

Mixture & Alligation

Mixture (মিশ্রণ):

মিশ্রণ অধ্যায়ের অধিকাংশ প্রশ্ন অনুপাতের সাথে সম্পর্কিত তাই অনুপাত অধ্যায়ের মধ্যেই এই অধ্যায়টি আলোচনা করা হলো। মিশ্রণ এর প্রশ্নগুলো প্রিলি এবং লিখিত উভয় পরীক্ষার জন্য অনেক গুরুত্বপূর্ণ। আগে থেকে সাধারণ ধারণা না থাকার কারণে অনেকের কাছে এই অধ্যায়টি অনেক জটিল মনে হয়। এখানে খুব সহজ থেকে খুব কঠিন সবধরনের প্রশ্ন প্রিলি ও লিখিত উভয় পরীক্ষার আলোকে ধারাবাহিকভাবে আলোচনা করা হলো।

❖ মিশ্রণের প্রাথমিক ধারণা:

যা মেশানো হয় শুধু তাই বাড়ে না বরং তার সাথে সাথে মোট উপাদানের পরিমাণ ও বেড়ে যায়।

যেমন: ১০ কেজি জুসে ৪ কেজি আম আছে। এখন কেউ ৫০% বানাতে চাইলে শুধু ১০ এর ৫০% বা ৫ কেজি বানাতে $৫-৪ = ১$ কেজি যোগ করলে হবে না। কারণ যখন ১ কেজি যোগ করবেন তখন মূল উপাদান ১০ কেজি থেকে বেড়ে ১১ কেজি হয়ে যাবে যার ৫০% হচ্ছে ৫.৫ সুতরাং ১ কেজির পরিবর্তে ১.৫ কেজি মেশাতে হবে।

Ratio related mixture

মনে রাখুন:

মিশ্রণের অনুপাতে যা মেশানো হবে না তার পরিমাণ অপরিবর্তিত থাকবে এবং দ্রুত হিসেব করার সময় এখানে থেকেই হিসেব করতে হবে।

1. A container holds 4 quarts of alcohol and 4 quarts of water. How many quarts of water must be added to the container to create a mixture that is 3 parts alcohol to 5 parts water by volume? [IBBL (PO)-2017]
 - a. $\frac{4}{3}$
 - b. $\frac{5}{3}$
 - c. $\frac{7}{3}$
 - d. $\frac{8}{3}$
2. In a mixture of 50 liters, milk and water are in the ratio of 3:2. How much water would be added to the mixture to make the ratio of the two equal? [Agrani Bank - (SO)-2017]
 - a. 14 liters
 - b. 12 liters
 - c. 10 liters
 - d. 8 liters
3. In a mixture 60 liters, the ratio of milk and water 2 : 1. If the this ratio is to be 1 : 2, then the quantity of water to be further added is:
 - a. 20 litres
 - b. 30 litres
 - c. 40 litres
 - d. 60 litres
4. A mixture contains alcohol and water in the ratio 4 : 3. If 5 litres of water is added to the mixture, the ratio becomes 4: 5. Find the quantity of alcohol in the given mixture
 - a. 10 litres
 - b. 30 litres
 - c. 40 litres
 - d. 20 litres
5. In a sugar-water solution, the ratio of water to sugar is 8 : 3. If you add 2 kgs of sugar, the ratio become 2 : 1. What is the amount of sugar in the original solution in kg? (MBA Ad.Test 02-03)
 - a. 3
 - b. 4.5
 - c. 6
 - d. 8

6. 729 liters mixture of milk & water, the ratio of milk to water in 7:2. To get a new mixture containing milk and water in the ratio 7:3, the amount of water to be added is [BB-AD-2010] & [Combined 5 bank –(Cash)-2019]
- a. 71 liters b. 81 liters c. 56 liters d. 50 liters

Percentage related mixture

7. How many liters of pure acid are there in 8 litres of a 20% solution
- a. 1.5 b. 1.6 c. 1.7 d. 1.8
8. A drink contains 20% cranberry juice, 20% raspberry juice and the rest is apple juice. You added 250 ml water in 750 ml of the drink. Now, what is the ratio of water to apple juice in the drink? (Exim Bank. T.Off. -2014)
- a. 6:5 b. 9:5 c. 5:12 d. 5:9
9. How much salt must be add to 10 grams of a 20% salt solution to strengthen in it into 50% solution?
- a. 5gm b. 3gm c. 6gm d. 4gm
10. A solution that contains 20% sugar by weight is made sweeter by doubling the amount of sugar. The percent of sugar, by weight, in the new solution is— (Dhaka Bank Ltd. MTO 2011)
- a. 50% b. 40% c. 33.33% d. 30%
11. In a solutions of 60 liter of sugar and water, 20% is sugar. How much water (in liter) must be added to make a solution that is 8% sugar? [FSIB Pro.Off.-2014] & [DBBL-(PO)-2017]
- a. 60 b. 72 c. 90 d. none
12. 300 grams of sugar solution has 40% sugar in it. How much sugar should be added to make it 50% in the solution? [BD House Building FC (SO)-2017]
- a. 40 grams b. 60 grams c. 80 grams d. 90 grams
13. A mixture of 20 kg of sprit and water contains 10% water. How much water must be added to this mixture to raise the percentage of water to 25% (IFIC Bank (PO)- 2009) + [PKB – (EO Cash) - 2018]+[Combined-4Banks (Officer)-2019]
- a. 2 b. 4 c. 5 d. 6
14. 125 gallons of a mixture contains 20% water. What amount of additional water should be added such that water content be raised to 25%? [Sonal Bank-(Officer-Cash)-2018]+[Sonal Bank (Off-FF)-2019]
- a. $\frac{15}{2}$ gallons b. $\frac{17}{2}$ gallons c. $\frac{19}{2}$ gallons d. $8\frac{1}{3}$ gallons
15. How many litres of a 90% of concentrated acid needs to be mixed with a 75% solution of concentrated acid to get a 30 liter solution of 78% concentrate acid? [Janata Bank (AEO-Teller)-2019]
- a. 8 b. 6 c. 7 d. 9

16. A 180 liter mixture of milk and water contains 20% water. How much milk, in liters, must be added to the mixture will contain water and milk in the ratio of 1:7? (Dhaka Bank Ltd. MTO 2011)
- a. 100 b. 108 c. 144 d. 252

Other mixture

17. 100 kg of solution A is mixed with 60 kg of solution B. If solution A has tin and copper in the ratio 1:4 and solution B has lead and tin in the ratio 3:2, then what is the amount of tin in the new solution? [Sonal Bank-(off:Cash)-2019-(FF-quota)]
- a. 70kg b. 36kg c. 44kg d. 56kg
18. Given that 24 carat gold is pure gold, 18 carat gold is $\frac{3}{4}$ th of pure gold and 20 carat gold is $\frac{5}{6}$ th of pure gold, the ratio of the pure gold is 18 carat gold to the pure gold in 20 carat gold is? [Sonal Bank-(off:Cash)-2019-(FF-quota)]
- a. 5:8 b. 10:9 c. 8:5 d. 9:10
19. If 2kg of metal, of which $\frac{1}{3}$ is zinc and the rest is copper, be mixed with 3 kg of metal, of which $\frac{1}{4}$ is zinc and the rest is copper, then what will be the ratio of zinc to copper in the mixture? [Combined-4Banks (Officer)-2019] & [Sonal Bank (Off-FF)-2019]
- a. 13:42 b. 19:43 c. 15 : 42 d. 17:43
20. A milkman purchases the milk at Tk. x per liter and sells it at Tk. 2x per liter still he mixes 2 liters water with every 6 liters of pure milk. What is the profit percentage? [Basic Bank- (AM)-2018]
- a. 116% b. 166.66% c. 60% d. 100%
21. A dishonest milkman professes to sell his milk at cost price but he mixes it with water and thereby gains 25%. The percentage of water in the mixture is : [Janata Bank-(AEO)-2019]
- a. 8% b. 10% c. 20% d. 15%

Rule of Alligation

ক্রম চিহ্নে মাধ্যমে আড়াআড়ি বিয়োগ করে মিশ্রণের প্রশ্নগুলো সহজে সমাধান করার নিয়মটিই হচ্ছে Rule of Alligation ।

মিশ্রণের জটিল কিছু প্রশ্ন এই নিয়মে খুব সহজে সমাধান করা যায়। আবার এই নিয়মটি ভালোভাবে বুঝলে শতকরা, লাভ-ক্ষতি, সুদকমা, গতিবেগ এবং সময় ও কাজের অনেক জটিল প্রশ্ন সহজে সমাধান করা সম্ভব হবে।

◆ **Basic rules are:**

If two ingredients are mixed then

$$\left(\frac{\text{Quantity of cheaper}}{\text{Quantity of dearer}} \right) = \frac{(\text{C.P. of dearer}) - (\text{Mean price})}{(\text{Mean price}) - (\text{C.P. of cheaper})}$$

We present as under:

30. Solution Y is 40 percent sugar by volume, and solution X is 20 percent sugar by volume. How many gallons of solution X must be added to 150 gallons of solution Y to create a solution that is 25 percent sugar by volume? [DBBL (AO)-2017]
 a. 75 b. 150 c. 240 d. 450
31. Akash/ Josim / Babu bought two varieties of pulse, costing Tk. 50 and tk. 60 per kg. each, and mixed them in some ratio. He then sold the mixture at Tk. 70 per kg., making a profit of 20 percent. What was the ratio of the mixture? (Union Bank. MTO.-2015)+(IBA-MBA Admission Test, (Novem -2014) [Bapex (AM)-2023]
 a. 1 : 10 b. 1 : 5 c. 2 : 7 d. None
32. How many killogram of sugar costing Tk. 9 per kg must be mixed with 27 kg of sugar costing Tk. 7 per kg so that there may be a gain of 10% by selling the mixture at Tk. 9.24 per kg? (Exim Bank Ltd. Off 2013)
 a. 36 b. 42 c. 56 d. 63
33. In what ratio must a grocer mix two varieties of tea worth (মূল্যের) Tk. 60 a kg and Tk.65 a kg so that by selling the mixture at Tk.68.20 a kg he may gain 10%? [IBBL (PO)-2017]
 a. 3 : 2 b. 3 : 4 c. 3 : 5 d. 4 : 5

Other Question

34. Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get alloy 15 times as heavy as water? [Pubali Bank Ltd (SO)-2017]
 a. 1 : 1 b. 2 : 3 c. 1 : 2 d. 3 : 2
35. A 19 liter mixture consists by volume of 1 part juice to 18 parts water. If x liters of juice and y liters of water are added to this mixture to make a 54 liter mixture consisting by volume of 1 part juice to 2 parts water, then what is the value of x? (Bank Asia Ltd. MTO 2011)
 a. 36 b. 35 c. 27 d. 17
36. Two equal glasses are respectively one-third and one fourth full of milk. They are then filled up with water and the contents are mixed in a tumbler. Ratio of milk and water in tumbler is: (IFIC Bank Ltd. MTO 2013)
 a. 7:5 b. 7:17 c. 3:7 d. 11:23
37. Solution X is 10 percent alcohol by volume, and solution Y is 30 percent alcohol by volume. How many milliliters of solution Y must be added to 200 milliliters of solution X to create a solution that is 25 percent alcohol by volume? [UCBL-(PO)-2017]
 a. 600 b. 800 c. 300 d. 250
38. Solution X contains 7% (by weight) of liquid M and solution Y contains 14.5% (by weight) of liquid M. If 3grams of solution X is mixed with 2 grams of solution Y, then liquid M accounts for what percent of the weight of the resulting solution? (Dutch Bangla Bank Ltd. RTPO 2011)
 a. 6.09% b. 10% c. 10.75% d. 21.5%

39. Of 24 kgs of salt water 8% is salt; of another mixture 4% is salt. How many kgs of the second mixture should be added to the first mixture in order to get a mixture that is 5% salt? (MBA Ad.Test 01-02)
- a. 48 b. 56 c. 64 d. 72
40. Coffee A normally costs 100 taka per pound. It is mixed with coffee B, which normally costs 70 taka per pound, to form a mixture which costs 88 taka per pound. If there are 10 pounds of the mix, how many pounds of coffee A are used in the mix? (MBA Ad.Test 01-02)
- a. 4 b. 5 c. 6 d. 7

Replacement related

41. In a mixture, the ratio of the milk and water is 6: 5. When 22 liter mixture is replaced by water, the ratio becomes 9: 13. Find the quantity of water after replacement? [Combined 2Banks-(off)-2018]
- a. 62 liter b. 50 liter c. 40 liter d. 52 liter
42. A jar contains a mixture of oil and water in the ratio 22:3, 50 liters of the mixture was taken out and 25 liters of water was added to it. If water was 34% in the resultant mixture, what was the initial quantity of the mixture (in liters) in the jar? [Sonal Bank-(off:Cash))-2019-(FF-quota)]
- a. 175 b. 150 c. 75 d. 12
43. A container contains 40 liters of milk. From this container 4 liters of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container? [Rupali (SO) -2019]
- (a) 26.34 liters (b) 27.36 liters (c) 28 liters (d) 29.16 liters

Application of Alligation

44. There are deer and peacock in zoo. The total number of their heads is 80 and the total number of their legs is 200 . How many peacock are there? [IFIC (MTO) – 17]
- a. 20 b. 30 c. 50 d. 60
45. Halim purchased brand A pen for Taka 200 each and brand B pen for Taka 100 each. If he purchased a total of 8 of these pens for Taka 1,200, how many pens of brand A did he purchase? [Janata Bank (AEO-RC) -2017]
- a. 3 b. 4 c. 5 d. 6
46. The average age of students of a class is 15.8 years. The average age of boys in the class is 16.4 years and that of the girls is 15.4 years. The ratio of number of boys to the number of girls in the class is
- a. 2:4 b. 2:3 c. 3:3 d. none

47. A sum of Tk.4000 is lent out in two parts, one at 8% simple interest and the other at 10% simple interest. In the annual interest is Tk.352, the sum lent at 8% is
a. 3600 b. 2400 c. 1200 d. none
48. A merchant buys two articles for Tk. 1400. He sells one of them at a profit of 20% and the other at a loss of 8%. He makes no profit or loss in the end. What is the selling price of the article that he sold at a loss ?
a. 1000 b. 1200 c. 800 d. 900

Some difficult question

49. A vessel is filled with liquid, 3 parts of which are water and 5 parts syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup ? [PKB-(EO)-19]

- a. $\frac{1}{3}$ b. $\frac{1}{4}$ c. $\frac{1}{5}$ d. $\frac{1}{7}$

