

1. OBJECTIVE QUESTIONS

1. The mean of six numbers is 30. If one number is excluded, the mean of the remaining numbers is 29. The excluded number is

(a) 29 (b) 30
(c) 35 (d) 45

Ans : (c) 35

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

$$\text{Sum of remaining 5 numbers} = 29 \times 5 = 145$$

$$\text{Hence, Excluded number} = 180 - 145 = 35$$

2. If each observation of a data is increased by 5, then their mean

(a) is decreased by 5
(b) is increased by 5
(c) becomes 7 times the original mean
(d) remains the same

Ans : (b) is increased by 5

$$\text{Let } \bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

If 5 is added in each observation, then

$$\begin{aligned} \text{Mean} &= \frac{(x_1 + 5) + (x_2 + 5) + \dots + (x_n + 5)}{n} \\ &= \frac{(x_1 + \dots + x_n) + 5n}{n} = \bar{x} + 5 \end{aligned}$$

3. Tally marks are used to find

(a) class intervals (b) range
(c) upper limits (d) frequency

Ans : (d) frequency

4. The range of the data 15, 20, 6, 5, 30, 35, 92, 35, 90, 18, 82 is

(a) 87 (b) 15
(c) 18 (d) 26

(a) 87

Arranging the data in ascending order, we have 5, 6, 15, 18, 20, 30, 35, 35, 82, 90, 92

$$\text{Range} = \text{Max. value} - \text{Min. value} = 92 - 5 = 87$$

5. In the class intervals 40-45, 50-60 the number 60 is included in

(a) 50-60 (b) 40-50
(c) Both in 40-50 and 50-60

(d) Neither in 40-50 nor in 50-60

Ans : (d) Neither in 40-50 nor in 50-60

60 is included in neither class interval 40-50 nor in 50-60.

6. In a morning walk, I took 20 rounds of a park. During this period I came across person A, person B, person C and person D, 11 times, 7 times, 10 times and 5 times respectively. I want to represent this data graphically. Which of the following is the best representation?

(a) Bar graph
(b) Histogram with unequal widths
(c) Histogram with equal widths
(d) Frequency polygon

Ans : (a) Bar graph

Bar graph is the simple most and popular graph to show ungrouped frequency distribution graphically.

7. The width of each of the five continuous classes in a frequency distribution is 5 and the upper class limit of the upper class is 60. The lower class limit of the lowest class is

(a) 45 (b) 25
(c) 35 (d) 40

Ans : (c) 35

Lower class limit = Upper class limit - width of class

$$60 - 5 = 55$$

continuous classes in a frequency distribution is 35-40, 40-45, 45-50, 50-55, 55-60

Lower class limit of lowest class is 35.

8. The class marks of a frequency distribution are 15, 20, 25, 30, The class corresponding to the class mark 25 is

(a) 12.5 - 17.5 (b) 20.5 - 29.5
(c) 18.5 - 21.5 (d) 22.5 - 27.5

Ans : (d) 22.5 - 27.5

$$\text{Class width} = 20 - 15 = 5$$

$$\text{Class mark} = 25$$

$$\text{Required class is } \left(25 - \frac{5}{2}\right) - \left(25 + \frac{5}{2}\right)$$

$$= (25 - 2.5) - (25 + 2.5)$$

$$= 22.5 - 27.5$$

9. For drawing a frequency polygon of a continuous

frequency distribution, we plot the points whose ordinates are the frequencies of the respective classes and abscissa are respectively, the

- (a) upper limits of the classes
- (b) lower limits of the classes
- (c) class marks of the classes
- (d) upper limits of preceding classes

Ans : (c) class marks of the classes

10. In a frequency distribution, the mid-value of a class is 10 and width of each class is 6. The upper limit of the class is

- (a) 13
- (b) 7
- (c) 8
- (d) 12

Ans : (a) 13

Let the upper limit = u and the lower limit = l

$$u - l = 6 \quad \dots(1)$$

$$\frac{u+l}{2} = 10 \quad u+l = 20 \quad \dots(2)$$

Solving (1) and (2), we get

$$u = 13; l = 7$$

11. Let U be the upper class boundary of a class in a frequency distribution and M be the midpoint of the class. Which one of the following is the lower class boundary of the class?

- (a) $M + \frac{(M+L)}{2}$
- (b) $L + \frac{M+L}{2}$
- (c) $2M - U$
- (d) $M - 2L$

Ans : (c) $2M - U$

Class mark

$$= \frac{\text{Upper class boundary} + \text{lower class boundary}}{2}$$

$$M = \frac{U+L}{2}$$

$$2M - U = L$$

12. The mid-value of a class interval is 25 and the class size is 8. The class interval is

- (a) 37 - 45
- (b) 21 - 29
- (c) 36.5 - 44.5
- (d) 36.5 - 46.5

Ans : (b) 21 - 29

Class mark = 25

and Class size = 8

Class mark

$$= \frac{\text{Lowerclass limit} + \text{Upper classlimit}}{2}$$

$$\frac{l+4}{2} = 25$$

$$l+u = 50 \quad \dots(1)$$

upper class limit - lower class limit = class size

$$u - l = 8 \quad \dots(2)$$

Solving (1) and (2), we get

$$u = 29$$

$$l = 21$$

13. If the mean of five observations $x, x+4, x+8, x+12$ and $x+16$ is 15, then the value of x is

- (a) 5
- (b) 6
- (c) 7
- (d) 8

Ans : (c) 7

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$15 = \frac{x+x+4+x+8+x+12+x+16}{5}$$

$$5x+40 = 75$$

$$5x = 35$$

$$x = 7$$

14. The mean of the marks scored by 40 students was found to be 35. Later on it was discovered that a score of 43 was misread as 34. The correct mean is

- (a) 35.2
- (b) 39.4
- (c) 39.8
- (d) 39.2

Ans : (a) 35.2

Sum of the observation = $35 \times 40 = 1400$ Once of the observation 43 was misread as 34

$$\text{Correct sum} = 1400 - 34 + 43 = 1409$$

$$\text{Correct mean} = \frac{1409}{40} = 35.225$$

15. There are 50 numbers. Each number is subtracted from 43 and the mean of the numbers so obtained is found to be 5. The mean of the given numbers is

- (a) 38
- (b) 39
- (c) 48
- (d) 49

Ans : (a) 38

$$\frac{x_1 + \dots + x_{50}}{50} = \bar{x}$$

$$x_1 + \dots + x_{50} = 50\bar{x}$$

$$\text{Now, } \frac{43 - x_1 + 43 - x_2 + \dots + 43 - x_{50}}{50} = \text{New mean}$$

$$\frac{43 \times 50 - \sum x_i}{50} = 5$$

$$2150 - 50 \times \bar{x} = 50 \times 5$$

$$\bar{x} = \frac{1900}{50} \quad \bar{x} = 38$$

16. Mode of the data 15, 14, 71, 15, 91, 2, 51, 19, 41, 51, 18, 15, 51 is

- (a) 51
- (b) 15
- (c) 16
- (d) 17

Ans : (a) 51

Arranging the data in ascending order, we have 2, 14, 15, 15, 18, 19, 41, 51, 51, 51, 71, 91

Mode = Highest occurring number

Mode = 51.

17. The median of the numbers 9, 5, 7, 17, 13, 18, 13, 9, 5, 17, 13, 12, 17 is

- (a) 7
- (b) 9
- (c) 13
- (d) 15

Ans : (c) 13

Arranging the given numbers in ascending order 5, 5, 7, 9, 9, 12, 13, 13, 13, 17, 17, 17, 18.

The number of terms = 13(odd)

$$\begin{aligned} \text{Median} &= \left(\frac{n+1}{2}\right)^{\text{th}} = \left(\frac{13+1}{2}\right)^{\text{th}} \text{ term} \\ &= 7^{\text{th}} \text{ term} = 13 \end{aligned}$$

18. The median of the numbers 45, 34, 65, 48, 93, 54, 22, 86, 45, 87, is
 (a) 51 (b) 49.5
 (c) 54 (d) 56

Ans : (a) 51

Arranging the given number in ascending order 22, 34, 45, 45, 48, 54, 65, 86, 87, 93

Number of terms = 10(even)

When number of terms are even, then

$$\begin{aligned} \text{Median} &= \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{ term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ term}}{2} \\ &= \frac{5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term}}{2} \\ &= \frac{48 + 54}{2} = \frac{102}{2} = 51 \end{aligned}$$

19. If the mean of the observations $x, x+3, x+5, x+7$ and $x+10$ is 9, the mean of the last three observations is
 (a) $10\frac{1}{3}$ (b) $10\frac{2}{3}$
 (c) $11\frac{1}{3}$ (d) $11\frac{2}{3}$

Ans : (c) $11\frac{1}{3}$

We know,

$$\text{Mean} = \frac{\text{Sum of all the observations}}{\text{Total number. of observation}}$$

$$\text{Mean} = \frac{x + x + 3 + x + 5 + x + 7 + x + 10}{5}$$

$$9 = \frac{5x + 25}{5}$$

$$x = 4$$

So, mean of last three observations is

$$\frac{3x + 22}{3} = \frac{12 + 22}{3} = \frac{34}{3} = 11\frac{1}{3}$$

20. If \bar{x} is the mean of $x_1, x_2, x_3, \dots, x_n$, then $\sum_{i=1}^n (x_i - \bar{x}) =$
 (a) $\frac{23}{25}$ (b) 0
 (c) $\frac{28}{25}$ (d) $\frac{4}{5}$

Ans : (b) 0

We know that mean of n observations is

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

$$n\bar{x} = \sum_{i=1}^n x_i \Rightarrow \sum_{i=1}^n (x_i - \bar{x}) = 0$$

21. If each observation of a data is increased by 7, then

their mean

- (a) remains the same
 (b) becomes 7 times the original mean
 (c) is decreased by 7
 (d) is increased by 7

Ans : (d) is increased by 7

Let
$$\bar{x} = \frac{x_1 + x_2 + \dots + x_n}{n}$$

If 7 is added in each observation, then

$$\begin{aligned} \text{New mean} &= \frac{x_1 + 7 + x_2 + 7 + \dots + x_n + 7}{n} \\ &= \frac{(x_1 + \dots + x_n) + 7n}{n} = \bar{x} + 7 \end{aligned}$$

Hence the mean is increased by 7.

22. If \bar{x} is the mean of x_1, x_2, \dots, x_n , then for $a \neq 0$, the mean of ax_1, ax_2, \dots, ax_n , then for $a \neq 0$, the mean of $ax_1, ax_2, \dots, ax_n, \frac{x_1}{a}, \frac{x_2}{a}, \dots, \frac{x_n}{a}$ is

- (a) $\left(a + \frac{1}{a}\right)\bar{x}$ (b) $\left(a + \frac{1}{a}\right)\frac{\bar{x}}{2}$
 (c) $\left(a + \frac{1}{a}\right)\frac{\bar{x}}{n}$ (d) $\frac{\left(a + \frac{1}{a}\right)\bar{x}}{2n}$

Ans : (b) $\left(a + \frac{1}{a}\right)\frac{\bar{x}}{2}$

$$\bar{x} = \frac{x_1 + \dots + x_n}{n}$$

Now,
$$\begin{aligned} &\frac{ax_1 + \dots + ax_n + \frac{x_1}{a} + \frac{x_2}{a} + \dots + \frac{x_n}{a}}{2n} \\ &= \frac{a(x_1 + x_2 + \dots + x_n) + \frac{1}{a}(x_1 + x_2 + \dots + x_n)}{2n} \\ &= \frac{a(n\bar{x}) + \frac{1}{a}(n\bar{x})}{2n} = \frac{n\bar{x}}{2n} \left(a + \frac{1}{a}\right) = \frac{\bar{x}}{2} \left(a + \frac{1}{a}\right) \end{aligned}$$

23. The mean of 90 items was found to be 45. Later on it was discovered that two items were misread as 26 and 19 instead of 62 and 09 respectively. The correct mean is

- (a) 49.0 (b) 45.0
 (c) 45.3 (d) 49.3

Ans : (c) 45.3

$$\begin{aligned} \text{Sum of the observations} &= 90 \times 45 \\ &= 4050. \end{aligned}$$

The observations 62 and 9 are misread as 26 and 19

$$\begin{aligned} \text{Correct sum} &= 4050 - 26 - 19 + 62 + 9 \\ &= 4076 \end{aligned}$$

$$\text{Correct mean} = \frac{4076}{90} = 45.3$$

24. The mean of 53 observations is 36. Out of these observations, the mean of first 27 observations is 32 and that of the last 27 observations is 40. The 27th observation is

- (a) 23 (b) 36
 (c) 38 (d) 40

Ans : (b) 36

$$\text{Sum of the observations} = 36 \times 53 = 1908$$

$$\text{Sum of first 27 observations} = 27 \times 32 = 864$$

$$\text{Sum of last 27 observations} = 27 \times 40 = 1080$$

We have,

$$x_1 + \dots + x_{27} + x_{27} + x_{28} + \dots + x_{53} = 864 + 1080 = 1944$$

$$1908 + x_{27} = 1944$$

$$x_{27} = 1944 - 1908 = 36$$

25. The marks obtained by 20 students of a class in a test (out of 50) are given below: 40, 44, 45, 46, 50, 42, 41, 08, 26, 28, 09, 32, 24, 06, 42, 36, 39.

The range of the data is

- (a) 44 (b) 54
(c) 90 (d) 10

Ans : (a) 44

$$\begin{aligned} \text{Range} &= \text{Max. value} - \text{Min. value} \\ &= 50 - 6 = 44 \end{aligned}$$

26. The class mark of the class 150-170 is

- (a) 130 (b) 135
(c) 140 (d) 160

Ans : (d) 160

$$\begin{aligned} \text{Class mark} &= \frac{\text{upper limit} + \text{lower limit}}{2} \\ &= \frac{150 + 170}{2} = \frac{320}{2} = 160 \end{aligned}$$

27. The mean of eight numbers is 40. If one number is excluded, their mean becomes 30. The excluded number is

- (a) 30 (b) 130
(c) 110 (d) 138

Ans : (c) 110

$$\text{Sum of 8 observations} = 40 \times 8 = 320$$

$$\text{Sum of 7 observations} = 30 \times 7 = 210$$

$$\text{Excluded observation} = 320 - 210 = 110$$

28. The median of the data arranged in ascending order 8, 9, 12, 18, $(x+2)$, $(x+4)$, 30, 31, 34, 39 is 24. The value of x is

- (a) 22 (b) 21
(c) 20 (d) 24

Ans : (b) 21

$$\text{Number of terms} = 10 \text{ (even)}$$

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{ term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ term}}{2}$$

$$= \frac{5^{\text{th}} \text{ term} + 6^{\text{th}} \text{ term}}{2}$$

$$24 = \frac{(x+2) + (x+4)}{2}$$

$$48 = 2x + 6$$

$$x = 21$$

29. The points scored by a kabaddi team in a series of matches are as follows:

8, 24, 10, 14, 5, 15, 7, 2, 17, 27, 10, 7, 48, 8, 18, 28

Find the median of the points scored by the team.

- (a) 12 (b) 14
(c) 10 (d) 15

Ans : (a) 12

Arranging the given data in ascending order:

2, 5, 7, 7, 8, 8, 10, 10, 14, 15, 17, 18, 24, 27, 28, 48

Number of terms = 16 (even)

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{ term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{ term}}{2}$$

$$= \frac{8^{\text{th}} \text{ term} + 9^{\text{th}} \text{ term}}{2}$$

$$= \frac{10 + 14}{2} = 12$$

30. In the class-intervals 30 – 40, 40 – 50 the number 50 is included in

- (a) 40 – 50
(b) 30 – 40
(c) Both in 30 – 40 and 40 – 50
(d) Neither in 30 – 40 nor in 40 – 50

Ans : (d) Neither in 30 – 40 nor in 40 – 50

31. Given the class-interval 0-10, 10-20, 20-30, then 20 is considered in class

- (a) 20-30 (b) 10-20
(c) 10-30 (d) 15-25

Ans : (a) 20-30

20 is considered in class 20-30.

32. The marks obtained by 12 students of a class in a test are 36, 27, 5, 19, 34, 23, 37, 23, 16, 23, 20, 38. Find mode.

- (a) 23 (b) 26
(c) 20 (d) 36

Ans : (a) 23

Arranging the data in ascending order, we have 5, 16,

19, 20, 23, 23, 23, 27, 34, 36, 37, 38

Mode Marks = Highest occurring marks = 23

33. In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit of the class is

- (a) 6 (b) 7
(c) 8 (d) 12

Ans : (b) 7

Let x be the upper limit and y be the lower limit.

Since the mid value of the class is 10

$$\text{Hence, } \frac{x+y}{2} = 10$$

$$x + y = 20 \quad \dots(1)$$

$$\text{and } x - y = 6 \text{ (width of the class = 6)} \quad \dots(2)$$

By solving (1) and (2), we get

$$y = 7$$

Hence, lower limit of the class is 7.

34. Let \bar{x} be the mean of x_1, x_2, \dots, x_n and \bar{y} the mean of y_1, y_2, \dots, y_n . If \bar{z} is the mean of $x_1, x_2, \dots, x_n, y_1, \dots, y_n$ then \bar{z} is equal to

- (a) $\bar{x} + \bar{y}$ (b) $\frac{\bar{x} + \bar{y}}{2}$
 (c) $\frac{\bar{x} + \bar{y}}{n}$ (d) $\frac{\bar{x} + \bar{y}}{2n}$

Ans : (b) $\frac{\bar{x} + \bar{y}}{2}$

$$\frac{x_1 + \dots + x_n}{n} = \bar{x}$$

$$\frac{y_1 + y_2 + \dots + y_n}{n} = \bar{y}$$

$$\bar{z} = \frac{\bar{x} + \bar{y}}{2}$$

35. The mean of 100 observations is 50. If one of the observations which was 50 is replaced by 150, the resulting mean will be

- (a) 50.5 (b) 51
 (c) 51.5 (d) 52

Ans : (b) 51

We have $\bar{x} = 50$

$$\frac{\sum x_i}{100} = 50$$

$$\sum x_i = 5000$$

As, 50 is replaced by 150.

Thus,

Now, $\sum x_i = 5000 - 50 + 150 = 5100$

Resulting mean, $= \frac{5100}{100} = 51$

2. FILL IN THE BLANK

DIRECTION : Complete the following statements with an appropriate word/term to be filled in the blank space(s).

- The range of the data 15, 20, 6, 5, 30, 35, 93, 34, 91, 17, 83, is
 Ans : $93 - 5 = 88$
- is the value of the middle most observation (s).
 Ans : Median
- Width of the class-interval is called of class interval.
 Ans : size
- The is the most frequently occurring observation.
 Ans : mode
- The is the difference between the greatest and

the least value of the variate.

Ans : range

- is found by adding all the values of the observations and dividing this by the total number of observations.
 Ans : Mean
- The of all bars in histogram should be uniform.
 Ans : width
- can also be drawn independently without drawing a histogram.
 Ans : Frequency polygon
- If n is an odd number, the median = value of the observation.
 Ans : $\left(\frac{n+1}{2}\right)^{\text{th}}$
- The of a class interval is called its class mark.
 Ans : mid-point

3. TRUE/FALSE

DIRECTION : Read the following statements and write your answer as true or false.

- Arithmetic mean, Geometric mean, Harmonic mean, Median and Mode are various measures of central tendency.
 Ans : True
- The mean of a set of numbers is \bar{x} , if each number is increased by k , then mean of new set is $\bar{x} - k$.
 Ans : False
- The algebraic sum of the deviations of a set of n values from their mean is 0.
 Ans : True
- The space between consecutive bars in bar graph should also be same.
 Ans : True
- Mean may or may not be the appropriate measure of central tendency.
 Ans : True
- If the arithmetic mean of 7, 5, 13, x and 9 is 10, then the value of x is 16.
 Ans : True

$$\frac{7 + 5 + 13 + x + 9}{5} = 10$$

$$x = 16$$

7. The data collected by the investigator himself for a definite plan or purpose is known as primary data.

Ans : True

8. The data collected by someone and used by any other person known as primary data.

Ans : False

It is known as secondary data.

4. MATCHING QUESTIONS

DIRECTION : Each question contains statements given in two columns which have to be matched. Statements (P, Q, R, S, T) in Column-I have to be matched with statements (1, 2, 3, 4, 5) in Column-II.

1. Match the following :

	Column-I		Column-II
(P)	Mode of the data 15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 20, 15, 17, 15 is	(1)	64
(Q)	The range of the data 25, 18, 20, 22, 16, 6, 17, 15, 12, 30, 32, 10, 19, 8, 11, 20 is	(2)	105
(R)	The class mark of the class 90 – 120 is	(3)	17.5 – 22.5
(S)	The class marks of a frequency distribution are given as follows: 15, 20, 25, The class corresponding to the class mark 20 is	(4)	15
(T)	The following observations are arranged in ascending order: 26, 29, 42, 53, x , $x + 2$, 70, 75, 82, 93. If the median is 65, then the value of x is	(5)	26

Ans : P-4, Q-5, R-2, S-3, T-1

(P) Most occurring observation is 15.

(Q) Highest data value is 32 and the lowest is 6

Hence, Range = highest value – lowest value

$$= 32 - 6 = 26$$

(R) Class-mark = $\frac{90 + 120}{2} = \frac{210}{2} = 105$

(S) The class corresponding to the class mark 20 is given as

$$\frac{15 + 20}{2} = \frac{35}{2} = 17.5$$

and $\frac{20 + 25}{2} = \frac{45}{2} = 22.5$

(T) Since the number of observation is 10 (even)

Hence, Median = $\frac{5^{th} \text{ term} + 6^{th} \text{ term}}{2}$

$$65 = \frac{x + x + 2}{2} = \frac{2x + 2}{2} = x + 1$$

$$x = 64$$

2. Match the following :

	Column-I		Column-II
(P)	For the set of numbers 2, 2, 4, 5 and 12, the true statement is	(1)	mode + 2 mean
(Q)	3 median is equal to	(2)	mid-value of the class
(R)	In a histogram, each class rectangle is constructed with base as	(3)	Mean > Mode
(S)	A frequency polygon is constructed by plotting frequency of the class interval and the	(4)	Class-intervals

Ans : P-3, Q-1, R-4, S-2

(P) Mean = $\frac{2 + 2 + 4 + 5 + 12}{5} = 5$

Mode = 2 (Mean > Mode)

(Q) Mode = 3 median – 2 mean

3 median = mode + 2 mean

3. Match the following :

	Column-I		Column-II
(P)	The class marks of the class interval 145-150 is	(1)	13
(Q)	In a frequency distribution, the mid-value of a class is 10 and width of each class is 6. The upper limit of the class is	(2)	110
(R)	The mean of eight numbers is 40. If one number is excluded, their mean becomes 30. The excluded number is	(3)	22.5–27.5
(S)	The class marks of a frequency distribution are 15, 20, 25, 30, The class corresponding to the class mark 25 is	(4)	147.5

Ans : P-4, Q-1, R-2, S-3

(P) Class – Marks = $\frac{145 + 150}{2} = \frac{295}{2}$

= 147.5

(Q) Let the upper limit = x

Lower limit = y

Hence, $x - y = 6$

and $\frac{x + y}{2} = 10$

$x + y = 20$

On solving both the equations, we get $x = 13$ and $y = 7$

(R) Sum of the 8 observation = $40 \times 8 = 320$

Sum of the 7 observation = $30 \times 7 = 210$

Excluded observation is $320 - 210 = 110$

(S) Class - width = $20 - 15 = 5$

Class mark = 25

Hence, Required class = $\left(25 - \frac{5}{2}\right) - \left(25 + \frac{5}{2}\right)$
 $= 22.5 - 27.5$

4. Match the following :

List-I		List-II	
(P)	Mean of first 10 odd prime numbers is	(1)	27.5
(Q)	Mean of first 10 multiples of 5 is	(2)	15.8
(R)	mean of first 9 doublets of natural numbers is	(3)	11
(S)	Mean of first 10 even numbers is	(4)	55

	P	Q	R	S
(a)	1	2	3	4
(b)	1	2	4	3
(c)	2	1	4	3
(d)	2	1	3	4

Ans : (c) P - 2, Q - 1, R - 4, S - 3

(P) First 10 odd prime numbers are 3, 5, 7, 11, 13, 17, 19, 23, 29, 31

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{158}{10} = 15.8$$

(Q) First 10 multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Number of observations}} = \frac{275}{10} = 27.5$$

(R) First 9 doublets of natural numbers are 11, 22, 33, 44, 55, 66, 77, 88, 99

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Numbers of observations}} = \frac{495}{9} = 55$$

(S) First 10 even numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Numbers of observations}} = \frac{110}{10} = 11$$

5. Match the following:

List-I		List-II	
(P)	Data which is collected for the first time by the statistical investigator or with the help of his workers is called	(1)	Secondary data
(Q)	These are the data already collected by a person or a society and these may be in published form. These data should be carefully used.	(2)	Variable
(R)	When the data is compiled in the same form and order in which it is collected, it is known as	(3)	Primary Data
(S)	A quantity which can vary from one individual to another is called	(4)	Raw Data

	P	Q	R	S
(a)	3	1	2	4
(b)	3	1	4	2
(c)	1	3	2	4
(d)	1	3	4	2

Ans : (b) P - 3, Q - 1, R - 4, S - 2

5. ASSERTION AND REASON

DIRECTION : In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as

- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
- (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Assertion is false but reason is true.

1. **Assertion :** If the mean of five observations $x, x + 2, x + 4, x + 6, x + 8$ is 11, then mean of last three observations is 8.

Reason : Mean of n observations

$$\frac{\text{Sum of observations}}{\text{Number of observations}}$$

Ans : (d) Assertion is false but reason is true.

$$\text{Mean} = \frac{\text{Sum of observation}}{\text{Numbers of observations}}$$

$$11 = \frac{x + x + 2 + x + 4 + x + 6 + x + 8}{5}$$

$$55 = 5x + 20$$

$$5x = 35 \Rightarrow x = 7$$

Mean of last three observations

$$= \frac{11 + 13 + 15}{3} = \frac{39}{3} = 13$$

- 2. Assertion :** The range of the first 6 multiples of 6 is 9.
Reason : Range = Maximum value – Minimum value
Ans : (d) Assertion is false but reason is true.

First 6 multiples of 6 = 6, 12, 18, 24, 30, 36
 Range = 36 – 6 = 30

- 3. Assertion :** The median of 83, 37, 70, 29, 45, 63, 41, 70, 34, 54, is 49.5.
Reason : The median of n odd number of observations is $\left(\frac{n+1}{2}\right)^{\text{th}}$ term.
Ans : (b) Both assertion and reason are true but reason is not the correct explanation of assertion.

29, 34, 37, 41, 45, 54, 63, 70, 70, 83
 Number of terms = 10 (even)
 For even number of observation we have

$$\begin{aligned} \text{Median} &= \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{term}}{2} \\ &= \frac{5^{\text{th}} \text{term} + 6^{\text{th}} \text{term}}{2} \\ &= \frac{45 + 54}{2} = \frac{99}{2} = 49.5 \end{aligned}$$

- 4. Assertion :** The median of the following observation 0, 1, 2, 3, x , $x + 2$, 8, 9, 11, 12 arranged in ascending order is 63, then the value of x is 62.
Reason : Median of n even observations is

$$\frac{\left(\frac{n}{2}\right)^{\text{th}} \text{term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{term}}{2}$$

Ans : (a) Both assertion and reason are true and reason is the correct explanation of assertion.

Number of terms = 10 (even)

$$\begin{aligned} \text{Median} &= \frac{\left(\frac{n}{2}\right)^{\text{th}} \text{term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{term}}{2} \\ &= \frac{5^{\text{th}} \text{term} + 6^{\text{th}} \text{term}}{2} \\ &= \frac{x + x + 2}{2} = 63 \end{aligned}$$

$$\begin{aligned} 2x + 2 &= 126 \\ x &= 62 \end{aligned}$$

- 5. Assertion :** The following is the data of wages per day: 8, 4, 7, 5, 8, 8, 5, 7, 9, 5, 7, 9, 10, 8, then the mode of the data is 8.
Reason : Mode = Highest observation – lowest observation.

Ans : (c) Assertion is true but reason is false.
 8 is the most frequent value.

- 6. Assertion :** Mode of the given data 110, 120, 130, 120, 110, 140, 130, 120, 140, 120, is 120.
Reason : The observation that occurs most frequently, i.e., the observation with maximum frequency is called mode.
Ans : (a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
 Since the value 120 occurs maximum number of times.

- 7. Assertion :** Median of the given data 34, 31, 42, 43, 46, 25, 39, 45, 32, is 39.
Reason : When the number of observations (n) is even, the median is the mean of the $\left(\frac{n}{2}\right)^{\text{th}}$ and $\left(\frac{n}{2} + 1\right)^{\text{th}}$ observations.

Ans : (b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

- 8. Assertion :** The difference between the maximum and minimum values of a variable is called its range.
Reason : The number of times a variate (observation) occurs in a given data is called range.

Ans : (c) Assertion is correct but Reason is incorrect.
 The number of times a variate (observation) occurs in a given data is called frequency of that variate.

- 9. Assertion :** If the median of the given data 26, 29, 42, 53, x , $x + 2$, 70, 75, 82, 93, is 65 then the value of x is 64.

Reason : When the number of observations (n) is odd the median is the value of the $\left(\frac{n+1}{2}\right)^{\text{th}}$ observation.
Ans : (b) Both Assertion and Reason are correct, but Reason is not the correct explanation of Assertion.

Assertion : Given, number of observation is 10 (even)

Hence
$$\text{Median} = \frac{x + (x + 2)}{2}$$

$$65 = \frac{2x + 2}{2} = x + 1$$

$$65 = x + 1$$

$$x = 64$$

- 10. Assertion :** Mean may or may not be the appropriate measure of central tendency.
Reason : If the number of observations are even then median is $\left(\frac{n+1}{2}\right)^{\text{th}}$ term.
Ans : (c) Assertion is correct but Reason is incorrect.
 Assertion is correct and Reason is incorrect.

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