Question 7:

A man bought 5 shirts at Rs. 450 each, 4 trousers at Rs. 750 each, and 12 pairs of shoes at Rs. 750 each. What is the average expenditure per article?

(a) 678.57

(b) 800

(c) 900

(d) 1000

Solution:

Step 1: Calculate the total cost of each type of item. Cost of 5 shirts:

$$5 \times 450 = 2250\,\text{Rs.}$$

Cost of 4 trousers:

$$4 \times 750 = 3000\,\text{Rs.}$$

Cost of 12 pairs of shoes:

$$12 \times 750 = 9000\,\text{Rs.}$$

Step 2: Calculate the total expenditure.

$$\text{Total expenditure} = 2250 + 3000 + 9000 = 14,250\,\text{Rs.}$$

Step 3: Calculate the total number of articles.

$$\text{Total articles} = 5 + 4 + 12 = 21.$$

Step 4: Calculate the average expenditure per article.

$$\text{Average expenditure} = \frac{\text{Total expenditure}}{\text{Total articles}} = \frac{14,250}{21} = 678.57\,\text{Rs.}$$

The correct answer is: (a) 678.57

Question 8:

A shopkeeper purchases 5 cartons for Rs. 105 and 8 cartons for Rs. 155. If a carton contains 5 items, then the average price per item is:

(a) 4.50

(b) 5

(c) 5.50

(d) 4

Solution:

Step 1: Calculate the total cost of the cartons.

$$\text{Total cost} = 105 + 155 = 260\,\text{Rs.}$$

Step 2: Calculate the total number of items. Each carton contains 5 items, so the total number of items is:

$$\text{Total items} = (5 + 8) \times 5 = 13 \times 5 = 65.$$

Step 3: Calculate the average price per item.

$$\text{Average price per item} = \frac{\text{Total cost}}{\text{Total items}} = \frac{260}{65} = 4\,\text{Rs.}$$

The correct answer is: (d) 4

Question 9:

A shopkeeper bought 5 dozens of eggs for Rs. 50, 84 eggs for Rs. 70, and 3 dozen eggs for Rs. 30. The average rate of one dozen will be:

(a) 10

(b) 12

(c) 13

(d) 15

Solution:

Step 1: Calculate the total cost of the eggs.

$$\text{Total cost} = 50 + 70 + 30 = 150\,\text{Rs.}$$

Step 2: Calculate the total number of eggs. Convert all quantities to dozens:

$$5\,\text{dozens} = 60\,\text{eggs}, \quad 84\,\text{eggs} = 7\,\text{dozens}, \quad 3\,\text{dozens} = 36\,\text{eggs}.$$

Total eggs in dozens:

$$5 + 7 + 3 = 15\,\text{dozens}.$$

Step 3: Calculate the average rate per dozen.

$$\text{Average rate per dozen} = \frac{\text{Total cost}}{\text{Total dozens}} = \frac{150}{15} = 10\,\text{Rs.}$$

The correct answer is: (a) 10

Question 21:

What is the temperature on Sunday if the sum of temperatures of the other 6 days is 145°C and the average of the week is 25°C?

(a) 29°C

(b) 30°C

(c) 28°C

(d) 31°C

Solution:

Step 1: Calculate the total temperature for the week. The average temperature for the week is 25°C, and there are 7 days in a week.

$$\text{Total temperature} = 25 \times 7 = 175^\circ\text{C}.$$

Step 2: Calculate the temperature on Sunday. The sum of temperatures for the other 6 days is 145°C.

$$\text{Temperature on Sunday} = \text{Total temperature} - \text{Sum of other 6 days}.$$

$$\text{Temperature on Sunday} = 175 - 145 = 30^\circ\text{C}.$$

The correct answer is: (b) 30°C

Question 22:

The average temperature of a week is 33°C. The average of the first three days is 30°C, while the average of the last three days is 35°C. What is the temperature of the fourth day?

(a) 33°C

(b) 35°C

(c) 36°C

(d) 40°C

Solution:

Step 1: Calculate the total temperature for the week. The average temperature for the week is 33°C, and there are 7 days in a week.

$$\text{Total temperature} = 33 \times 7 = 231^\circ\text{C}.$$

Step 2: Calculate the total temperature of the first three days.

$$\text{Total temperature of first 3 days} = 30 \times 3 = 90^\circ\text{C}.$$

Step 3: Calculate the total temperature of the last three days.

$$\text{Total temperature of last 3 days} = 35 \times 3 = 105^\circ\text{C}.$$

Step 4: Calculate the temperature of the fourth day.

Temperature of fourth day = Total temperature−(Total of first 3 days+Total of last 3 days).

$$\text{Temperature of fourth day} = 231 - (90 + 105) = 231 - 195 = 36^\circ\text{C}.$$

The correct answer is: (c) 36°C

Question 23:

The average of 5 consecutive natural numbers is n. If the next two numbers are also included, the average of 7 numbers will be:

(a) Increases by 2

(b) Increases by 1

(c) Remains the same

(d) Increases by 1.4

Solution:

Step 1: Represent the 5 consecutive natural numbers. Let the 5 consecutive numbers be:

$$n - 2, n - 1, n, n + 1, n + 2.$$

The average of these 5 numbers is n.

Step 2: Include the next two numbers. The next two numbers are:

$$n + 3, n + 4.$$

Step 3: Calculate the new average. The total of all 7 numbers is:

$$(n - 2) + (n - 1) + n + (n + 1) + (n + 2) + (n + 3) + (n + 4) = 7n.$$

The new average is:

$$\text{New average} = \frac{\text{Total of 7 numbers}}{7} = \frac{7n}{7} = n + 1.$$

The average increases by 1.

The correct answer is: (b) Increases by 1

Question 27:

The average of 6 numbers is 30. If the average of the first 4 is 25 and that of the last 3 is 35, the fourth number is:

(a) 40

(b) 35

(c) 30

(d) 25

Solution:

Step 1: Calculate the total of all 6 numbers.

$$\text{Total of 6 numbers} = 30 \times 6 = 180.$$

Step 2: Calculate the total of the first 4 numbers.

$$\text{Total of first 4 numbers} = 25 \times 4 = 100.$$

Step 3: Calculate the total of the last 3 numbers.

$$\text{Total of last 3 numbers} = 35 \times 3 = 105.$$

Step 4: Find the fourth number. The fourth number is included in both the first 4 numbers and the last 3 numbers.

Fourth number = Total of first 4 numbers+Total of last 3 numbers−Total of all 6 numbers.

$$\text{Fourth number} = 100 + 105 - 180 = 25.$$

The correct answer is: (d) 25

Question 28:

The average of 6 observations is 45.5. If one new observation is added to the previous observations, then the new average becomes 47. The new observation is:

(a) 58

(b) 56

(c) 50

(d) 46

Solution:

Step 1: Calculate the total of the 6 observations.

$$\text{Total of 6 observations} = 45.5 \times 6 = 273.$$

Step 2: Calculate the total of the 7 observations.

$$\text{Total of 7 observations} = 47 \times 7 = 329.$$

Step 3: Find the new observation.

$$\text{New observation} = \text{Total of 7 observations} - \text{Total of 6 observations}.$$

$$\text{New observation} = 329 - 273 = 56.$$

The correct answer is: (b) 56

Question 29:

The average age of three friends is 23. Even if the age of the 4^{th} friend is added, the average remains 23. What is the age of the 4^{th} friend?

(a) 21 years

(b) 23 years

(c) 32 years

(d) Cannot be determined

Solution:

Step 1: Calculate the total age of the 3 friends.

$$\text{Total age of 3 friends} = 23 \times 3 = 69.$$

Step 2: Calculate the total age of the 4 friends. If the average remains 23, the total age of 4 friends is:

$$\text{Total age of 4 friends} = 23 \times 4 = 92.$$

Step 3: Find the age of the 4^{th} friend.

$$\text{Age of 4th friend} = \text{Total age of 4 friends} - \text{Total age of 3 friends.}$$

$$\text{Age of 4th friend} = 92 - 69 = 23.$$

The correct answer is: (b) 23 years

Question 30:

If the sum of a few numbers is 450 and their mean is 50, and if another number 100 is included, the mean would become:

(a) 55

(b) 60

(c) 75

(d) 150

Solution:

Step 1: Calculate the number of numbers.

$$\text{Number of numbers} = \frac{\text{Sum of numbers}}{\text{Mean}} = \frac{450}{50} = 9.$$

Step 2: Calculate the new sum of numbers.

$$\text{New sum} = 450 + 100 = 550.$$

Step 3: Calculate the new mean.

$$\text{New mean} = \frac{\text{New sum}}{\text{New number of numbers}} = \frac{550}{10} = 55.$$

The correct answer is: (a) 55

Question 36:

The average weight of 5 persons sitting in a boat is 38 kg. If the average weight of the boat and the persons sitting in the boat is 52 kg, what is the weight of the boat?

(a) 228 kg

(b) 122 kg

(c) 232 kg

(d) 242 kg

Solution:

Step 1: Calculate the total weight of the 5 persons.

$$\text{Total weight of 5 persons} = 38 \times 5 = 190\,\text{kg}.$$

Step 2: Calculate the total weight of the boat and the 5 persons.

$$\text{Total weight (boat + persons)} = 52 \times 6 = 312\,\text{kg}.$$

Step 3: Calculate the weight of the boat.

$$\text{Weight of the boat} = \text{Total weight (boat + persons)} - \text{Total weight of 5 persons}.$$

$$\text{Weight of the boat} = 312 - 190 = 122\,\text{kg}.$$

The correct answer is: (b) 122 kg

Question 37:

The average age in a city of $10,000$ is 40 years. The average of half of them is 50 years. The average of the remaining is:

(a) 15

(b) 25

(c) 30

(d) 35

Solution:

Step 1: Calculate the total age of all $10,000$ people.

$$\text{Total age} = 40 \times 10,000 = 400,000 \,\text{years}.$$

Step 2: Calculate the total age of half of the population.

$$\text{Total age of 5,000 people} = 50 \times 5,000 = 250,000 \,\text{years}.$$

Step 3: Calculate the total age of the remaining $5,000$ people.

$$\text{Total age of remaining 5,000 people} = 400,000 - 250,000 = 150,000 \,\text{years}.$$

Step 4: Calculate the average age of the remaining $5,000$ people.

$$\text{Average age} = \frac{\text{Total age of remaining 5,000 people}}{5,000} = \frac{150,000}{5,000} = 30 \,\text{years}.$$

The correct answer is: (c) 30

Question 38:

The average age of r boys in a class of KIPS College is a years. If the average age of s of them is b years, then the average age of the remaining boys is:

(a) $\frac{sa-rb}{r-s}$

(b) $\frac{ra-sb}{r-s}$

(c) $\frac{ra+sb}{r-s}$

(d) $\frac{ra-sb}{r+s}$

Solution:

Step 1: Calculate the total age of all r boys.

$$\text{Total age of all boys} = r \times a = ra.$$

Step 2: Calculate the total age of s boys.

$$\text{Total age of } s \text{ boys} = s \times b = sb.$$

Step 3: Calculate the total age of the remaining boys.

$$\text{Total age of remaining boys} = \text{Total age of all boys} - \text{Total age of } s \text{ boys}.$$

$$\text{Total age of remaining boys} = ra - sb.$$

Step 4: Calculate the average age of the remaining boys. The number of remaining boys is $r - s$.

$$\text{Average age of remaining boys} = \frac{\text{Total age of remaining boys}}{\text{Number of remaining boys}} = \frac{ra - sb}{r - s}.$$

The correct answer is: (b) $\frac{ra-sb}{r-s}$

Question 47:

In the class of 100 students at KIPS, the average marks of the students in the mathematics tests were 80. How many got exactly 80 marks in the test?

(a) 50

(b) More than 50

(c) 90

(d) Cannot be determined

Solution:

The average marks of 100 students are 80. This means the total marks of all students are:

$$\text{Total marks} = 100 \times 80 = 8000.$$

However, the problem does not provide any information about the distribution of marks (e.g., how many scored above or below 80). Without this information, it is impossible to determine how many students scored exactly 80.

The correct answer is: (d) Cannot be determined

Question 48:

If X persons are admitted to a hospital during the last 5 years and Y persons are recovered out of them during this period, then find the average number of persons admitted in one year:

(a) $\frac{X}{5}$

(b) $\frac{X-Y}{5}$

(c) $\frac{X}{Y}$

(d) $\frac{X+Y}{5}$

Solution:

The total number of persons admitted in 5 years is X. The average number of persons admitted in one year is:

$$\text{Average admitted per year} = \frac{\text{Total admitted}}{\text{Number of years}} = \frac{X}{5}.$$

The correct answer is: (a) $\frac{X}{5}$

Question 49:

In the above question, what is the average of un-recovered persons per year?

(a) $\frac{X-Y}{5}$

(b) $X - Y$

(c) $\frac{Y}{X}$

(d) $\frac{X+Y}{5}$

Solution:

The total number of un-recovered persons is:

$$\text{Un-recovered persons} = X - Y.$$

The average number of un-recovered persons per year is:

$$\text{Average un-recovered per year} = \frac{\text{Total un-recovered}}{\text{Number of years}} = \frac{X-Y}{5}.$$

The correct answer is: (a) $\frac{X-Y}{5}$

Question 50:

During a certain operation, B persons are successfully recovered every year. If A persons are treated during the last 5 years, what will be the average death rate per year?

(a) $\frac{B}{5}$

(b) $A - 5B$

(c) $\frac{A-B}{5}$

(d) $\frac{A-5B}{5}$

Solution:

The total number of persons successfully recovered in 5 years is:

$$\text{Recovered persons} = 5B.$$

The total number of deaths in 5 years is:

$$\text{Deaths} = \text{Total treated} - \text{Recovered persons} = A - 5B.$$

The average death rate per year is:

$$\text{Average death rate per year} = \frac{\text{Total deaths}}{\text{Number of years}} = \frac{A - 5B}{5}.$$

The correct answer is: (d) $\frac{A-5B}{5}$

Question 65:

An Aero plane travels distances 2500 km, 1200 km, and 500 km at the rate of 500 km/h, 400 km/h, and 250 km/h respectively. The average is:

(a) 420 km/h

(b) 410 km/h

(c) 405 km/h

(d) 383.33 km/h

Solution:

The total distance is:

$$\text{Total distance} = 2500 + 1200 + 500 = 4200\,\text{km}.$$

The total time is:

$$\text{Total time} = \frac{2500}{500} + \frac{1200}{400} + \frac{500}{250} = 5 + 3 + 2 = 10\,\text{hours}.$$

The average speed is:

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{4200}{10} = 420\,\text{km/h}.$$

The correct answer is: (a) 420 km/h

Question 66:

A family with 6 members has an average age of 25 while a family of 9 has an average age of 35. The combined average of both families will be:

(a) 30

(b) 31

(c) 39

(d) 43

Solution:

The total age of family 1 is:

$$\text{Total age of family } 1 = 6 \times 25 = 150.$$

The total age of family 2 is:

$$\text{Total age of family } 2 = 9 \times 35 = 315.$$

The total number of members is:

$$\text{Total members} = 6 + 9 = 15.$$

The combined average is:

$$\text{Combined average} = \frac{150 + 315}{15} = \frac{465}{15} = 31.$$

The correct answer is: (b) 31

Question 67:

In a KIPS College class there are 15 girls with an average score of 43 on a mathematics test. While the average score of boys is 48. If the average score of the whole class is 45, how many boys are there in the class?

(a) 9

(b) 10

(c) 15

(d) 18

Solution:

The total score of girls is:

$$\text{Total score of girls} = 15 \times 43 = 645.$$

Let the number of boys be x. The total score of boys is:

$$\text{Total score of boys} = 48x.$$

The average score of the whole class is:

$$\frac{645 + 48x}{15 + x} = 45.$$

Simplify:

$$645 + 48x = 675 + 45x \implies 3x = 30 \implies x = 10.$$

The correct answer is: (b) 10

Question 68:

At KIPS College a class has two sections in one of which there are 40 students, with an average of 14.5 years. The average of the class is 14.2 years. If there are 32 students in the other section, the average age of the second section is:

(a) 13.8 years

(b) 13.6 years

(c) 13 years

(d) 15 years

Solution:

The total age of the class is:

$$\text{Total age of the class} = 40 \times 14.5 = 580.$$

The total age of the first section is:

$$\text{Total age of the first section} = 32 \times 14.2 = 454.4.$$

The total age of the second section is:

$$\text{Total age of the second section} = 580 - 454.4 = 125.6.$$

The average age of the second section is:

$$\text{Average age of the second section} = \frac{125.6}{8} = 15.7 \,(\text{approx}).$$

The correct answer is: (d) 15

Question 69:

The average weight of the class of 35 students was 45 kg, with the admission of a new student the average weight came down to 44.5 kg. Find the weight of the new student:

(a) 27 kg

(b) 30 kg

(c) 25 kg

(d) 45 kg

Solution:

The total weight of 35 students is:

$$\text{Total weight of 35 students} = 35 \times 45 = 1575\,\text{kg}.$$

The total weight after the new student joins is:

$$\text{Total weight after new student joins} = 36 \times 44.5 = 1602\,\text{kg}.$$

The weight of the new student is:

$$\text{Weight of the new student} = 1602 - 1575 = 27\,\text{kg}.$$

The correct answer is: (a) 27 kg

Question 70:

There were 40 members in a certain hostel. If 10 members are more admitted the expenses of the mess is increased by Rs. 50 per month while the average expenditure per head diminished by Rs. 3. The original monthly expenses are:

(a) Rs. 620

(b) Rs. 800

(c) Rs. 700

(d) Rs. 850

Solution:

Let the original monthly expenses be x.

The new expenses per head are:

$$\frac{x+50}{40+10} = \frac{x}{40} - 3.$$

Simplify:

$$\frac{x+50}{50} = \frac{x}{40} - 3.$$

Cross-multiply:

$$40(x+50) = 50x - 6000.$$

Simplify further:

$$40x + 2000 = 50x - 6000 \implies 10x = 8000 \implies x = 800.$$

The correct answer is: (b) Rs. 800