$

Final Answer

72 L

Repeated Replacement**MCQ 76**

A 64 L vessel is full of milk. Each time 16 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 48 L B. 41 L
C. 31 L D. 36 L

Solution

$$Q_n = 64 \left(1 - \frac{16}{64} \right)^2$$

$$= 64 \left(\frac{48}{64} \right)^2 = 36 \text{ L}$$

Final Answer

36 L

MCQ 77

A 81 L vessel is full of milk. Each time 27 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 36 L B. 54 L
C. 41 L D. 31 L

Solution

$$Q_n = 81 \left(1 - \frac{27}{81} \right)^2$$

$$= 81 \left(\frac{54}{81} \right)^2 = 36 \text{ L}$$

Final Answer

36 L

MCQ 78

A 125 L vessel is full of milk. Each time 25 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 100 L B. 80 L
C. 85 L D. 75 L

Solution

$$Q_n = 125 \left(1 - \frac{25}{125} \right)^2$$

$$= 125 \left(\frac{100}{125} \right)^2 = 80 \text{ L}$$

Final Answer

80 L

MCQ 79

A 100 L vessel is full of milk. Each time 20 L is removed and replaced by water. After 3 such operations, how much original milk remains?

- A. 80 L B. $281/5$ L
C. $256/5$ L D. $231/5$ L

Solution

$$Q_n = 100 \left(1 - \frac{20}{100}\right)^3$$

$$= 100 \left(\frac{80}{100}\right)^3 = \frac{256}{5} \text{ L}$$

Final Answer

$$\frac{256}{5} \text{ L}$$

MCQ 80

A 50 L vessel is full of milk. Each time 10 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 40 L B. 37 L
C. 27 L D. 32 L

Solution

$$Q_n = 50 \left(1 - \frac{10}{50}\right)^2$$

$$= 50 \left(\frac{40}{50}\right)^2 = 32 \text{ L}$$

Final Answer

$$32 \text{ L}$$

MCQ 81

A 80 L vessel is full of milk. Each time 20 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 45 L B. 60 L
C. 50 L D. 40 L

Solution

$$Q_n = 80 \left(1 - \frac{20}{80}\right)^2$$

$$= 80 \left(\frac{60}{80}\right)^2 = 45 \text{ L}$$

Final Answer

$$45 \text{ L}$$

MCQ 82

A 60 L vessel is full of milk. Each time 15 L is removed and replaced by water. After 3 such operations, how much original milk remains?

- A. 45 L B. $405/16$ L
C. $485/16$ L D. $325/16$ L

Solution

$$Q_n = 60 \left(1 - \frac{15}{60}\right)^3$$

$$= 60 \left(\frac{45}{60}\right)^3 = \frac{405}{16} \text{ L}$$

Final Answer

$$\frac{405}{16} \text{ L}$$

MCQ 83

A 40 L vessel is full of milk. Each time 8 L is removed and replaced by water. After 3 such operations, how much original milk remains?

- A. 32 L B. $637/25$ L
C. $512/25$ L D. $387/25$ L

Solution

$$Q_n = 40 \left(1 - \frac{8}{40}\right)^3$$

$$= 40 \left(\frac{32}{40}\right)^3 = \frac{512}{25} \text{ L}$$

Final Answer

$$\frac{512}{25} \text{ L}$$

MCQ 84

A 90 L vessel is full of milk. Each time 30 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 60 L B. 45 L
C. 35 L D. 40 L

Solution

$$Q_n = 90 \left(1 - \frac{30}{90}\right)^2$$

$$= 90 \left(\frac{60}{90}\right)^2 = 40 \text{ L}$$

Final Answer

$$40 \text{ L}$$

MCQ 85

A 72 L vessel is full of milk. Each time 18 L is removed and replaced by water. After 2 such operations, how much original milk remains?

- A. 81/2 L B. 54 L
C. 91/2 L D. 71/2 L

Solution

$$Q_n = 72 \left(1 - \frac{18}{72}\right)^2$$

$$= 72 \left(\frac{54}{72}\right)^2 = \frac{81}{2} \text{ L}$$

Final Answer

$$\frac{81}{2} \text{ L}$$

Dilution and Concentration**MCQ 86**

How much water must be added to 20 L of a 40% solution to reduce its concentration to 25%?

- A. 17 L B. 12 L
C. 7 L D. 32 L

Solution

$$\text{Solute} = 20 \left(\frac{40}{100}\right) = 8$$

$$V_f \left(\frac{25}{100}\right) = 8 \Rightarrow V_f = 32$$

$$\text{Water added} = 32 - 20 = 12 \text{ L}$$

Final Answer

$$12 \text{ L}$$

MCQ 87

How much water must be added to 30 L of a 50% solution to reduce its concentration to 30%?

- A. 25 L B. 15 L
C. 20 L D. 50 L

Solution

$$\text{Solute} = 30 \left(\frac{50}{100}\right) = 15$$

$$V_f \left(\frac{30}{100}\right) = 15 \Rightarrow V_f = 50$$

$$\text{Water added} = 50 - 30 = 20 \text{ L}$$

Final Answer

$$20 \text{ L}$$

MCQ 88

How much water must be added to 24 L of a 25% solution to reduce its concentration to 15%?

- A. 21 L B. 11 L
C. 40 L D. 16 L

Solution

$$\text{Solute} = 24 \left(\frac{25}{100}\right) = 6$$

$$V_f \left(\frac{15}{100}\right) = 6 \Rightarrow V_f = 40$$

$$\text{Water added} = 40 - 24 = 16 \text{ L}$$

Final Answer

$$16 \text{ L}$$

MCQ 89

How much water must be added to 40 L of a 30% solution to reduce its concentration to 20%?

- A. 20 L B. 25 L
C. 15 L D. 60 L

Solution

$$\text{Solute} = 40 \left(\frac{30}{100}\right) = 12$$

$$V_f \left(\frac{20}{100}\right) = 12 \Rightarrow V_f = 60$$

$$\text{Water added} = 60 - 40 = 20 \text{ L}$$

Final Answer

$$20 \text{ L}$$

MCQ 90

How much water must be added to 50 L of a 60% solution to reduce its concentration to 40%?

- A. 30 L B. 25 L
C. 20 L D. 75 L

Solution

$$\text{Solute} = 50 \left(\frac{60}{100}\right) = 30$$

$$V_f \left(\frac{40}{100}\right) = 30 \Rightarrow V_f = 75$$

$$\text{Water added} = 75 - 50 = 25 \text{ L}$$

Final Answer

$$25 \text{ L}$$

MCQ 91

How much water must be added to 36 L of a 45% solution to reduce its concentration to 30%?

- A. 23 L B. 13 L
C. 18 L D. 54 L

Solution

$$\text{Solute} = 36 \left(\frac{45}{100} \right) = \frac{81}{5}$$

$$V_f \left(\frac{30}{100} \right) = \frac{81}{5} \Rightarrow V_f = 54$$

$$\text{Water added} = 54 - 36 = 18 \text{ L}$$

Final Answer

18 L

MCQ 92

How much water must be added to 25 L of a 32% solution to reduce its concentration to 20%?

- A. 20 L B. 10 L
C. 40 L D. 15 L

Solution

$$\text{Solute} = 25 \left(\frac{32}{100} \right) = 8$$

$$V_f \left(\frac{20}{100} \right) = 8 \Rightarrow V_f = 40$$

$$\text{Water added} = 40 - 25 = 15 \text{ L}$$

Final Answer

15 L

MCQ 93

How much water must be added to 48 L of a 50% solution to reduce its concentration to 40%?

- A. 12 L B. 17 L
C. 7 L D. 60 L

Solution

$$\text{Solute} = 48 \left(\frac{50}{100} \right) = 24$$

$$V_f \left(\frac{40}{100} \right) = 24 \Rightarrow V_f = 60$$

$$\text{Water added} = 60 - 48 = 12 \text{ L}$$

Final Answer

12 L

MCQ 94

A 50 L solution contains 20% solute. How much water must evaporate to make it 25% solute?

- A. 15 L B. 10 L
C. 5 L D. 40 L

Solution

$$\text{Solute} = 50 \left(\frac{20}{100} \right) = 10$$

$$V_f \left(\frac{25}{100} \right) = 10 \Rightarrow V_f = 40$$

$$\text{Water evaporated} = 50 - 40 = 10 \text{ L}$$

Final Answer

10 L

MCQ 95

A 60 L solution contains 30% solute. How much water must evaporate to make it 40% solute?

- A. 20 L B. 10 L
C. 15 L D. 45 L

Solution

$$\text{Solute} = 60 \left(\frac{30}{100} \right) = 18$$

$$V_f \left(\frac{40}{100} \right) = 18 \Rightarrow V_f = 45$$

$$\text{Water evaporated} = 60 - 45 = 15 \text{ L}$$

Final Answer

15 L

MCQ 96

A 40 L solution contains 25% solute. How much water must evaporate to make it 40% solute?

- A. 20 L B. 10 L
C. 25 L D. 15 L

Solution

$$\text{Solute} = 40 \left(\frac{25}{100} \right) = 10$$

$$V_f \left(\frac{40}{100} \right) = 10 \Rightarrow V_f = 25$$

$$\text{Water evaporated} = 40 - 25 = 15 \text{ L}$$

Final Answer

15 L

MCQ 97

A 80 L solution contains 15% solute. How much water must evaporate to make it 20% solute?

- A. 20 L B. 25 L
C. 15 L D. 60 L

Solution

$$\text{Solute} = 80 \left(\frac{15}{100} \right) = 12$$

$$V_f \left(\frac{20}{100} \right) = 12 \Rightarrow V_f = 60$$

$$\text{Water evaporated} = 80 - 60 = 20 \text{ L}$$

Final Answer

20 L

MCQ 98

A 45 L solution contains 20% solute. How much water must evaporate to make it 30% solute?

- A. 20 L B. 15 L
C. 10 L D. 30 L

Solution

$$\text{Solute} = 45 \left(\frac{20}{100} \right) = 9$$

$$V_f \left(\frac{30}{100} \right) = 9 \Rightarrow V_f = 30$$

$$\text{Water evaporated} = 45 - 30 = 15 \text{ L}$$

Final Answer

15 L

MCQ 99

A 100 L solution contains 25% solute. How much water must evaporate to make it 40% solute?

- A. $85/2$ L B. $65/2$ L
C. $75/2$ L D. $125/2$ L

Solution

$$\text{Solute} = 100 \left(\frac{25}{100} \right) = 25$$

$$V_f \left(\frac{40}{100} \right) = 25 \Rightarrow V_f = \frac{125}{2}$$

$$\text{Water evaporated} = 100 - \frac{125}{2} = \frac{75}{2} \text{ L}$$

Final Answer $\frac{75}{2} \text{ L}$ **MCQ 100**

A 72 L solution contains 30% solute. How much water must evaporate to make it 45% solute?

- A. 29 L B. 19 L
C. 48 L D. 24 L

Solution

$$\text{Solute} = 72 \left(\frac{30}{100} \right) = \frac{108}{5}$$

$$V_f \left(\frac{45}{100} \right) = \frac{108}{5} \Rightarrow V_f = 48$$

$$\text{Water evaporated} = 72 - 48 = 24 \text{ L}$$

Final Answer

24 L

RAPID REVISION GRID | MIXTURE & ALLIGATION**Alligation**

$$L : H = (H - M) : (M - L)$$

Weighted mean

$$M = \frac{q_1 c_1 + q_2 c_2}{q_1 + q_2}$$

Repeated replacement

$$Q_n = V \left(1 - \frac{r}{V}\right)^n$$

Dilution Amount of solute remains constant when only water is added.

Evaporation Amount of non-volatile solute remains constant while total volume falls.

Exam check Check units and confirm the final percentage lies between 0 and 100.