Tips, Formulae and shortcuts for Mixtures and Alligations

By

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Cracku Tip 1 – Mixtures and Alligations

- The topic mixtures and alligations is basically an application of averages concept in CAT.
- The theory involved in this topic is very limited and students should be comfortable with the some basic formulas and concepts.
- This pdf covers all the important formulas and concepts related to mixtures and alligations.

Cracku Tip 2 – Mixtures and Alligations

A mixture is created when two or more substances are mixed in a certain ratio.

Types of mixtures

1. Simple mixture

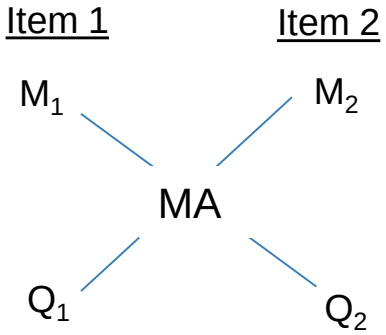
A simple mixture is formed by the mixture of two or more different substances.

Ex. Water and Wine mixture

2. Compound mixture

Compound mixture is formed by the mixture of two or more simple mixtures.

Cracku Tip 3 – Mixtures and Alligations



If M_1 and M_2 are the values, Q_1 and Q_2 are the quantities of item 1 and item 2 respectively and M_A is the weighted average of the two items, then

$$\frac{Q_1}{Q_2} = \frac{M_2 - MA}{M_A - M_1}$$

Weighted average M_A can be calculated by, $M_A = \frac{Q_1 M_1 + Q_2 M_2}{Q_1 + Q_2}$

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Cracku Tip 4 – Mixtures and Alligations

The alligation rule can be applied when cheaper substance is mixed with expensive substance

$$\frac{\text{Quantity of cheaper}}{\text{Quantity of dearer}} = \frac{\text{Price of dearer} - \text{Mean price}}{\text{Mean price} - \text{Price of cheaper}}$$

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Cracku Tip 5 – Mixtures and Alligations

If two mixtures M_1 and M_2,having substances S_1 and S_2 in the ratio a:b and p:q respectively are mixed, then in the final mixture,

$$\frac{\text{Quantity of } S_1}{\text{Quantity of } S_2} = \frac{M_1\left[\frac{a}{a+b}\right]+M_2\left[\frac{p}{p+q}\right]}{M_1\left[\frac{b}{a+b}\right]+M_2\left[\frac{q}{p+q}\right]}$$

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Cracku Tip 6 – Mixtures and Alligations

If there is a container with ‘a’ liters of liquid A and if ‘b’ liters are withdrawn and equal amount is replaced by another liquid B and if the operation is repeated for ‘n’ times

After nth operation,

- Liquid A in the container = $\left[\frac{a-b}{a}\right]^n$ × Initial quantity of A in the container
- $\frac{\text{Liquid A after nth operation}}{\text{Liquid B after nth operation}} = \frac{\left[\frac{a-b}{a}\right]^n}{1-\left[\frac{a-b}{a}\right]^n}$

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