# Unit No. 12

# INFORMATION HANDLING

## Exercise No. 12.1

## Question No. 1

**The following distribution represents the scores achieved by a group of chemistry students in the chemistry laboratory.**

| Scores | No. of Students |
|--------|-----------------|
| 24 - 28 | 3 |
| 29 – 33 | 6 |
| 34 – 38 | 12 |
| 39 – 43 | 23 |
| 44 – 48 | 15 |
| 49 – 53 | 6 |
| **Total** | **65** |

**Answer the following questions.**

**(i) What is the upper limit of the last class?**

**Solution:**

The upper limit of the last class is 53.

**(ii) What is the lower limit of the class 39 - 43?**

**Solution:**

The lower limit of the class 39 - 43 is 39.

**(iii) What is the midpoint of the class (34 - 38)?**

**Solution:**

The midpoint $= \frac{\text{(lower limit + upper limit)}}{2}$

The midpoint $= \frac{(34\ +38)}{2} = \frac{72}{2} = 36$

**(iv) What are the class frequencies of the classes 29 - 33 and 44 - 48?**

**Solution:**

- For the class 29 - 33, the number of students (frequency) = 6.
- For the class 44 - 48, the number of students (frequency) = 15.

**(v) What is the size of the class limits in the above frequency distribution?**

**Solution:**

| Scores | Class Sizes |
|--------|-------------|
| 24 - 28 | 28 – 24 + 1 = 5 |
| 29 – 33 | 33 – 29 + 1 = 5 |

| 34 – 38 | 38 – 34 + 1 = 5 |
|---|---|
| 39 – 43 | 43 – 39 + 1 = 5 |
| 44 – 48 | 48 – 44 + 1 = 5 |
| 49 – 53 | 53 – 49 + 1 = 5 |
| **The Class Size** | **5** |

**(vi) In which class or group does minimum number of students fall?**

**Solution:**

Looking at the "No. of Students" column, the minimum frequency is **3**.

The minimum number of students falls in the class = **24 – 28.**

**(vii) What is the lower limit of the class having 15 as its class frequency?**

**Solution:**

The lower limit of the class (44 – 48) having **15** as its class frequency is **44**.

**(viii) What is the number of students having scores between 24 and 43?**

**Solution:**

| Scores | No. of Students |
|---|---|
| 24 - 28 | 3 |
| 29 – 33 | 6 |
| 34 – 38 | 12 |
| 39 – 43 | 23 |
| **Total (24 – 43)** | **44** |

So, the number of students having scores between 24 and 43 is **44**.

## Question No. 2

**For a school staff, the following expenditures (rupees in hundred) are required for the repair of chairs.**

**145, 152, 153, 156, 158, 160, 146, 152, 155, 159, 161, 163, 165, 147, 148, 151, 154, 156, 158, 160, 144, 167, 151, 150, 152, 149, 145, 153, 152, 155**

**Prepare a frequency distribution by tally bar method using 3 as the size of the class limits and also write down what are the frequencies of the last three classes?**

**Data:**

**Class Size = h = 3**

**Number of Staff members = n = 30**

**Lowest Value = Xmin = 144**

**Highest Value = Xmax = 167**

**To Find:**

**Range = R = ?**

**Frequencies of the last three classes = ?**

**Solution:**

Range = Xmax – Xmin

Range = 167 – 144 = **23**

Finding No. of classes:

Approx. No. of classes = $\frac{Range}{Class\ Size}$

Approx. No. of classes = $\frac{23}{3}$ = 7.67 = 8

| Class Limits | Tally Marks | f |
|---|---|---|
| 144 – 146 | \|\|\|\| | 4 |
| 147 – 149 | \|\|\| | 3 |
| 150 – 152 | 卌 \|\| | 7 |
| 153 – 155 | 卌 | 5 |
| 156 – 158 | \|\|\|\| | 4 |
| 159 - 161 | \|\|\|\| | 4 |
| 162 – 164 | \| | 1 |
| 165 - 167 | \|\| | 2 |
| Total | | Σf = 30 |

**Frequency of last THREE classes:**

Class limits = f

- ➤ 159 – 161 = 4
- ➤ 162 – 164 = 1
- ➤ 165 - 167 = 2

# Question No. 3

**Given below are the weights in kg of 30 students of a high school.**

**30, 33, 24, 21, 15, 39, 37, 44, 42, 33, 33, 28, 29, 32, 31, 28, 26, 32, 34, 35, 38, 36, 41, 30, 35, 41, 23, 26, 18, 34**

**Taking 5 as the size of the class limit, prepare a frequency table and construct a frequency polygon.**

**Data:**

**Class Size = h = 5**

**Number of Staff members = n = 30**

**Lowest Value = Xmin = 15**

**Highest Value = Xmax = 44**

**To Find:**

**Range = R = ?**

**Frequency Polygon = ?**

**Solution:**

Range = Xmax – Xmin

Range = 44 – 15 = **29**

Finding No. of classes:

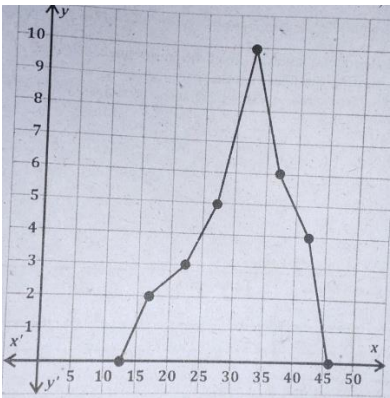Approx. No. of classes $= \frac{Range}{Class\ Size}$

Approx. No. of classes $= \frac{29}{5} = 5.8 = 6$

| Class Limits | Tally Marks | f |
|---|---|---|
| 15 – 19 | \|\| | 2 |
| 20 – 24 | \|\|\| | 3 |
| 25 – 29 | ⅢⅡ | 5 |
| 30 – 34 | ⅢⅡ ⅢⅡ | 10 |
| 35 – 39 | ⅢⅡ \| | 6 |
| 40 - 44 | \|\|\|\| | 4 |
| **Total** | | Σf = 30 |

**Frequency Polygon:**

The midpoint $= \frac{(lower\ limit\ +\ upper\ limit)}{2}$

| Class Limits | Mid-Points (x) | Graph Points |
|---|---|---|
| 15 – 19 | 17 | (17, 1) |
| 20 – 24 | 22 | (22, 2) |
| 25 – 29 | 27 | (27, 4) |
| 30 – 34 | 32 | (32, 9) |
| 35 – 39 | 37 | (37, 5) |
| 40 - 44 | 42 | (42, 4) |



# Question No. 4

A group of Grade - 10 students obtained the following marks out of 100 marks in English test.

**58, 59, 58, 33, 40, 58, 45, 46, 43, 45, 45, 50, 52, 49, 50, 57, 52, 55, 49, 50, 62, 49, 48, 44, 42, 47, 46, 47, 46, 53, 40, 44**

**Classify the data into a frequency distribution by (direct method) taking 6 as the size of the class limit. Also find the class limit with least class frequency and construct histogram for the data.**

**Data:**

**Class Size = h = 6**

**Number of Staff members = n = 32**

**Lowest Value = Xmin = 33**

**Highest Value = Xmax = 62**

**To Find:**

**Range = R = ?**

**Class limit with least class frequency = ?**

**Histogram = ?**

**Solution:**

Range = Xmax – Xmin

Range = 62 – 33 = **29**

Finding No. of classes:

Approx. No. of classes = $\frac{Range}{Class\ Size}$

Approx. No. of classes = $\frac{29}{6}$ = 4.8 = 5

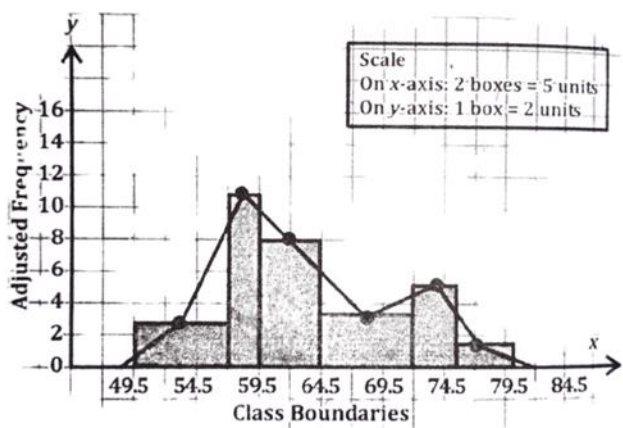| Class Limits | Tally Marks | Frequency (f) | Class Boundaries |
|:---:|:---:|:---:|:---:|
| 33 – 38 | \| | 1 | 32.5-38.5 |
| 39 – 44 | ЖЖ \| | 6 | 38.5-44.5 |
| 45 – 50 | ЖЖ ЖЖ ЖЖ | 15 | 44.5-50.5 |
| 51 – 56 | \|\|\|\| | 4 | 50.5-56.5 |
| 57 – 62 | ЖЖ \| | 6 | 56.5-62.5 |
| Total |  | Σf = 32 |  |

Least Frequency Class:

The class with least frequency (1) is

**33 – 38.**

**Histogram:**

## Question No. 5
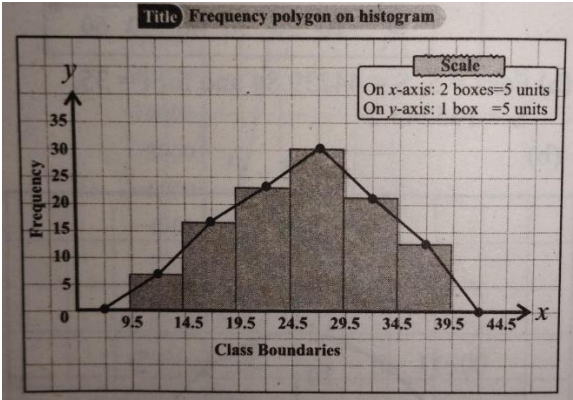
From the table given below. Draw a frequency polygon for the given frequency distribution.

| Weight (Kg) | Frequency (f) |
|:---:|:---:|
| 10 – 14 | 06 |
| 15 – 19 | 17 |
| 20 – 24 | 23 |
| 25 – 29 | 30 |
| 30 – 34 | 22 |
| 35 – 39 | 13 |

**Solution:**

| Weight (Kg) | C.B | M.P (x) | (f) |
|:---:|:---:|:---:|:---:|
| 10 – 14 | 9.5 – 14.5 | 12 | 06 |
| 15 – 19 | 14.5 – 19.5 | 17 | 17 |
| 20 – 24 | 19.5 – 24.5 | 22 | 23 |
| 25 – 29 | 24.5 – 29.5 | 27 | 30 |
| 30 – 34 | 29.5 – 34.5 | 32 | 22 |
| 35 – 39 | 34.5 – 39.5 | 37 | 13 |

**Frequency Polygon on Histogram:**

Title Frequency polygon on histogram

## Question No. 6

The following data shows the number of heads in an experiment of 50 sets of tossing a coin 5 times. Make a discrete frequency distribution from the information. 3, 3, 4, 0, 5, 4, 3, 3, 1, 2, 4, 5, 0, 3, 2, 4, 4, 0, 0, 0, 5, 5, 3, 2, 1, 4, 3, 2, 5, 3, 2, 1, 3, 5, 4, 3, 2, 1, 3, 2, 1, 3, 1, 3, 1, 4, 3, 2, 2, 4

**Solution:**

| No. of Heads | Tally Marks | Frequency (f) |
|---|---|---|
| 0 | 卌 | 5 |
| 1 | 卌 ‖ | 7 |
| 2 | 卌 ‖‖ | 9 |
| 3 | 卌 卌 ‖‖ | 14 |
| 4 | 卌 ‖‖ | 9 |
| 5 | 卌 | | 6 |
| Total | | Σf = 50 |

## Question No. 7

The marks obtained by the students of Grade - 10 in mathematics test were grouped into the following frequency distribution.

| Marks | Frequency |
|---|---|
| 35 – 37 | 2 |
| 38 – 44 | 12 |
| 45 – 54 | 16 |
| 55 – 61 | 13 |
| 62 – 67 | 9 |
| 68 – 72 | 3 |

Draw a histogram for the above distribution.

**Solution:**

**Class Width:**

**35 – 37 = 37- 35 + 1 = 3**

**38 – 44 = 44- 38 + 1 = 7**
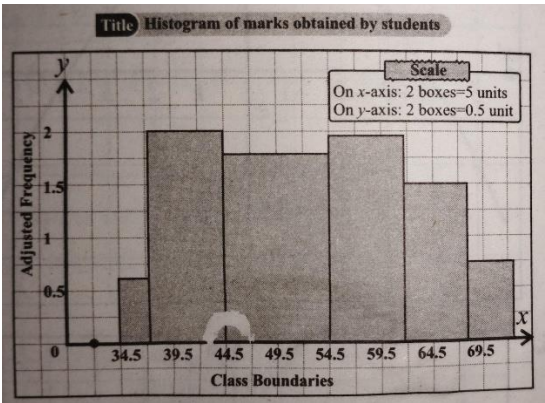
**45 – 54 = 54- 45 + 1 = 10**

**55 – 61 = 61- 55 + 1 = 7**

**62 – 67 = 67- 62 + 1 = 6**

**68 – 72 = 72- 68 + 1 = 5**

| Marks | f | Class Width | Adjusted Frequency |
|---|---|---|---|
| 35 – 37 | 2 | 3 | $\frac{2}{3} = 0.7$ |
| 38 – 44 | 12 | 7 | $\frac{12}{7} = 1.7$ |
| 45 – 54 | 16 | 10 | $\frac{16}{10} = 1.6$ |
| 55 – 61 | 13 | 7 | $\frac{13}{7} = 1.9$ |
| 62 – 67 | 9 | 6 | $\frac{9}{6} = 1.5$ |
| 68 – 72 | 3 | 5 | $\frac{3}{5} = 0.6$ |
| Total | $\Sigma f = 55$ | | |

**Histogram:**



# Question No. 8

Make a frequency polygon on histogram for the following grouped data:

| Class limits | Frequency (f) |
|---|---|
| 5 – 8 | 2 |

| | |
|---|---|
| 8 – 12 | 12 |
| 12 – 20 | 25 |
| 20 – 25 | 32 |
| 25 – 27 | 14 |
| 27 – 32 | 5 |

**Solution:**

**Class Width:**

**5 – 8** = 8 - 5 + 1 = **4**

**8 – 12** = 12 - 8 + 1 = **5**

**12 – 20** = 20 - 12 + 1 = **9**

**20 – 25** = 25 – 20 + 1 = **6**

**25 – 27** = 27 - 25 + 1 = **3**

**27 – 32** = 32 - 27 + 1 = **6**

| Marks | F | Class Width | Adjusted Frequency | M.P (x) |
|---|---|---|---|---|
| 5 – 8 | 2 | 4 | $\frac{2}{4} = 0.5$ | 6.5 |
| 8 – 12 | 12 | 5 | $\frac{12}{5} = 2.4$ | 10 |
| 12 – 20 | 25 | 9 | $\frac{25}{9} = 2.8$ | 16 |
| 20 – 25 | 32 | 6 | $\frac{32}{6} = 5.3$ | 22.5 |
| 25 – 27 | 14 | 3 | $\frac{14}{3} = 4.7$ | 26 |
| 27 – 32 | 5 | 6 | $\frac{5}{6} = 0.8$ | 29.5 |
| Total | $\Sigma f = 90$ | | | |

**Polygon on Histogram:**