Mixture and Alligations Question for CAT

Instructions

For the following questions answer them individually

Question 1

A milkman mixes 20 litres of water with 80 litres of milk. After selling one-fourth of this mixture, he adds water to replenish the quantity that he had sold. What is the current proportion of water to milk?

[CAT 2004]

A   2 : 3

B   1 : 2

C   1 : 3

D   3 : 4

   Answer: A

▶ Video Solution

Explanation:

After selling 1/4th of the mixture, the remaining quantity of water is 15 liters and milk is 60 liters. So the milkman would add 25 liters of water to the mixture. The total amount of water now is 40 liters and milk is 60 liters. Therefore, the required ratio is 2:3.

Instructions

DIRECTIONS for the following two questions: The following table presents the sweetness of different items relative to sucrose, whose sweetness is taken to be 1.00.

Lactose	0.16
Maltose	0.32
Glucose	0.74
Sucrose	1
Fructose	1.7
Saccharin	675

Question 2

What is the maximum amount of sucrose (to the nearest gram) that can be added to one-gram of saccharin such that the final mixture obtained is atleast 100 times as sweet as glucose?

A   7

B   8

C   9

D   100

   Answer: B

▶ Video Solution

Explanation:

For the mixture to be 100 times as sweet as glucose, its sweetness relative to the mixture should be at least 74.

1 gm of saccharin = 675

Let the number of grams of sucrose to be added be N. Thus, the total weight of the mixture = N + 1.

So, $(675 + N) / (N+1) = 74$

=> $675 + N = 74N + 74$

=> 601 = 73N => N = 8.23

When N=9, sweetness will be S = (675+9)/10 = 684/10 = 68.4

When N=8, sweetness will be S = (675+8)/9 = 683/9 = 75.8

So, option b) is the correct answer.

Question 3

Approximately how many times sweeter than sucrose is a mixture consisting of glucose, sucrose and fructose in the ratio of 1: 2: 3?

A 1.3

B 1

C 0.6

D 2.3

Answer: A

▶ Video Solution

Explanation:

The relative sweetness of the mixture is (1*0.74 + 2*1 + 3*1.7) / (1+2+3) = 7.84/6 = 1.30

Option a) is the correct answer.

Take 3 Free CAT Mocks (With Solutions)

Instructions

For the following questions answer them individually

Question 4

Bottle 1 contains a mixture of milk and water in 7: 2 ratio and Bottle 2 contains a mixture of milk and water in 9: 4 ratio. In what ratio of volumes should the liquids in Bottle 1 and Bottle 2 be combined to obtain a mixture of milk and water in 3:1 ratio?

A 27:14

B 27:13

C 27:16

D 27:18

Answer: B

▶ Video Solution

Explanation:

The ratio of milk and water in Bottle 1 is 7:2 and the ratio of milk and water in Bottle 2 is 9:4

Therefore, the proportion of milk in Bottle 1 is $\frac{7}{9}$ and the proportion of milk in Bottle 2 is $\frac{9}{13}$

Let the ratio in which they should be mixed be equal to X:1.

Hence, the total volume of milk is $\frac{7X}{9} + \frac{9}{13}$

The total volume of water is $\frac{2X}{9} + \frac{4}{13}$

They are in the ratio 3:1

Hence, $\frac{7X}{9} + \frac{9}{13} = 3 * \left(\frac{2X}{9} + \frac{4}{13} \right)$

Therefore, $91X + 81 = 78X + 108$

Therefore $X = \frac{27}{13}$

Question 5

Consider three mixtures — the first having water and liquid A in the ratio 1:2, the second having water and liquid B in the ratio 1:3, and the third having water and liquid C in the ratio 1:4. These three mixtures of A, B, and C, respectively, are further mixed in the proportion 4: 3: 2. Then the resulting mixture has

A   The same amount of water and liquid B

B   The same amount of liquids B and C

C   More water than liquid B

D   More water than liquid A

   Answer: C

▶ Video Solution

Explanation:

The proportion of water in the first mixture is $\frac{1}{3}$

The proportion of Liquid A in the first mixture is $\frac{2}{3}$

The proportion of water in the second mixture is $\frac{1}{4}$

The proportion of Liquid B in the second mixture is $\frac{3}{4}$

The proportion of water in the third mixture is $\frac{1}{5}$

The proportion of Liquid C in the third mixture is $\frac{4}{5}$

As they are mixed in the ratio 4:3:2, the final amount of water is $4 \times \frac{1}{3} + 3 \times \frac{1}{4} + 2 \times \frac{1}{5} = \frac{149}{60}$

The final amount of Liquid A in the mixture is $4 \times \frac{2}{3} = \frac{8}{3}$

The final amount of Liquid B in the mixture is $3 \times \frac{3}{4} = \frac{9}{4}$

The final amount of Liquid C in the mixture is $2 \times \frac{4}{5} = \frac{8}{5}$

Hence, the ratio of Water : A : B : C in the final mixture is $\frac{149}{60} : \frac{8}{3} : \frac{9}{4} : \frac{8}{5} = 149 : 160 : 135 : 96$

From the given choices, only option C is correct.

Question 6

Two types of tea, A and B, are mixed and then sold at Rs. 40 per kg. The profit is 10% if A and B are mixed in the ratio 3 : 2, and 5% if this ratio is 2 : 3. The cost prices, per kg, of A and B are in the ratio

A   17 : 25

B   18 : 25

C   19 : 24

D   21 : 25

   Answer: C

▶ Video Solution

Explanation:
The selling price of the mixture is Rs.40/kg.
Let a be the price of 1 kg of tea A in the mixture and b be the price per kg of tea B.
It has been given that the profit is 10% if the 2 varieties are mixed in the ratio 3:2
Let the cost price of the mixture be x.
It has been given that 1.1x = 40
x = 40/1.1

Price per kg of the mixture in ratio 3:2 = $\frac{3a+2b}{5}$

$$\frac{3a+2b}{5} = \frac{40}{1.1}$$
$$3.3a + 2.2b = 200 \text{ ------(1)}$$

The profit is 5% if the 2 varieties are mixed in the ratio 2:3.
Price per kg of the mixture in ratio 2:3 = $\frac{2a+3b}{5}$
$$\frac{2a+3b}{5} = \frac{40}{1.05}$$
$$2.1a + 3.15b = 200 \text{ -----(2)}$$

Equating (1) and (2), we get,
$$3.3a + 2.2b = 2.1a + 3.15b$$
$$1.2a = 0.95b$$
$$\frac{a}{b} = \frac{0.95}{1.2}$$
$$\frac{a}{b} = \frac{19}{24}$$

Therefore, option C is the right answer.

Question 7

A trader sells 10 litres of a mixture of paints A and B, where the amount of B in the mixture does not exceed that of A. The cost of paint A per litre is Rs. 8 more than that of paint B. If the trader sells the entire mixture for Rs. 264 and makes a profit of 10%, then the highest possible cost of paint B, in Rs. per litre, is

A 16

B 26

C 20

D 22

  Answer: C

▶ Video Solution

Explanation:
Let the price of paint B be x.
Price of paint A = x+8

We know that the amount of paint B in the mixture does not exceed the amount of paint A. Therefore, paint B can at the maximum compose 50% of the mixture.

The seller sells 10 litres of paint at Rs.264 earning a profit of 10%.
=> The cost price of 10 litres of the paint mixture = Rs. 240

Therefore, the cost of 1 litre of the mixture = Rs.24

We have to find the highest possible cost of paint B.
When we increase the cost of paint B, the cost of paint A will increase too. If the cost price of the mixture is closer to the cost of paint B, then the amount of paint B present in the mixture should be greater than the amount of paint A present in the mixture.
The highest possible cost of paint B will be obtained when the volumes of paint A and paint B in the mixture are equal.

=> (x+x+8)/2 = 24
2x = 40
x = Rs. 20

Therefore, option C is the right answer.

Question 8

A 20% ethanol solution is mixed with another ethanol solution, say, S of unknown concentration in the proportion 1:3 by volume. This mixture is then mixed with an equal volume of 20% ethanol solution. If the resultant mixture is a 31.25% ethanol solution, then the unknown concentration of S is

A   30%

B   40%

C   50%

D   60%

   Answer: C

   ▶ Video Solution

Explanation:
Let the volume of the first and the second solution be 100 and 300.
When they are mixed, quantity of ethanol in the mixture
= (20 + 300S)
Let this solution be mixed with equal volume i.e. 400 of third solution in which the strength of ethanol is 20%.
So, the quantity of ethanol in the final solution
= (20 + 300S + 80) = (300S + 100)
It is given that, 31.25% of 800 = (300S + 100)
or, 300S + 100 = 250
or S = $\frac{1}{2}$ = 50%
Hence, 50 is the correct answer.

Question 9

A jar contains a mixture of 175 ml water and 700 ml alcohol. Gopal takes out 10% of the mixture and substitutes it by water of the same amount. The process is repeated once again. The percentage of water in the mixture is now

A   30.3

B   35.2

C   25.4

D   20.5

   Answer: B

   ▶ Video Solution

Explanation:
Final quantity of alcohol in the mixture = $\frac{700}{700 + 175} * \left(\frac{90}{100}\right)^2 * [700 + 175]$ = 567 ml

Therefore, final quantity of water in the mixture = 875 - 567 = 308 ml

Hence, we can say that the percentage of water in the mixture = $\frac{308}{875} \times 100$ = 35.2 %

Question 10

There are two drums, each containing a mixture of paints A and B. In drum 1, A and B are in the ratio 18 : 7. The mixtures from drums 1 and 2 are mixed in the ratio 3 : 4 and in this final mixture, A and B are in the ratio 13 : 7. In drum 2, then A and B were in the ratio

A 251 : 163

B 239 : 161

C 220 : 149

D 229 : 141

Answer: B

▶ Video Solution

Explanation:

It is given that in drum 1, A and B are in the ratio 18 : 7.

Let us assume that in drum 2, A and B are in the ratio x : 1.

It is given that drums 1 and 2 are mixed in the ratio 3 : 4 and in this final mixture, A and B are in the ratio 13 : 7.

By equating concentration of A

$$\Rightarrow \frac{3 * \frac{18}{18 + 7} + 4 * \frac{x}{x + 1}}{3 + 4} = \frac{13}{13 + 7}$$

$$\Rightarrow \frac{\frac{54}{25} + \frac{4x}{x + 1}}{7} = \frac{91}{20}$$

$$\Rightarrow \frac{4x}{x + 1} = \frac{239}{100}$$

$$\Rightarrow x = \frac{239}{161}$$

Therefore, we can say that in drum 2, A and B are in the ratio $\frac{239}{161}$: 1 or 239 : 161.

Question 11

A 20% ethanol solution is mixed with another ethanol solution, say, S of unknown concentration in the proportion 1:3 by volume. This mixture is then mixed with an equal volume of 20% ethanol solution. If the resultant mixture is a 31.25% ethanol solution, then the unknown concentration of S is

A 30%

B 40%

C 50%

D 60%

Answer: C

▶ Video Solution

Explanation:

Let the volume of the first and the second solution be 100 and 300.
When they are mixed, quantity of ethanol in the mixture
= (20 + 300S)
Let this solution be mixed with equal volume i.e. 400 of third solution in which the strength of ethanol is 20%.
So, the quantity of ethanol in the final solution
= (20 + 300S + 80) = (300S + 100)
It is given that, 31.25% of 800 = (300S + 100)
or, 300S + 100 = 250

or S = $\frac{1}{2}$ = 50%

Hence, 50 is the correct answer.

Question 12

The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. If three salt solutions A, B, C are mixed in the proportion 1 : 2 : 3, then the resulting solution has strength 20%. If instead the proportion is 3 : 2 : 1, then the resulting solution has strength 30%. A fourth solution, D, is produced by mixing B and C in the ratio 2 : 7. The ratio of the strength of D to that of A is

A 3 : 10

B 1 : 3

C 1 : 4

D 2 : 5

Answer: B

▶ Video Solution

Explanation:

Let 'a', 'b' and 'c' be the concentration of salt in solutions A, B and C respectively.

It is given that three salt solutions A, B, C are mixed in the proportion 1 : 2 : 3, then the resulting solution has strength 20%.

$$\Rightarrow \frac{a + 2b + 3c}{1 + 2 + 3} = 20$$

$$\Rightarrow a + 2b + 3c = 120 \dots (1)$$

If instead the proportion is 3 : 2 : 1, then the resulting solution has strength 30%.

$$\Rightarrow \frac{3a + 2b + c}{1 + 2 + 3} = 30$$

$$\Rightarrow 3a + 2b + c = 180 \dots (2)$$

From equation (1) and (2), we can say that

$$\Rightarrow b + 2c = 45$$

$$\Rightarrow b = 45 - 2c$$

Also, on subtracting (1) from (2), we get

$$a - c = 30$$

$$\Rightarrow a = 30 + c$$

In solution D, B and C are mixed in the ratio 2 : 7

So, the concentration of salt in D = $\frac{2b + 7c}{9}$ = $\frac{90 - 4c + 7c}{9}$ = $\frac{90 + 3c}{9}$

Required ratio = $\frac{\frac{90 + 3c}{9}}{a}$ = $\frac{90 + 3c}{9(30 + c)}$ = 1 : 3

Hence, option B is the correct answer.

CAT Formulas PDF [Download Now]

Question 13

The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A 15

B 13

C 12

D 14

Answer: D

Explanation:

Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively.

The amount of salt in vessels A, B, C = 50 ml, 110 ml, 160 ml respectively.

The amount of water in vessels A, B, C = 450 ml, 390 ml, 340 ml respectively.

In 100 ml solution in vessel A, there will be 10ml of salt and 90 ml of water

Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A

i.e after the first transfer, the amount of salt in vessels A, B, C = 40, 120, 160 ml respectively.

after the second transfer, the amount of salt in vessels A, B, C =40, 100, 180 ml respectively.

After the third transfer, the amount of salt in vessels A, B, C = 70, 100, 150 respectively.

Each transfer can be captured through the following table.

Salt solution		Initial Conc.(ml)	After 1st transfer	After 2nd transfer	After 3rd transfer
A	Total Conc.	500	400	400	500
	Salt Conc.	50	40	40	70
	Water	450	360	360	430
B	Total Conc.	500	600	500	500
	Salt Conc.	110	120	100	100
	Water	390	480	400	400
C	Total Conc.	500	500	600	500
	Salt Conc.	160	160	180	150
	Water	340	340	420	350

Percentage of salt in vessel A = $\frac{70}{500} \times 100$

=14%

Question 14

A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one fourths of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

Answer: 8

Explanation:

Initially the amount of Dye and Water are 16,24 respectively.

To make the ratio of Dye to Water to 2:5 the amount of water should be 40l for 16l of Dye=> 16l of water is added.

Now, the Dye and Water arr 16,40 respectively.

After removing 1/4th of solution the amount of Dye and Water will be 12,30l respectively.

To have Dye and Water in the ratio of 2:3, for 30l of water we need 20l of Dye => 8l of Dye should be added.

Hence , 8 is correct answer.

Question 15

Two alcohol solutions, A and B, are mixed in the proportion 1:3 by volume. The volume of the mixture is then doubled by adding solution A such that the resulting mixture has 72% alcohol. If solution A has 60% alcohol, then the percentage of alcohol in solution B is

A 90%

B 94%

C 92%

D 89%

Answer: C

▶ Video Solution

Explanation:

Initially let's consider A and B as one component

The volume of the mixture is doubled by adding A(60% alcohol) i.e they are mixed in 1:1 ratio and the resultant mixture has 72% alcohol.

Let the percentage of alcohol in component 1 be 'x'.

Using allegations , $\frac{(72-60)}{x-72} = \frac{1}{1}$ => x= 84

Percentage of alcohol in A = 60% => Let's percentage of alcohol in B = x%

The resultant mixture has 84% alcohol. ratio = 1:3

Using allegations , $\frac{(x-84)}{84-60} = \frac{1}{3}$

=> x= 92%

Top-500 Free CAT Questions (With Solutions)

Question 16

The strength of an indigo solution in percentage is equal to the amount of indigo in grams per 100 cc of water. Two 800 cc bottles are filled with indigo solutions of strengths 33% and 17%, respectively. A part of the solution from the first bottle is thrown away and replaced by an equal volume of the solution from the second bottle. If the strength of the indigo solution in the first bottle has now changed to 21% then the volume, in cc, of the solution left in the second bottle is

Answer: 200

▶ Video Solution

Explanation:

Let Bottle A have an indigo solution of strength 33% while Bottle B have an indigo solution of strength 17%.

The ratio in which we mix these two solutions to obtain a resultant solution of strength 21% : $\frac{A}{B} = \frac{21-17}{33-21} = \frac{4}{12} \, or \, \frac{1}{3}$

Hence, three parts of the solution from Bottle B is mixed with one part of the solution from Bottle A. For this process to happen, we need to displace 600 cc of solution from Bottle A and replace it with 600 cc of solution from Bottle B {since both bottles have 800 cc, three parts of this volume = 600cc}.As a result, 200 cc of the solution remains in Bottle B.

Hence, the correct answer is 200 cc.

Take 3 Free CAT Mocks (With Solutions)

CAT Previous Papers PDF

Free CAT Exam Preparation App

CAT Formulas PDF [Download Now]

Top-500 Free CAT Questions (With Solutions)

Free CAT Study Material

Free CAT Preparation Video Lectures

Daily Free CAT Practice Tests

CAT Syllabus (Download PDF)

Free Videos for CAT Preparation

CAT Percentile Predictor

Important Verbal Ability Questions for CAT (Download PDF)

Data Interpretation for CAT Questions (download pdf)

Logical Reasoning for CAT Questions (download pdf)

Quantitative Aptitude for CAT Questions (download pdf)

Know the CAT Percentile Required for IIM Calls

Join MBA Telegram Group

Enroll for Excellent CAT/MBA courses

Cracku CAT Success Stories

Subscribe to MBA Exams Youtube Channel