# EXERCISE LEVEL –I

**Q.1** Among the given sets, the set with the greatest range is:
(a) 17, 32, 24, 18, 35                                    (b) 19, 25, 34, 36, 27
(c) 22, 15, 8, 19, 16                                     (d) 11, 24, 13, 9, 17

**Q.2** If the range of two data sets, a, 5, 9 and 4, 7, b, is 8, determine the range of the data set a, 4, 5, 7, 9, b, where a is its minimum value and b is its maximum value.
(a) 25                     (b) 13                     (c) 22                     (d) 11

**Q.3** If the minimum passing score for a test is 50 marks and a data set of scores for 5 students who passed the exam is 55, 80, m, 66, 79, what is the value of m if the range of the provided data is 31?
(a) 49                     (b) 91                     (c) 52                     (d) 86

**Q.4** If the range of the data set containing the values 9, 18, 4, 20, and x is 17, what are the potential values for x?
(a) 3 or 21                (b) 7 or 23                (c) $-2$ or 26             (d) 3 or 13

**Q.5** The range of the set comprising the values 35, 22, 10, 12, 17, and 32 is:
(a) 23                     (b) 25                     (c) 10                     (d) 35


**Q.6** The mean deviation of the numbers 11, 12, 13, 14, 15 with respect to their mean is
(a) 1                      (b) 1.2                    (c) 1.5                    (d) 2

**Q.7** The mean deviation for 'n' observations, denoted as $x_1, x_2, \ldots, x_n$, from their mean, $\bar{x}$, is calculated as
(a) $\sum_{i=1}^{n}(x_i - \bar{x})$                      (b) $\frac{1}{n}\sum_{i=1}^{n}|x_i - \bar{x}|$
(c) $\sum_{i=1}^{n}(x_i - \bar{x})^2$                    (d) $\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2$

**Q.8** The mean deviation around the mean for the given data is:

| $x_1$ | 20 | 22 | 25 | 27 |
|---|---|---|---|---|
| $f_1$ | 3 | 8 | 6 | 3 |

(a) 4.283                  (b) 3.463                  (c) 5.762                  (d) 2.085

**Q.9** The mean deviation around the mean for the given data is:

| Class | 100–120 | 120–140 | 140–160 | 160–180 | 180–200 |
|---|---|---|---|---|---|
| Frequency | 2 | 1 | 3 | 2 | 2 |

(a) 25                     (b) 22.4                   (c) 31.5                   (d) 41

**Q.10** The mean of five observations, 1, 2, 6, x, and y, is 4.4. Therefore, the sum of x and y is.
(a) 4                      (b) 9                      (c) 15                     (d) 13

**Q.11** The variance for the given data is: 6,7,8,12,13,15
(a) 12.05                  (b) 11.14                  (c) 14.08                  (d) 12.15

**Q.12** Consider observations a, b, c, d, and e with a mean of m and a standard deviation of s. If k is a positive value, the standard deviation of the observations $a + k, b + k, c + k, d + k, e + k$ is $(k > 0)$ is:
(a) $m + k$                (b) $s + k$                (c) s                      (d) ks

**Q.13** Consider "n" observations denoted as $x_1, x_2, \ldots, x_n$, with their arithmetic mean $\bar{x}$. The formula for the standard deviation is expressed as:
(a) $\sum(x_i - \bar{x})^2$     (b) $\frac{\sum(x_i-\bar{x})^2}{n}$     (c) $\sqrt{\frac{\sum(x_i-\bar{x})^2}{n}}$     (d) $\sqrt{\frac{\sum x_i^2}{n} + \bar{x}^2}$

**Q.14** The sum of the squares of all 100 observations, given that their mean is 50 and standard deviation is 5, is:

(a) 5000000        (b) 250000        (c) 252500        (d) 255000

**Q.15** Consider observations $x_1, x_2, x_3, x_4, x_5$ with a mean of m and standard deviation of s. The standard deviation of the observations $kx_1, kx_2, kx_3, kx_4, kx_5$ is:

(a) $k + s$        (b) $\frac{s}{k}$        (c) $ks$        (d) s

**Q.16** The standard deviation of the first 10 natural numbers is:

(a) 2.87        (b) 3.25        (c) 6.35        (d) 5.5

**Q.17** The standard deviation for the data set 2, 4, 5, 6, 8, 17 is 23.33. Consequently, the standard deviation for the data set 4, 8, 10, 12, 16, 34 will be:

(a) 23.23        (b) 25.23        (c) 46.66        (d) 48.66

**Q.18** Given that the standard deviation of the numbers 2, 3, 2x, and 11 is 3.5, determine the potential values for x.

(a) 2        (b) 5        (c) 3        (d) 4

**Q.19** If the standard deviation of temperature data in degrees °C is 5, converting the data to °F with the given relationship [ given $C = \frac{5}{9}$ (F would result in a variance of.

(a) 81        (b) 57        (c) 36        (d) 25

**Q.20** If $n = 10, \bar{x} = 12$ and $\sum x_i^2 = 1530$ then co-efficient of variation is

(a) 36%        (b) 41%        (c) 25%        (d) 38%

**Q.21** The mean and standard deviation of 50 observation are 50 and 10.later on its was decide to omit an observation which was incorrect by recorded as 99. Then the standard deviation of the remaining 49 observation are.

(a) 7        (b) 7.21        (c) 6.5        (d) 8

**Q.22** Coefficient of variation of two distribution are 15 and 20 and their measure are 20 and 10 respectively. If their standard deviation are $\sigma_1$ and $\sigma_2$ then

(a) $3\sigma_1 = 2\sigma_2$        (b) $\sigma_1 < \sigma_2$        (c) $2\sigma_1 = 3\sigma_2$        (d) $\sigma_1 = 10\sigma_2$

**Q.23** The deviation from the median's mean is.

(a) Equal to that measured from any another value

(b) Maximum if all observations are positive

(c) Greater than that measured from any other value

(d) Less than that measured from any other observation

**Q.24** When tested, the lines (in hours) of 5 bulbs were noted as follows:

1357, 1090, 1666, 1494, 1623

(a) 178        (b) 179        (c) 220        (d) 356

**Q.25** The mean deviation about the median for the following data is: 7,5,4,3,4,3,2,11,19,21,15

(a) 5.04        (b) 5.18        (c) 6.02        (d) 4.32

**Q.26** Following are the marks obtained by 9 student in a mathematics test 50,69,20,33,53,39,40,6559 the mean deviation from the median is.

(a) 9        (b) 10.5        (c) 12.67        (d) 14.76

**Q.27** The mean deviation around the median for the given data is:

| $x_1$ | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------|---|---|---|---|---|---|---|
| $f_1$ | 4 | 3 | 2 | 1 | 4 | 5 | 1 |

(a) 2.6        (b) 1.85        (c) 3.26        (d) 2.31

**Q.28** The mean deviation around the median for the given data is:

| Class | 0–10 | 10–20 | 20–30 | 30–40 | 40–50 |
|-------|------|-------|-------|-------|-------|
| Frequency | 2 | 1 | 3 | 2 | 2 |

(a) 11.12        (b) 15.06        (c) 19.6        (d) 13.52

**Q.29** The mean of seven observations is 11. If six of the observations are 2, 6, 8, 10, 12, 18, then the value of the remaining observation is.

(a) 18          (b) 21          (c) 14          (d) 16

**Q.30** The median for the data set 10, 21, 5, 6, 4, 12, 14, 3, is.

(a) 16          (b) 8          (c) 4          (d) 10

**Q.31** If $\sum_{i=1}^{10} x_i = 60$ and $\sum_{i=1}^{10} x_i^2 = 360$ then $\sum_{i=1}^{10} x_i^3$ is

(a) 2160          (b) 3250          (c) 3360          (d) 3160

**Q.32** If the variance of a dataset is 361, then the standard deviation of the data is.

(a) 16          (b) 18          (c) 17          (d) 19

**Q.33** The standard deviation of the data 6,5,9,13,12, 8,10 is

(a) $\sqrt{\dfrac{52}{7}}$          (b) $\sqrt{6}$          (c) $\dfrac{52}{7}$          (d) 6

**Q.34** Take the initial 10 positive integers. If we multiply each number by -1 and then add 1 to each result, the variance of the obtained numbers is.

(a) 8.25          (b) 3.62          (c) 2.25          (d) 3.15

**Q.35** The following relates to a sample of size 60: $\sum x^2 = 18000, \sum x = 960$. The various is.

(a) 6.63          (b) 16          (c) 22          (d) 44

**Q.36** The variance of a set of 20 observations is 5. If each observation is multiplied by 2, then the variance of the resulting observations is.

(a) 10          (b) 20          (c) 25          (d) 12.5

**Q.37** If the standard deviation of a variable X is o, then the standard deviation of variable $\dfrac{aX+b}{c}$ is

(a) $a\sigma$          (b) $\dfrac{a}{c}\sigma$          (c) $\dfrac{c}{a}\sigma$          (d) $\dfrac{a\sigma+b}{c}$

**Q.38** If v represents the variance and o represents the standard deviation, then.

(a) $v = \dfrac{1}{\sigma^2}$          (b) $v = \dfrac{1}{\sigma}$          (c) $v = \sigma^2$          (d) $v^2 = \sigma$

**Q.39** If the standard deviation (S.D.) of a set of observations is 8, and each observation is divided by 2, the standard deviation of the new set of observations will be.

(a) 4          (b) 8          (c) –4          (d) –8

**Q.40** The coefficient of variation for two distributions is 50 and 60, with arithmetic means of 30 and 25, respectively. The difference between their standard deviations is.

(a) 2.5          (b) 1          (c) 1.5          (d) 0

**Q.41** The mean and variance of a set of six observations are 5 and 7, respectively. Given that four of the observations are 1, 3, 4, and 6, find the values of the remaining two observations.

(a) 8 and 6          (b) 9 and 4          (c) 7 and 9          (d) 8 and 9

**Q.42.** The coefficient of variation for two distributions is 25 and 30, and their standard deviations are 480 and 630, respectively. The sum of their arithmetic means is.

(a) 3080          (b) 4020          (c) 4680          (d) 5650

**Q.43** If the coefficient of variation for two distributions is 60% and 75%, and their standard deviations are 45 and 40, respectively, then the ratio of their arithmetic means is.

(a) 45: 32          (b) 9: 10          (c) 7:8          (d) 7: 10

**Q.44** If two distributions share identical means, then.

(a) The distribution with lesser S.D. is more consistent

(b) The distribution with lesser S.D. is less consistent

(c) Their C.V.'s will also be equal          (d) Their S.D.'s will also be equal

**Q.45** Given $\sum_{i=1}^{20} a_i = 100$, $\sum_{i=1}^{20} a_i^2 = 600$, $\sum_{i=1}^{20} b_i = 140$, $\sum_{i=1}^{20} b_i^2 = 1000$ where $a_i, b_i$ denote length and weight of an observation respectively. Then which is more varying?

(a) Length          (b) Weight

(c) Both have equal C.V.          (d) None of these

**Q.46** Mohan erroneously recorded 10 instead of 8 for one observation while calculating the mean of 50 observations, resulting in a calculated mean of 4.04. The correct mean is.

(a) 4.08          (b) 3.95          (c) 4.01          (d) 4

# EXERCISE LEVEL –II

**EL–II**

**Q.1** Determine the mean deviation from the mean for the given data.

13,17,16,14,11,13,10,16,11,18,12,17

**Q.2** Calculate the mean deviation from the mean for the provided data.

| $x_i$ | 5 | 7 | 9 | 10 | 12 | 15 |
|-------|---|---|---|----|----|----|
| $f_i$ | 8 | 6 | 2 | 2  | 2  | 6  |

**Q.3** Determine the mean deviation from the mean for the given dataset.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
|-------|------|-------|-------|-------|-------|-------|
| No. of Girls | 6 | 8 | 14 | 16 | 4 | 2 |

**Q4** Calculate the mean deviation from the median for the given data.

38, 70, 48, 34, 63, 42, 55, 44, 53, 47

**Q.5** Determine the mean deviation from the median for the provided data.

| Income Per Day | No. of Person |
|----------------|---------------|
| 0 - 100 | 4 |
| 100 - 200 | 8 |
| 200 - 300 | 9 |
| 300 – 400 | 10 |
| 400 – 500 | 7 |
| 500 – 600 | 5 |
| 600 - 700 | 4 |

**Q.6** The measurements (in centimeters) of 10 rods in a store are as follows:

42.2, 52.3, 55.2, 72.9, 52.8,79.0, 32.5, 15.2, 27.9, 30.2

**1.**    Find M.D. (Med)                              **2.**    Find M.D. (Mean)

**Q.7** Determine the variance and standard deviation for the given data:

**1.**    65, 58, 68, 44, 48, 45, 60, 62, 60, 50.

**2.**    48, 80, 58, 44, 52, 65, 73, 56, 64, 54

**3.**    28, 60, 38, 24, 32, 45, 53, 36, 44, 34.

**Q.8** A set of 25 variates has a mean of 40 and a standard deviation of 5, while a second set of 35 variates has a mean of 45 and a standard deviation of 2. Calculate the combined mean and standard deviation for the two sets of variates taken together.

**Q.9** Compute the standard deviation for the given distribution:

| Class-Interval | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 3 | 1 | 1 | 8 | 17 | 38 | 9 | 3 |

**Q.10** In a patient study, the following data is collected. Determine the arithmetic mean and the standard deviation of the data:

| Age (in years) | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|
| No. of cases | 1 | 0 | 1 | 10 | 17 | 38 | 9 | 3 |

**Q.11**   Compute the mean and variance for the given distribution:

| Classes | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 |
|---------|-----|------|-------|-------|-------|-------|-------|-------|-------|
| Frequency | 20 | 24 | 32 | 28 | 20 | 11 | 26 | 15 | 24 |

**Q.12**   The coefficient of variation for two distributions is 60 and 70, and their respective standard deviations are 21 and 16. Determine their arithmetic means.

**Q.13**   Compute the coefficient of variation for the given data.

| Income (Rs.) | 1000.-1700 | 1700-2400 | 2400-3100 | 3100-3800 | 3800-4500 | 4500-5200 |
|--------------|------------|-----------|-----------|-----------|-----------|-----------|
| No. of families | 12 | 18 | 20 | 25 | 35 | 10 |

**Q.14**   Based on the share prices of X and Y provided below, determine which one exhibits greater stability in value:

| X | 35 | 54 | 52 | 53 | 56 | 58 | 52 | 50 | 51 | 49 |
|---|----|----|----|----|----|----|----|----|----|----|
| Y | 108 | 107 | 105 | 105 | 106 | 107 | 104 | 103 | 104 | 101 |

**Q.15**   Determine the mean deviation about the mean for the given data: 7, 4, 19, 36, 24, 28, 6, 2, 19, 11

**Q.16**   Calculate the mean deviation about the median for the provided data: 1, 4, 8, 15, 12, 36, 5, 14

**Q.17**   Find the mean deviation about the median for the following data set: 12, 10, 8, 9, 24, 21, 6, 33, 15

**Q.18**   Find the mean deviation about the mean for the following dataset: [data not provided]

| $x_1$ | 11 | 12 | 13 | 14 | 15 | 16 |
|-------|----|----|----|----|----|----|
| $f_1$ | 6 | 8 | 12 | 8 | 16 | 10 |

**Q.19**   Calculate the mean deviation about the median for the given data.

| $x_1$ | 3 | 4 | 5 | 6 | 7 |
|-------|---|---|---|---|---|
| $f_1$ | 2 | 4 | 6 | 8 | 5 |

**Q.20**   Determine the mean deviation about the median for the provided dataset.

| $x_1$ | 4 | 6 | 7 | 12 | 15 | 16 | 20 | 22 |
|-------|---|---|---|----|----|----|----|----|
| $f_1$ | 2 | 3 | 4 | 6 | 3 | 5 | 4 | 3 |

**Q.21**   Calculate the mean deviation about the mean for the given dataset.

| Marks obtained | 10–20 | 20–30 | 30–40 | 40–50 | 50-60 |
|----------------|-------|-------|-------|-------|-------|
| No. of Student | 4 | 5 | 6 | 3 | 2 |

**Q.22**   Calculate the mean deviation using the step-deviation method:

| Class | 0–5 | 5–10 | 10–15 | 15–20 | 20–25 |
|-------|-----|------|-------|-------|-------|
| Frequency | 3 | 1 | 3 | 1 | 2 |

**Q.23**   Determine the mean deviation about the median for the given dataset.

| Height (in cm) | 70–75 | 75–80 | 80–85 | 85–90 | 90–38 |
|----------------|-------|-------|-------|-------|-------|
| No. Of Boys | 9 | 6 | 13 | 8 | 4 |

**Q.24**   Calculate the variance and standard deviation for the following set of numbers:
15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29.

**Q.25**   Determine the variance and standard deviation for the given dataset.

| $x_1$ | 4 | 8 | 11 | 17 | 20 | 24 | 32 |
|-------|---|---|----|----|----|----|----|
| $f_1$ | 3 | 5 | 9 | 5 | 4 | 3 | 1 |

**Q.26** Compute the mean, variance, and standard deviation for the given distribution:

| Class | 30–40 | 40–50 | 50–60 | 60–70 | 70–80 | 80–90 | 90–100 |
|-------|-------|-------|-------|-------|-------|-------|--------|
| Frequency | 3 | 7 | 12 | 15 | 8 | 3 | 2 |

**Q.27** Determine the standard deviation for the following:

| $x_1$ | 3 | 8 | 13 | 18 | 23 |
|-------|---|---|----|----|----|
| $f_1$ | 7 | 10 | 15 | 10 | 6 |

**Q.28** The coefficient of variation for two distributions is 60 and 45, with corresponding standard deviations of 24 and 15, respectively. What are the arithmetic means of these distributions?

**Q.29** The stock prices (in ₹) of two companies, X and Y, over a 10-week period are provided. Determine which company's shares exhibit greater stability.

| X | 35 | 54 | 52 | 54 | 56 | 58 | 53 | 50 | 52 | 49 |
|---|----|----|----|----|----|----|----|----|----|----|
| Y | 108 | 106 | 105 | 105 | 108 | 107 | 104 | 103 | 104 | 104 |

**Q.30** Considering the provided data below, identify the group that displays higher variability.

| Marks | 10–20 | 20–30 | 30–40 | 40–50 | 50–60 | 60–70 | 70–80 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| Group A | 8 | 15 | 32 | 28 | 41 | 12 | 9 |
| Group B | 10 | 20 | 30 | 26 | 42 | 5 | 7 |

**Q..31** Given a set of 5 observations with a mean of 12 and a standard deviation of $\sqrt{6}$, if three specific observations are 11, 12, and 14, determine the remaining two observations.

**Q.32** If the standard deviation of a set of six observations is 14, and each observation is increased by 5, calculate the new standard deviation.

**Q.33** The standard deviation of a set of 10 observations is 12. If each observation is multiplied by 5, determine the new standard deviation.

**Q.34** A student calculated the mean and variance of 7 observations as 9 and 34, respectively. However, the student mistakenly recorded one observation as 21 instead of 14. Determine the correct mean and standard deviation.

## ANSWER KEY – LEVEL – I

| Q. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | a | d | d | a | b | b | b | d | b | d |
| Q. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Ans. | b | c | c | c | c | a | c | c | a | c |
| Q. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | b | c | d | a | b | c | b | a | b | b |
| Q. | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| Ans. | a | d | a | a | d | b | b | c | a | d |
| Q. | 41 | 42 | 43 | 44 | 45 | 46 | | | | |
| Ans. | c | b | a | a | a | d | | | | |

## ANSWER KEY – LEVEL – II

1.  2.33
2.  3.39
3.  10.35
4.  8.4
5.  157.92
6.  **1.**  16.44        **2.**  16.44
7.  **1.**  66.2        **2.**  10.61        **3.**  112.64
8.  42.917, 4.34 nearly
9.  1.4
10.  60.7, 11.28
11.  21.5, 164.75
12.  22.85
13.  32.0870
14.  Y
15.  9.6
16.  7.375
17.  6.67
18.  1.389
19.  1
20.  4.83
21.  10.3
22.  6.2
23.  5.14
24.  Variance $= 18.67$
     Standard deviation $= 4.32$
25.  $\sigma^2 = 45.8$
     $\sigma = 6.77$
26.  $\bar{x} = 62$
     $\sigma^2 = 201$
     $\sigma = 14.18$
27.  $\sigma = 6.122$
28.  $\bar{x}_1 = 40, \bar{x}_2 = 33.33$

**29.**     Y is more stable (as C.V. is less)

**30.**     B is more variable (as C.V. is higher)

**31.**     15 and 8

**32.**     $\sigma = 14$

**33.**     $\sigma = 60$

**34.**     $\bar{x} = 8$

            $\sigma = 4$