

## IPMAT SAMPLE QUESTIONS (AVERAGES, MIXTURE & ALLEGATION)

Q1. Milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio the liquids in both the vessels should be mixed to obtain a new mixture in vessel C, maintaining half milk and half water?

- a) 1 : 1  
b) 7 : 5  
c) 2 : 4  
d) 1 : 3

Q2. Imagine you have two large pitchers, A and B. A contains 10 litres of wine and B contains 10 litres of water. One litre of water is removed from B and poured into A. The liquid is mixed very well. Then one litre of the mixture from A is poured into B. Which of the following statements is true?

- a) The water contents in A is more than the wine contents in B  
b) The water contents in A is less than the wine contents in B  
c) The water contents in A is same as the wine contents in B  
d) None of these.

Q3. The table below shows the temperatures in degrees Fahrenheit in a city over one week.

Noontime Temperature!						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
66	78	75	69	78	77	70

If  $m$  represents the median temperature,  $f$  represents the temperature that occurs most often, and  $a$  represents the average (arithmetic mean) of the seven temperatures, which of the following is the correct order of  $m$ ,  $f$ , and  $a$ ?

- a)  $a < m > f$   
b)  $a < m < f$   
c)  $m < a < f$   
d)  $m < f < a$

Q4. In a Retail outlet the average revenue was Rs. 10,000 per day over a 30 day period. During this period the average daily revenue on weekends (total 8 days) was Rs. 20,000 per day. What was the average daily revenue on weekdays?

- a) 6364  
b) 5250  
c) 6570  
d) 8060

Q5. How many litres of a 30% alcohol solution should be added to 40 litres of a 60% alcohol solution to prepare a 50% solution?

- a) 30  
b) 20  
c) 24  
d) 32

Q6. Average weight of 19 men is 74 kgs, and the average weight of 38 women is 63 kgs. What is the average weight (rounded off to the nearest integer) of all the men and the women together?

- a) 59kg  
b) 65kg  
c) 69kg  
d) 67kg

Q7. The average marks in English subject of a class of 24 students is 56. If the marks of three students were misread as 44, 45 and 61 of the actual marks 48, 59 and 67 respectively, then what would be the correct average?

- a) 56.5
- b) 59
- c) 57.5
- d) None of these

Q8. A mixture of 12 kg of wheat flour costing Rs.16 per kg and 4 kg of corn flour costing Rs. 2 per kg is sold at Rs.16 per kg. What is the profit made in selling 40 kg of the mixture?

- a) Rs.140
- b) Rs.280
- c) Rs.300
- d) Rs.420

Q9. The average of 11 numbers is 10.9. If the average of the first six numbers is 10.5 and that of the last six numbers is 11.4, then the middle number is :

- a) 11.5
- b) 11.4
- c) 11.3
- d) 11.0

Q10. One litre of water is evaporated from 6 litres of a solution containing 5% salt. The percentage of salt in the remaining solution is

- a)  $4\frac{4}{9}\%$
- b)  $5\frac{5}{7}\%$
- c) 5%
- d) 6%

Q11. A petrol tank at a filling station has a capacity of 400 litres. The attendant sells 40 litres of petrol from the tank to one customer and then replenishes it with kerosene oil. This process is repeated with six customers. What quantity of pure petrol will the seventh customer get when he purchases 40 litres of petrol?

- a) 20.50 litres
- b) 21.25 litres
- c) 24.75 litres
- d) 22.40 litres

Q12. In a Green view apartment, the houses of a row are numbered consecutively from 1 to 49. Assuming that there is a value of 'x' such that the sum of the numbers of the houses preceding the house numbered 'x' is equal to the sum of the numbers of the houses following it. Then what will be the value of 'x'?

- a) 21
- b) 30
- c) 35
- d) 42

Q13. A 10 litre cylinder contains a mixture of water and sugar, the volume of sugar being 15% of total volume. A few litres of the mixture is released and an equal amount of water is added. Then the same amount of the mixture as before is released and replaced with water for a second time. As a result, the sugar content becomes 10 % of total volume. What is the approximate quantity of mixture released each time?

- a) 1 litres
- b) 1.2 litres
- c) 1.5 litres
- d) 2 litres

Q14. Mr. and Mrs. Gupta have three children - Pratik, Wriddik and Kajol, all of whom were born in different cities. Pratik is 2 years elder to Wriddik. Mr. Gupta was 30 years of age when Kajol was born in Hyderabad, while Mrs. Gupta was 28 years of age when Wriddik was born in Bangalore. If Kajol was 5 years of age when Pratik was born in Mumbai, then what were the ages of Mr. and Mrs. Gupta respectively at the time of Pratik's birth?

- 1. 35 years, 26 years
- 2. 30 years, 21 years
- 3. 37 years, 28 years
- 4. None of the above

Q15. Mrs. Sonia buys Rs. 249.00 worth of candies for the children of a school. For each girl she gets a strawberry flavoured candy priced at Rs. 3.30 per candy; each boy receives a chocolate flavoured candy priced at Rs. 2.90 per candy. How many candies of each type did she buy?

- a) 21, 57
- b) 57, 21
- c) 37, 51
- d) 27, 51

Q16. Two alloys of aluminium have different percentages of aluminium in them. The first one weighs 8 kg and the second one weighs 16 kg. One piece each of equal weight was cut off from both the alloys and first piece was alloyed with the second alloy and the second piece alloyed with the first one. As a result, the percentage of aluminium became the same in the resulting two new alloys. What was the weight of each cut-off piece?

- a) 3.33 kg
- b) 4.67 kg
- c) 5.33 kg
- d) None of the above

Q17. The average of 7 consecutive numbers is P. If the next three numbers are also added, the average shall

- a) remain unchanged
- b) increase by 1
- c) increase by 1.5
- d) increase by 2

Q18. X and Y are the two alloys which were made by mixing Zinc and Copper in the ratio 6 : 9 and 7 : 11 respectively. If 40 grams of alloy X and 60 grams of alloy Y are melted and mixed to form another alloy Z, what is the ratio of Zinc and Copper in the new alloy Z?

- a) 6 : 9
- b) 59 : 91
- c) 5 : 9
- d) 59 : 90

Q19. A chartered bus carrying office employees travels everyday in two shifts – morning and evening. In the evening, the bus travels at an average speed which is 50% greater than the morning average speed; but takes 50% more time than the amount of time it takes in the morning. The average speed of the chartered bus for the entire journey is greater / less than its average speed in the morning by:

- a) 18% less
- b) 30% greater
- c) 37.5% greater
- d) 50% less

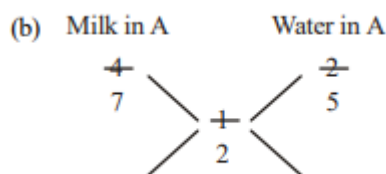
Q20. A cricket team has 11 players and each of them has played 20 matches till date. Virat, Rohit, Mahendra, Rahul and Shikhar have scored runs at an average of 60, 55, 50, 45 and 40 respectively. Rest of the players have scored at an average of 25 each. In the next 10 matches, Virat and Rohit each scored 900 runs whereas Mahendra scored twice that of Rahul. After 30 matches, if Virat's new average score is twice that of Rahul, what is the approximate average score of Mahendra?

- a) 49  
b) 41  
c) 43  
d) 45

## Answer Key & Explanation:

1. Correct Answer: B

**Solution:**



$$\frac{-1}{2} - \frac{2}{5} \qquad \frac{-4}{7} - \frac{1}{2}$$

$$= \frac{5-4}{10} = \frac{1}{10} \qquad = \frac{8-7}{14} = \frac{1}{14}$$

$$\therefore \text{Required Ratio} = \frac{1}{10} \times \frac{14}{1} = \frac{7}{5}$$

2. Correct Answer: C

3. Correct Answer: B

**Solution:**

- (b) Arranging data in ascending order, we get 66, 69, 70, 75, 77, 78, 78  
So, median,  $m = 75$

$$\text{Arithmetic mean} = \frac{66+69+70+75+77+78+78}{7}$$

$$= 73.29$$

Mode = 78.

Median, lies between mean and mode i.e.,  $a < m < f$ .

4. Correct Answer: A

**Solution:**

$$\text{Total revenue of the month} = 30 \times 10000 = 300000$$

$$\text{Revenue on weekend} = 8 \times 20000 = 160000$$

$$\therefore \text{Revenue on other 22 days} = 300000 - 160000$$

$$= 140000$$

$$\therefore \text{Average daily revenue on weekdays} = \frac{140000}{22}$$

$$\approx 6364$$

Hence, option 1.

5. Correct Answer: B

**Solution:**

Let there be  $x$  liters of 30% alcohol solution.

$$\therefore x(0.3) + 40(0.6) = (40 + x)0.5$$

$$\therefore x = 20$$

Hence, option B.

6. Correct Answer: D

7. Correct Answer: D

**Solution:**

Given, Sum of the marks misread =  $44+45+61 = 150$

Actual marks of the students = 48, 59 and 67

$$\text{Actual marks sum} = 48+59+67 = 174$$

$$\text{Difference} = 174-150 = 24$$

$$\text{Correct average} = 56 + 24/24 = 57$$

D is the correct answer.

8. Correct Answer: A

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**Solution:**

**Explanation:**

The cost price of the mixture per kg =  $\frac{12 \times 16 + 4 \times 2}{12 + 4}$

= Rs. 12.5

Selling price of the mixture per kg = Rs 16

Profit made on selling 1 kg of mixture =  $16 - 12.5 = \text{Rs. } 3.5$

Profit made on selling 40 kg of mixture =  $40 \times 3.5 = \text{Rs. } 140$

A is the correct answer.

9. Correct Answer: A

**Solution:**

- (a) The middle number = Sum of the first six + Sum of the last six - Sum of all the 11  
 $= 6 \times 10.5 + 6 \times 10.5 - 11 \times 10.9$   
 $= 63 + 63 - 119.9$   
 $= 11.5$

10. Correct Answer: D

11. Correct Answer: B

**Solution:**

From 2nd customer for each customer the purity of oil becomes 0.9 of its previous value i.e. 2nd customer will get only  $40 \times 0.9 = 36$  liters of pure petrol 3rd customer will get  $36 \times 0.9 = 32.4$  liters of pure petrol and so on.

Therefore the 7th customer will get = 21.25 liters of pure petrol

Therefore our answer is option 'B'.

12. Correct Answer: C

13. Correct Answer: D

**Solution:**

Using formula for repeated dilution,  
 Quantity of original solution remaining = Total mixture (1 - Quantity released/Total solution) No. of times

$\Rightarrow 10\%$  of total volume =  $15\%$  of total volume  $(1 - x/10)^2$

$\Rightarrow 10/15 = (1 - x/10)^2$

$\Rightarrow \sqrt{2/3} = 1 - x/10$

$\Rightarrow x/10 = 1 - \sqrt{2/3}$

$\Rightarrow x = (1 - 0.81) \times 10 = 1.9 \approx 2$  litres

14. Correct Answer: A

**Solution:**

Let age of Writik = x Yrs (Present)

Age of Partik =  $(x + 2)$  yrs

Age of Kajol =  $(x + 7)$  yrs

Mr. Gupta was 30 yrs when Kajol was born

Mrs. Gupta was 28 yrs when Writik was born

Mrs. Gupta was 26 yrs when Partik was born

Mr. Gupta was 35 yrs when Partik was born.

15. Correct Answer: B

**Solution:**

As no definite number is being given, the question is to be answered by taking each of the options one by one.

Taking the first option, the total expenditure happens to be  $21 \times 3.30 + 57 \times 2.90 = 234.6$ .

Trying the second option the expenditure happens to be  $57 \times 3.30 + 21 \times 2.90 = 249$ .

Hence second option is the answer.

16. Correct Answer: C

**Solution:**

Let 'x' % of aluminium is there in first alloy. And 'y' % of aluminium is there in second alloy. And z is the weight of each cut off piece.

As per the Question:-

Percentage of New two alloys are equal after two alloys are mixed. i.e.

$$\frac{x\% \text{ of } 8 \text{ Kg} - x\% \text{ of } z + y\% \text{ of } z}{8} \times 100 = \frac{y\% \text{ of } 16 + x\% \text{ of } z - y\% \text{ of } z}{16} \times 100$$

$$= \frac{\frac{x.8}{100} - \frac{x.z}{100} + \frac{y.z}{100}}{8} \times 100$$

$$= \frac{\frac{y.16}{100} + \frac{x.z}{100} - \frac{y.z}{100}}{16} \times 100$$

Cancelling 100 both sides

$$\frac{16x}{100} - \frac{2zx}{100} + \frac{2yz}{100} = \frac{16y}{100} + \frac{xz}{100} - \frac{yz}{100}$$

Taking  $\frac{1}{100}$  common

$$16x - 2zx + 2yz = 16y + xz - yz$$

$$16x - 16y - 3zx + 3yz = 0$$

$$16(x-y) - 3z(x-y) = 0, (x-y)(16-3z) = 0$$

Hence either  $x-y=0$  or  $16-3z=0$  but  $x-y \neq 0$  because they are different as given in the question.

$$\text{Hence } 16-3z=0, 3z=16, z=5.33\text{kg}$$

17. Correct Answer: C

**Solution:**

Average of 7 consecutive numbers will be

$$\frac{7+1}{2} = \frac{8}{2} = 4^{\text{th}} \text{ number. Average of 10 number will}$$

be midpoint of  $\frac{10}{2}$  i.e.  $5^{\text{th}}$  and  $\frac{10}{2} + 1$  i.e.  $6^{\text{th}}$  numbers

i.e. So average increases by 1.5.

18. Correct Answer: B

**Solution:**

Alloy X has zinc and copper in ratio 6:9

If 40 grams is taken then weights of zinc and copper are:

$$\text{Zinc} = \frac{6}{15} \times 40 = 16 \text{ grams}$$

$$\text{Copper} = \frac{9}{15} \times 40 = 24 \text{ grams}$$

Alloy Y has zinc and copper in ratio 7:11

If 60 grams is taken then weights of zinc and copper are:

$$\text{Zinc} = \frac{7}{18} \times 60 = \frac{70}{3} \text{ grams}$$

$$\text{Copper} = 60 - \frac{70}{3} = \frac{110}{3} \text{ grams}$$

When mixed together, the weights of Zinc and Copper are:

$$\text{Zinc} = 16 + \frac{70}{3} = \frac{118}{3}$$

$$\text{Copper} = 24 + \frac{110}{3} = \frac{182}{3}$$

$$\text{Ratio} = 118/3 : 182/3 = 59:91$$

19. Correct Answer: B

**Solution:**

Morning speed = 100kmph. Evening speed = 150kmph. Morning time = 1hr. Evening time = 1.5hrs Distance in the morning = 100 × 1 = 100 km

$$\text{Distance in the evening} = 150 \times 1.5 = 225\text{km}$$

$$\text{Average speed for entire journey is} = \frac{100 + 225}{1 + 1.5} = \frac{325}{2.5} = 130\text{kmph}$$

$$\text{Average speed in morning} = \frac{100}{1} = 100\text{kmph} \Rightarrow 1^{\text{st}} \text{ value is } 30\% \text{ greater.}$$

20. Correct Answer: C

**Solution:**

The average scores of Virat, Rohit, Mahendra, Rahul and Shikhar in the first 20 matches are 60, 55, 50, 45, 40 respectively. In the next 10 matches, Virat and Rohit each scored 900 runs whereas Mahendra scored twice that of Rahul.

$$\text{Virat's score in 30 matches} = 60 \times 20 + 900 = 2100$$

Let us consider Rahul scored x runs in last 10 matches, then Mahendra scores 2x runs.

$$\text{Rahul's score in 30 matches} = 45 \times 20 + x = 900 + x$$

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Mahendra's score in 30 matches =  
 $50 \times 20 + 2x = 1000 + 2x$   
It is given that After 30 matches, Virat's  
new average score is twice that of Rahul.

$2100 = 2(900 + x)$   $x = 150$   
Mahendra's score in 30 matches = 1300  
Average score of Mahendra = 43  
C is the correct answer.

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