EXERCISE-I

Mean

1. The mean of a set of observation is $\bar{x}$. If each observation is divided by α, $\alpha \neq 0$ and then is increased by 10, then the mean of the new set is

(A) $\frac{\bar{x}}{\alpha}$ (B) $\frac{\bar{x}+10}{\alpha}$

(C) $\frac{\bar{x}+10\alpha}{\alpha}$ (D) $\alpha\bar{x}+10$

2. If the mean of the numbers $27+x$, $31+x$, $89+x$, $107+x, 156+x$ is 82, then the mean of $130+x, 126+x, 68+x, 50+x, 1+x$ is

(A) 75 (B) 157

(C) 82 (D) 80

3. Consider the frequency distribution of the given numbers

Value :	1	2	3	4
Frequency :	5	4	6	f

If the mean is known to be 3, then the value of f is

(A) 3 (B) 7

(C) 10 (D) 14

4. If the arithmetic mean of the numbers $x_1, x_2, x_3, ..., x_n$ is $\bar{x}$, then the arithmetic mean of numbers $ax_1+b, ax_2+b, ax_3+b, ..., ax_n+b$, where a, b are two constants would be

(A) $\bar{x}$ (B) $n a\bar{x}+nb$

(C) $a\bar{x}$ (D) $a\bar{x}+b$

5. The G.M. of the numbers $3, 3^2, 3^3, ..., 3^n$ is

(A) $3^{2/n}$ (B) $3^{(n-1)/2}$

(C) $3^{n/2}$ (D) $3^{(n+1)/2}$

6. The reciprocal of the mean of the reciprocals of n observations is their

(A) A.M. (B) G.M.

(C) H.M. (D) None of these

7. The harmonic mean of 3, 7, 8, 10, 14 is

(A) $\frac{3+7+8+10+14}{5}$

(B) $\frac{1}{3}+\frac{1}{7}+\frac{1}{8}+\frac{1}{10}+\frac{1}{14}$

(C) $\frac{\frac{1}{3}+\frac{1}{7}+\frac{1}{8}+\frac{1}{10}+\frac{1}{14}}{4}$

(D) $\frac{5}{\frac{1}{3}+\frac{1}{7}+\frac{1}{8}+\frac{1}{10}+\frac{1}{14}}$

8. If the algebraic sum of deviations of 20 observations from 30 is 20, then the mean of observations is

(A) 30 (B) 30.1

(C) 29 (D) 31

9. The weighted mean of first n natural numbers whose weights are equal to the squares of corresponding numbers is

(A) $\frac{n+1}{2}$ (B) $\frac{3n(n+1)}{2(2n+1)}$

(C) $\frac{(n+1)(2n+1)}{6}$ (D) $\frac{n(n+1)}{2}$

10. If the values $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, ..., \frac{1}{n}$ occur at frequencies 1, 2, 3, 4, 5, ….,n in a distribution, then the mean is

(A) 1 (B) n

(C) $\frac{1}{n}$ (D) $\frac{2}{n+1}$

11. The number of observations in a group is 40. If the average of first 10 is 4.5 and that of the remaining 30 is 3.5, then the average of the whole group is

(A) $\frac{1}{5}$ (B) $\frac{15}{4}$

(C) 4 (D) 8

12. A student obtain 75%, 80% and 85% in three subjects. If the marks of another subject are added, then his average cannot be less than

(A) 60% (B) 65%

(C) 80% (D) 90%

13. The mean age of a combined group of men and women is 30 years. If the means of the age of men and women are respectively 32 and 27, then the percentage of women in the group is

(A) 30 (B) 40

(C) 50 (D) 60

14. The A.M. of a 50 set of numbers is 38. If two numbers of the set, namely 55 and 45 are discarded, the A.M. of the remaining set of numbers is

(A) 38.5 (B) 37.5

(C) 36.5 (D) 36

15. An automobile driver travels from plane to a hill station 120 *km* distant at an average speed of 30 *km per hour*. He then makes the return trip at an average speed of 25 *km* per hour. He covers another 120 *km* distance on plane at an average speed of 50 *km per hour*. His average speed over the entire distance of 360 *km* will be

(A) $\frac{30+25+50}{3}$ *km/hr*

(B) $(30,25,50)^{\frac{1}{3}}$

(C) $\frac{3}{\frac{1}{30}+\frac{1}{25}+\frac{1}{50}}$ *km/hr*

(D) None of these

16. The average weight of students in a class of 35 students is 40 *kg*. If the weight of the teacher be included, the average rises by $\frac{1}{2}$ *kg*; the weight of the teacher is

(A) 40.5 *kg* (B) 50 *kg*

(C) 41 *kg* (D) 58 *kg*

17. If $\bar{x}_1$ and $\bar{x}_2$ are the means of two distributions such that $\bar{x}_1 < \bar{x}_2$ and $\bar{x}$ is the mean of the combined distribution, then

(A) $\bar{x} < \bar{x}_1$ (B) $\bar{x} > \bar{x}_2$

(C) $\bar{X} = \frac{\bar{X}_1 + \bar{X}_2}{2}$ (D) $\bar{x}_1 < \bar{x} < \bar{x}_2$

18. The A.M. of n observations is M. If the sum of $n-4$ observations is a, then the mean of remaining 4 observations is

(A) $\frac{nM-a}{4}$ (B) $\frac{nM+a}{2}$

(C) $\frac{nM-A}{2}$ (D) $nM+a$

19. If the mean of the distribution is 2.6, then the value of y is

Variate x	1	2	3	4	5
Frequency f of x	4	5	y	1	2

(A) 24 (B) 13

(C) 8 (D) 3

20. In a class of 100 students there are 70 boys whose average marks in a subject are 75. If the average marks of the complete class are 72, then what are the average marks of the girls

(A) 73 (B) 65

(C) 68 (D) 74

21. If the mean of the set of numbers $x_1, x_2, x_3, ..., x_n$ is $\bar{x}$, then the mean of the numbers $x_i + 2i$, $1 \le i \le n$ is

(A) $\bar{x} + 2n$ (B) $\bar{x} + n + 1$

(C) $\bar{x} + 2$ (D) $\bar{x} + n$

22. The harmonic mean of 4, 8, 16 is

(A) 6.4 (B) 6.7

(C) 6.85 (D) 7.8

23. Mean of 100 items is 49. It was discovered that three items which should have been 60, 70, 80 were wrongly read as 40, 20, 50 respectively. The correct mean is

(A) 48 (B) $82\frac{1}{2}$

(C) 50 (D) 80

24. A school has four sections of chemistry in class XII having 40, 35, 45 and 42 students. The mean marks obtained in chemistry test are 50, 60, 55 and 45 respectively for the four sections, the over all average of marks per students is

(A) 53 (B) 45

(C) 55.3 (D) 52. 25

25. The mean of 5 numbers is 18. If one number is excluded, their mean becomes 16. Then the excluded number is

(A) 18 (B) 25

(C) 26 (D) 30

26. The mean weight per student in a group of seven students is 55 *kg* If the individual weights of 6 students are 52, 58, 55, 53, 56 and 54; then weights of the seventh student is

(A) 55*kg* (B) 60*kg*

(C) 57*kg* (D) 50*kg*

Median and Mode

27. For a frequency distribution 7th decile is computed by the formula

(A) $D_7 = l + \frac{\left(\frac{N}{7} - C\right)}{f} \times i$

(B) $D_7 = l + \frac{\left(\frac{N}{10} - C\right)}{f} \times i$

(C) $D_7 = l + \frac{\left(\frac{7N}{10} - C\right)}{f} \times i$

(D) $D_7 = l + \frac{\left(\frac{10N}{7} - C\right)}{f} \times i$

28. Which of the following, in case of a discrete data, is not equal to the median

(A) 50th percentile (B) 5th decile

(C) 2nd quartile (D) Lower quartile

29. The median of 10, 14, 11, 9, 8, 12, 6 is

(A) 10 (B) 12

(C) 14 (D) 11

30. The relation between the median *M*, the second quartile Q_2, the fifth decile D_5 and the 50^{th} percentile P_{50}, of a set of observations is

(A) $M = Q_2 = D_5 = P_{50}$

(B) $M < Q_2 < D_5 < P_{50}$

(C) $M > Q_2 > D_5 > P_{50}$

(D) None of these

31. For a symmetrical distribution $Q_1 = 25$ and $Q_3 = 45$, the median is

(A) 20 (B) 25

(C) 35 (D) None of these

32. If a variable takes the discrete values $\alpha-4,\alpha-\frac{7}{2},\alpha-\frac{5}{2},\alpha-3,\alpha-2,$ $\alpha+\frac{1}{2},\alpha-\frac{1}{2},\alpha+5(\alpha>0)$, then the median is

(A) $\alpha-\frac{5}{4}$ (B) $\alpha-\frac{1}{2}$

(C) $\alpha-2$ (D) $\alpha+\frac{5}{4}$

33. The upper quartile for the following distribution

Size of items	1	2	3	4	5	6	7
Frequency	2	4	5	8	7	3	2

is given by the size of

(A) $\left(\frac{31+1}{4}\right)$th item

(B) $\left[2\left(\frac{31+1}{4}\right)\right]$th item

(C) $\left[3\left(\frac{31+1}{4}\right)\right]$th item

(D) $\left[4\left(\frac{31+1}{4}\right)\right]$th item

34. The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observation of the set is increased by 2, then the median of the new set

(A) Is increased by 2

(B) Is decreased by 2

(C) Is two times the original median

(D) Remains the same as that of the original set

35. For a continuous series the mode is computed by the formula

(A) $1+\frac{f_{m-1}}{f_m-f_{m-1}-f_{m+1}}\times C$ or

$1+\left(\frac{f_1}{f_m-f_1-f_2}\right)\times i$

(B) $1=\frac{f_m-f_{m-1}}{f_m-f_{m-1}-f_{m+1}}\times C$ or

$1+\frac{f_m-f_1}{f_m-f_1-f_2}\times i$

(C) $1+\frac{f_m-f_{m-1}}{2f_m-f_{m-1}-f_{m+1}}\times C$ or

$1+\frac{f_m-f_1}{2f_m-f_1-f_2}\times i$

(D) $1+\frac{2f_m-f_{m-1}}{f_m-f_{m-1}-f_{m+1}}\times C$ or

$1+\frac{2f_m-f_1}{f_m-f_1-f_2}\times i$

36. A set of numbers consists of three 4's, five 5's, six 6's, eight 8's and seven 10's. The mode of this set of numbers is

(A) 6 (B) 7

(C) 8 (D) 10

37. The mode of the following items is 0, 1, 6, 7, 2, 3, 7, 6, 6, 2, 6, 0, 5, 6, 0

(A) 0 (B) 5

(C) 6 (D) 2

38. The mode of the distribution

Marks	4	5	6	7	8
No. of students	6	7	10	8	3

(A) 5 (B) 6

(C) 8 (D) 10

Relation between mean, median and mode, Pie diagram

39. If in a moderately asymmetrical distribution mode and mean of the data are 6λ and 9λ respectively, then median is

(A) 8λ (B) 7λ

(C) 6λ (D) 5λ

40. Which of the following is not a measure of central tendency

(A) Mean (B) Median

(C) Mode (D) Range

41. The most stable measure of central tendency is

(A) Mean (B) Median

(C) Mode (D) None of these

42. Which of the following average is most affected of extreme observations

(A) Mode (B) Median

(C) Arithmetic mean (D) Geometric mean

43. The following data was collected from the newspaper : (percentage distribution)

Country	Agriculture	Industry	Services	Others
India	45	19	28	8
U.K.	3	40	44	13
Japan	6	48	43	3
U.S.A.	3	35	61	1

It is an example of

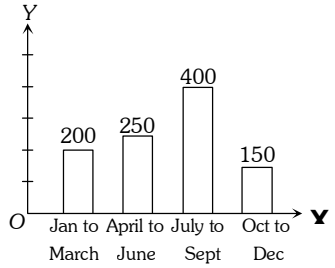
(A) Data given in text form

(B) Data given in diagrammatic form

(C) Primary data

(D) Secondary data

44. The mortality in a town during 4 quarters of a year due to various causes is given below : Based on this data, the percentage increase in mortality in the third quarter is



(A) 40 (B) 50

(C) 60 (D) 75

45. A market with 3900 operating firms has the following distribution for firms arranged according to various income groups of workers

Income group	No. of firms
150-300	300
300-500	500
500-800	900
800-1200	1000
1200-1800	1200

If a histogram for the above distribution is constructed the highest bar in the histogram would correspond to the class

(A) 500-800 (B) 1200-1800

(C) 800-1200 (D) 150-300

46. The total expenditure incurred by an industry under different heads is best presented as a

(A) Bar diagram

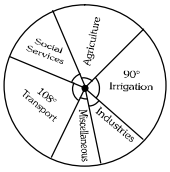
(B) Pie diagram

(C) Histogram

(D) Frequency polygon

47. The expenditure of a family for a certain month were as follows :
Food – Rs.560, Rent – Rs.420,
Clothes – Rs.180, Education – Rs.160, Other items – Rs.120
A pie graph representing this data would show the expenditure for clothes by a sector whose angle equals
(A) 180° (B) 90°
(C) 45° (D) 64°

48. Section-wise expenditure of a State Govt. is shown in the given figure. The expenditure incurred on transport is



(A) 25% (B) 30%
(C) 32% (D) 35%

Measures of dispersion

49. The variance of the data 2, 4, 6, 8, 10 is
(A) 6 (B) 7
(C) 8 (D) None of these

50. The mean deviation of the numbers 3, 4, 5, 6, 7 is
(A) 0 (B) 1.2
(C) 5 (D) 25

51. If the standard deviation of 0, 1, 2, 3, …..,9 is K, then the standard deviation of 10, 11, 12, 13 …..19 is
(A) K (B) $K + 10$
(C) $K + \sqrt{10}$ (D) $10K$

52. For a normal distribution if the mean is M, mode is M_0 and median is M_d, then
(A) $M > M_d > M_0$ (B) $M < M_d < M_0$
(C) $M = M_d M_0$ (D) $M = M_d = M_0$

53. For a frequency distribution mean deviation from mean is computed by
(A) $\text{M.D.} = \frac{\Sigma d}{\Sigma f}$ (B) $\text{M.D.} = \frac{\Sigma fd}{\Sigma f}$
(C) $\text{M.D.} = \frac{\Sigma f|d|}{\Sigma f}$ (D) $\text{M.D.} = \frac{\Sigma f}{\Sigma f|d|}$

54. Quartile deviation for a frequency distribution is
(A) $Q = Q_3 - Q_1$ (B) $Q = \frac{1}{2}(Q_3 - Q_1)$
(C) $Q = \frac{1}{3}(Q_3 - Q_1)$ (D) $Q = \frac{1}{4}(Q_2 - Q_1)$

55. The variance of the first n natural numbers is
(A) $\frac{n^2 - 1}{12}$ (B) $\frac{n^2 - 1}{6}$
(C) $\frac{n^2 + 1}{6}$ (D) $\frac{n^2 + 1}{12}$

56. For a moderately skewed distribution, quartile deviation and the standard deviation are related by
(A) $\text{S.D.} = \frac{2}{3}\text{Q.D.}$ (B) $\text{S.D.} = \frac{3}{2}\text{Q.D.}$
(C) $\text{S.D.} = \frac{3}{4}\text{Q.D.}$ (D) $\text{S.D.} = \frac{4}{3}\text{Q.D.}$

57. For a frequency distribution standard deviation is computed by applying the formula
(A) $\sigma = \sqrt{\left(\frac{\Sigma fd}{\Sigma f}\right) - \frac{\Sigma fd^2}{\Sigma f}}$
(B) $\sigma = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd^2}{\Sigma f}\right)^2}$
(C) $\sigma = \sqrt{\left(\frac{\Sigma fd}{\Sigma f}\right)^2 - \frac{\Sigma fd^2}{\Sigma f}}$
(D) $\sigma = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2}$

58. For a frequency distribution, standard deviation is computed by

(A) $\sigma = \frac{\sum f(x - \bar{x})}{\sum f}$

(B) $\sigma = \frac{\sqrt{\sum f(x - \bar{x})^2}}{\sum f}$

(C) $\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}}$

(D) $\sigma = \sqrt{\frac{\sum f(x - \bar{x})}{\sum f}}$

59. If Q.D. is 16, the most likely value of S.D. will be

(A) 24 (B) 42

(C) 10 (D) None of these

60. If M.D. is 12, the value of S.D. will be

(A) 15 (B) 12

(C) 24 (D) None of these

61. The range of following set of observations 2, 3, 5, 9, 8, 7, 6, 5, 7, 4, 3 is

(A) 11 (B) 7

(C) 5.5 (D) 6

62. If v is the variance and σ is the standard deviation, then

(A) $v^2 = \sigma$ (B) $v = \sigma^2$

(C) $v = \frac{1}{\sigma}$ (D) $v = \frac{1}{\sigma^2}$

63. If each observation of a raw data whose variance is σ^2, is multiplied by λ, then the variance of the new set is

(A) σ^2 (B) $\lambda^2\sigma^2$

(C) $\lambda + \sigma^2$ (D) $\lambda^2 + \sigma^2$

64. For a given distribution of marks mean is 35.16 and its standard deviation is 19.76. The co-efficient of variation is

(A) $\frac{35.16}{19.76}$ (B) $\frac{19.76}{35.16}$

(C) $\frac{35.16}{19.76} \times 100$ (D) $\frac{19.76}{35.16} \times 100$

65. If 25% of the item are less than 20 and 25% are more than 40, the quartile deviation is

(A) 20 (B) 30

(C) 40 (D) 10

66. For a normal curve, the greatest ordinate is

(A) $2\pi\sigma$ (B) $\sigma\sqrt{2\pi}$

(C) $\frac{1}{\sqrt{2\pi\sigma}}$ (D) $\frac{1}{\sigma\sqrt{2\pi}}$

67. If the variance of observations $x_1, x_2, ...x_n$ is σ^2, then the variance of $ax_1, ax_2 ....., ax_n$, $\alpha \neq 0$ is

(A) σ^2 (B) $a\sigma^2$

(C) $a^2\sigma^2$ (D) $\frac{\sigma^2}{a^2}$

68. The mean deviation from the mean for the set of observations –1, 0, 4 is

(A) $\sqrt{\frac{14}{3}}$ (B) 2

(C) $\frac{2}{3}$ (D) None of these

69. The mean and S.D. of 1, 2, 3, 4, 5, 6 is

(A) $\frac{7}{2}, \sqrt{\frac{35}{12}}$ (B) 3, 3

(C) $\frac{7}{2}, \sqrt{3}$ (D) $3, \frac{35}{12}$

70. The standard deviation of 25 numbers is 40. If each of the numbers is increased by 5, then the new standard deviation will be

(A) 40 (B) 45

(C) $40 + \frac{21}{25}$ (D) None of these

71. The S.D of 15 items is 6 and if each item is decreased or increased by 1, then standard deviation will be

(A) 5 (B) 7

(C) 91/15 (D) 6

72. The quartile deviation for the following data is

x :	2	3	4	5	6
f :	3	4	8	4	1

(A) 0 (B) $\frac{1}{4}$

(C) $\frac{1}{2}$ (D) 1

73. The sum of squares of deviations for 10 observations taken from mean 50 is 250. The co-efficient of variation is

(A) 50% (B) 10%

(C) 40% (D) None of these

74. The means of five observations is 4 and their variance is 5.2. If three of these observations are 1, 2 and 6, then the other two are

(A) 2 and 9 (B) 3 and 8

(C) 4 and 7 (D) 5 and 6

75. Consider any set of observations $x_1, x_2, .x_3, ..., x_{101}$; it being given that $x_1 < x_2 < x_3 < .... < x_{100} < x_{101}$; then the mean deviation of this set of observations about a point k is minimum when k equals

(A) x_1 (B) x_{51}

(C) $\frac{x_1 + x_2 + ... + x_{101}}{101}$ (D) x_{50}

76. For $(2n+1)$ observations $x_1, -x_1$, $x_2, -x_2, ...x_n, -x_n$ and 0 where x's are all distinct. Let S.D. and M.D. denote the standard deviation and median respectively. Then which of the following is always true

(A) S.D. < M.D.

(B) S.D. > M.D.

(C) S.D. = M.D.

(D) Nothing can be said in general about the relationship of S.D. and M.D.

77. Suppose values taken by a variable x are such that $a \le x_i \le b$, where x_i denotes the value of x in the i^{th} case for $i = 1, 2, n$. Then

(A) $a \le \text{Var}(x) \le b$ (B) $a^2 \le \text{Var}(x) \le b^2$

(C) $\frac{a^2}{4} \le \text{Var}(x)$ (D) $(b-a)^2 \ge \text{Var}(x)$

78. The variance of α, β and γ is 9, then variance of 5α, 5β and 5γ is

(A) 45 (B) 9/5

(C) 5/9 (D) 225

79. A batsman scores runs in 10 innings 38, 70, 48, 34, 42, 55, 63, 46, 54, 44, then the mean deviation is

(A) 8.6 (B) 6.4

(C) 10.6 (D) 9.6

80. What is the standard deviation of the following series

Measurements	0-10	10-20	20-30	30-40
Frequency	1	3	4	2

(A) 81 (B) 7.6

(C) 9 (D) 2.26