



OBJECTIVE Type Questions

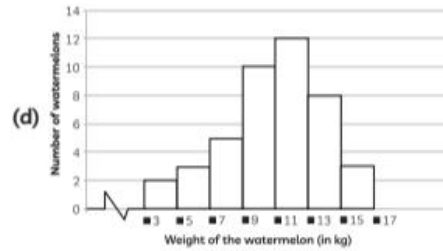
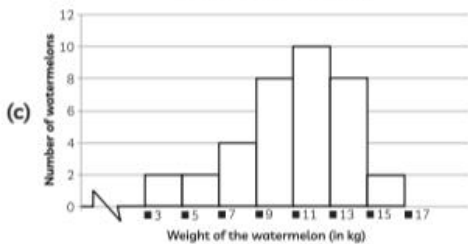
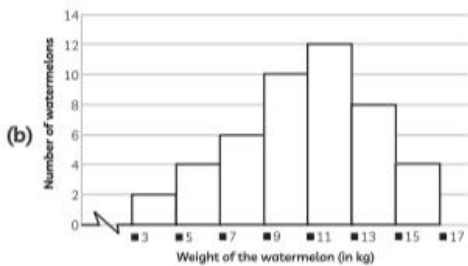
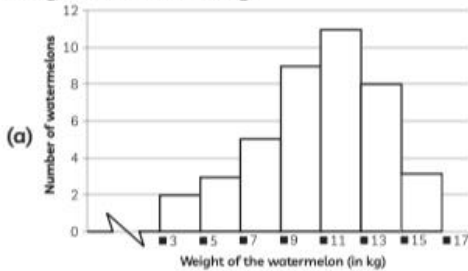
[1 mark]

Multiple Choice Questions

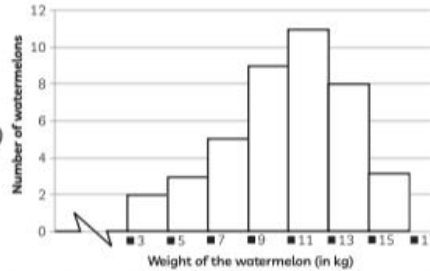
1. The table below shows the weights of watermelons at a store.

Weight of watermelon (in kg)	Number of watermelons
3 - 5	2
5 - 7	3
7 - 9	5
9 - 11	9
11 - 13	11
13 - 15	8
15 - 17	3

Which of the following histogram represents the given data correctly?



Ans. (a)



Explanation: Histogram given in option (a) is the correct representation of the given table.

2. The width of each of five continuous classes in a frequency distribution is 5 and the lower class-limit of the lowest class is 10. The upper class-limit of the highest class is:

- (a) 15 (b) 25
(c) 35 (d) 40 [NCERT Exemplar]

Ans. (c) 35

Explanation: Given: Lower class limit is 10.
Width of each of five continuous classes is 5.
Total width till upper class limit = 5×5
= 25

Therefore, the upper class limit of the highest class
= $10 + 25 = 35$

3. The class marks of a frequency distribution are given as follows: 15, 20, 25...

The class corresponding to the class mark 20 is:

- (a) 12.5-17.5 (b) 17.5-22.5
(c) 18.5-21.5 (d) 19.5-20.5

Ans. (b) 17.5-22.5

Explanation: The class marks of a frequency distribution are given as: 15, 20, 25...

Class size for the given frequency distribution is: $20 - 15 = 5$

$$\begin{aligned} \text{Upper limit} &= \text{Class mark} + \frac{\text{Class Size}}{2} \\ &= 20 + \frac{5}{2} = \frac{40+5}{2} = \frac{45}{2} \\ &= 22.5 \end{aligned}$$



$$\begin{aligned} \text{Lower limit} &= \text{Class mark} - \frac{\text{Class Size}}{2} \\ &= 20 - \frac{5}{2} = \frac{35}{2} = 17.5 \end{aligned}$$

Hence, 17.5 – 22.5 is the corresponding class to the class mark 20.

4. 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:

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

[NCERT Exemplar]

Ans. (c) class marks of the classes

Explanation: For drawing a frequency polygon of a continuous frequency distribution, we plot the frequencies of the classes on the ordinates and the class marks of the classes on the abscissae.

Class mark is the mid value or the central value of a class

It is calculated as follows:

$$\frac{\text{Upper limit} + \text{Lower limit}}{2}$$

5. The class mark of the class 90-130 is :

- (a) 90
- (b) 105
- (c) 115
- (d) 110

Ans. (d) 110

Explanation: Class mark is the mid value of a class.

$$\begin{aligned} \text{Class mark} &= \frac{\text{upper limit} + \text{lower limit}}{2} \\ &= \frac{130+90}{2} \\ &= \frac{220}{2} \\ \text{Class mark} &= 110 \end{aligned}$$

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

- (a) 10
- (b) 7
- (c) 8
- (d) 13

Ans. (d) 13

Explanation:

$$\begin{aligned} \text{Mid value} &= 10 \\ \text{Class width} &= 6 \end{aligned}$$

$$\begin{aligned} \text{Lower limit} &= \text{mid value} - \frac{\text{Class width}}{2} \\ &= 10 - \frac{6}{2} \\ &= 10 - 3 \end{aligned}$$

$$\text{lower limit} = 7$$

$$\text{Class width} = \text{upper limit} - \text{lower limit}$$

$$6 = \text{upper limit} - 7$$

$$\text{upper limit} = 6 + 7$$

$$= 13$$

7. In a continuous frequency distribution, class mark of a class is 85 and lower limit is 83, then its upper limit is:

- (a) 80
- (b) 89
- (c) 86
- (d) 87

[Diksha]

Ans. (d) 87

Explanation:

$$\text{Class mark} = \frac{\text{upper limit} + \text{lower limit}}{2}$$

$$85 = \frac{\text{upper limit} + 83}{2}$$

$$\text{Upper limit} = 85 \times 2 - 83$$

$$\text{Upper limit} = 170 - 83 = 87$$

Fill in the Blanks

8. The class mark of the class interval 90-120 is

Ans. 105

Explanation: We have,

$$\begin{aligned} \text{Class mark} &= \frac{\text{Upper limit} + \text{Lower limit}}{2} \\ &= \frac{120+90}{2} = \frac{210}{2} = 105 \end{aligned}$$

9. The class size of the grouped frequency table given below is

5 – 5.2	5.2 – 5.4	5.4 – 5.6	5.6 – 5.8	5.8 – 6.0
34	4	4	4	6

Ans. 0.2

Explanation: Class size is the difference between the upper and lower limit of a class in a frequency distribution.

Therefore, for any given class, 5.2 – 5 = 5.4 – 5.2 = 5.4 – 5.6 = 5.8 – 5.6 = 6.0 – 5.8 = 0.2

10. In a histogram, the class intervals or the groups are taken along

Ans. X-axis



True and False

11. Class width of observations is the sum of the upper limit and the lower limit.

Ans. False

Explanation: Class width is the difference between the upper limit and the lower limit, i.e.,
Class width = upper limit – lower limit

12. In a histogram, the area of the rectangle is proportional to its frequency.

Ans. True

Explanation: A histogram is a graph where a set of rectangles are represented as per the class intervals and the frequencies. In a histogram, the area of the rectangle is proportional to its frequency. Thus, we can say that the lengths of the rectangles are proportional to the frequencies.

Assertion and Reason (A–R)

Direction for questions 13 to 15: In question number 13 to 15, a statement of Assertion (A) is followed by a statement of Reason (R).

Choose the correct option as:

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

13. Assertion (A): The range of first 9 multiple of 9 is 27.

Reason (R): Range = Highest value – Lowest value.

Ans. (d) Assertion (A) is false but reason (R) is true.

Explanation: First 9 multiples of 9 are 9, 18, 27, 36, 45, 54, 63, 72, 81

We have,

Range = Highest value – Lowest value

∴ Range = 81 – 9 = 72

Hence, assertion (A) is false, but reason (R) is true.

14. Assertion (A): Histogram is a resultant graph that appears like a solid figure, with consecutive rectangles having no gap in between.

Reason (R): Histogram is a graphical representation of a grouped frequency distribution with consecutive classes.

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

Explanation: Histogram is a graph that represent grouped frequency with continuous classes in the form of rectangles with class intervals as bases (x-axis) and corresponding frequency as height (y-axis).

There is no gap in between any two consecutive rectangles.

Hence, both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

15. Assertion (A): Frequency polygons can be drawn independently without the histogram by joining the midpoints of the class-marks. These midpoint of the class marks are called class intervals.

Reason (R): Class mark

$$= \frac{\text{Upper limit} + \text{Lower limit}}{2}$$

Ans. (d) Assertion (A) is false but reason (R) is true.

Explanation: A frequency polygon is almost identical to a histogram, which is used to display a cumulative frequency distribution. It can also be drawn independently without drawing histograms. For this, we required the mid-points of the class intervals used in the data. These mid points of the class intervals are called class marks.

$$\text{Class mark} = \frac{\text{Upper limit} + \text{Lower limit}}{2}$$

Hence, assertion (A) is false but reason (R) is true.

CASE BASED Questions (CBQs)

[4 & 5 marks]

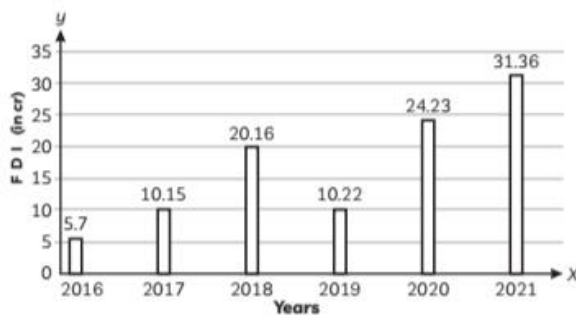
Read the following passages and answer the questions that follow:

16. A foreign direct investment is an investment in the form of controlling ownership in a business

in one country by an entity based in another country. India is a major monetary source for economic development in India. Foreign companies invest directly in fast growing private Indian businesses to take benefits



of cheaper wages and changing business environment of India. The bar graph diagram shows the trends of foreign direct investment (FDI) into a public sector undertakings in India from all over the world in 2016–2022. (In crores)



- (A) The sum of FDI in 2016 and 2017, is:
 (a) 18.58 cr (b) 15.85 cr
 (c) 15.22 cr (d) 15.75 cr
- (B) The year which exhibited the highest FDI in the PSU of India over the period, is:
 (a) 2017 (b) 2018
 (c) 2020 (d) 2021
- (C) The absolute difference in FDI in the PSU of India between 2020 and 2021, is:
 (a) 7.29 cr (b) 7.13 cr
 (c) 7.16 cr (d) 7.22 cr
- (D) The year which exhibited the lowest FDI in the PSU of India over the period is:
 (a) 2017 (b) 2020
 (c) 2016 (d) 2015

Ans. (A) (b) 15.85 cr

Explanation: From the given bar graph,
 The sum of FDI in 2016 and 2017
 $= 5.7 + 10.15$
 $= 15.85\text{cr}$

(B) (d) 2021

Explanation: From the graph, it is clear that in 2021, the PSU got the highest FDI.

(C) (b) 7.13 cr

Explanation: FDI in 2020 = 24.23 cr
 FDI in 2021 = 31.36 cr
 Absolute difference in the given period
 $= (31.36 - 24.23)\text{ cr}$
 $= 7.13\text{ cr}$

(D) (c) 2016

Explanation: from the given graph, in 2016, the PSU got lowest FDI that is 5.7 cr.

17. A teacher of St. Xavier School wanted to analyse the performance of two sections of students in a Mathematics test of 100 marks. She looked at the performance of the students, she found that a few students got under 20 marks and a few got 70 marks or above. So, she decided to group them into intervals of varying sizes as follows: 0–20, 20–30, ..., 60–70 and 70–above. Then she formed the following table:

Marks scored	Numbers of students
0 – 20	8
20 – 30	20
30 – 40	13
40 – 50	18
50 – 60	11
60 – 70	17
70 above	13
Total	100



- (A) Determine the number of students who scored less than 40 marks but more than 20 marks.
- (B) If two students scored distinction are also added, then find the number of students scoring more than 70 marks.
- (C) Find the total number of students scoring the marks between 50–60 and 60–70 and also find the number of students scoring less than 60 marks.

Ans. (A) From the given table,

Number of students scoring less than 40 marks = 20 + 13 = 33

Thus, 33 students scored less than 40 marks but more than 20 marks.

(B) Since, distinction are the mark secured above 75.

So, if two students scored distinction are also added, then the number of students scoring more than 70 marks are 13 + 2 = 15

Thus, 15 students scored more than 70 marks.



(C) From the table,

Number of students scoring marks between 50 – 60 = 11

Number of students scoring marks between 60 – 70 = 17

Total number of students = 11 + 17 = 28

From the table,

Number of students scoring less than 60 marks = 8 + 20 + 13 + 18 + 11 = 70

18. In order to monitor reckless driving on Delhi roads, special cameras have been installed at strategic locations. The following tables shows a frequency distribution table for the speeds of 100 cars passing through a particular spot on a particular day in Delhi.



Speed (in km/h)	Numbers of four wheeler
1 – 10	8
11 – 20	3
21 – 30	6
31 – 40	12
41 – 50	2
51 – 60	7

- (A) Draw a frequency polygon for the frequency distribution table.
- (B) What is the class mark of the interval 41 to 50?
- (C) Find the number of four wheelers whose speed is less the 40 km/hr.

Ans. (A) Though the given frequency table is in inclusive form, class marks in case of inclusive and exclusive forms are the same. We take the imagined classes (-9-0) at the beginning and 61-70 at the end, each with frequency zero. Thus, we have:

Class Interval	Class Mark	Frequency
-9 – 0	-4.5	0
1 – 10	5.5	8
11 – 20	15.5	3
21 – 30	25.5	6
31 – 40	35.5	12
41 – 50	45.5	2
51 – 60	55.5	7
61 – 70	65.5	0

Along the x-axis, we mark 4.5, 5.5, 15.5, 25.5, 35.5, 45.5, 55.5 and 65.5.

Along the y-axis, we mark 0, 8, 3, 6, 12, 2, 7 and 0.

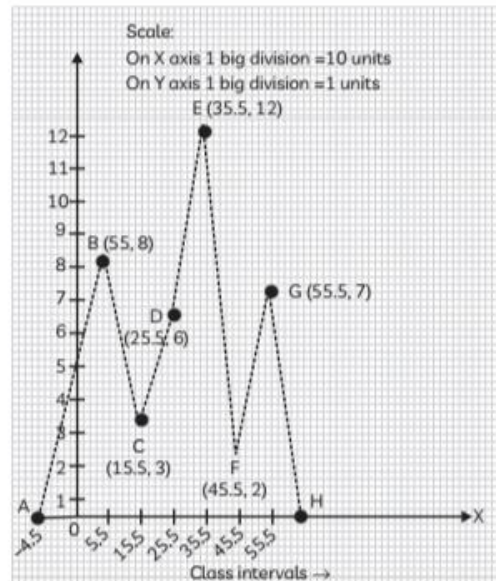
We have chose the scale as follows:

On the x-axis, 1 big division = 10 units.

On the y-axis, 1 big division = 1 units.

We plot the points A(-4.5, 0), B(5.5, 8), C(15.5, 3), D(25.5, 6), E(35.5, 12), F(45.5, 2), G(55.5, 7) and H(65.5, 0)

We draw line segments AB, BC, CD, DE, EF, FG, GH to obtain the required frequency polygon, as shown below.



(B) Class mark = $\frac{\text{Upper limit} + \text{Lower limit}}{2}$

$$= \frac{50 + 41}{2}$$

$$= \frac{91}{2} = 45.5$$



- (C) From the table,
Number of four-wheeler whose speed is less than 40 km/h

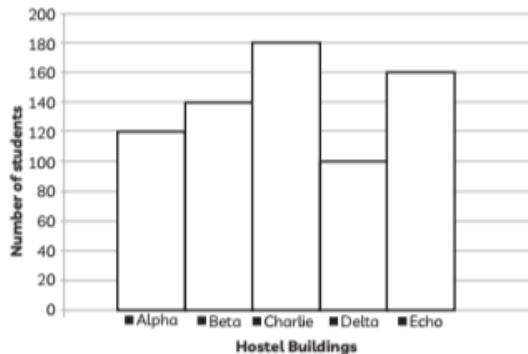
$$= 9 + 3 + 6 + 12$$

$$= 30$$

VERY SHORT ANSWER Type Questions (VSA)

[1 mark]

19. The bar graph shows the number of students residing at different hostel buildings.



From the above graph, how many students reside in Charlie building?

Ans. 180

From the given bar graph,
Charlie building has 180 students residing.

20. Write the class mark of the class 130 – 150.
[NCERT Exemplar]

Ans. Class mark = $\frac{\text{Upper limit} + \text{Lower limit}}{2}$

$$= \frac{150 + 130}{2}$$

$$= \frac{280}{2}$$

$$= 140$$

21. Vani were doing a survey, based on heights of the children in her society and record the data in the form of grouped frequency distribution table as shown below.

Height (in cm)	Number of children
130 – 135	50
135 – 140	53
140 – 145	51
145 – 150	60
150 – 155	67

By analysing the table, find the number of children having height lesser than 145 cm.

Ans. Number of children having height lesser than 145cm = 50 + 53 + 51 = 154

22. The points scored by a basketball team in a series of matches are as follows:

17, 7, 10, 25, 5, 10, 18, 10 and 24.

Find the range of the points.

Ans. Here, maximum points = 25 and minimum points = 5

$$\text{Range} = \text{Maximum value} - \text{Minimum value}$$

$$= 25 - 5 = 20$$

23. To draw a histogram to represent the following frequency distribution.

Class Interval	Frequency
5 – 10	6
10 – 15	12
15 – 25	10
25 – 45	8
45 – 75	15

Find the adjusted frequency for the class 25 – 45.

Ans. We have, Adjusted frequency of a class

$$= \frac{\text{Minimum class width} \times \text{Frequency}}{\text{Class size of given class}}$$

$$= \frac{(10 - 5) \times 8}{(45 - 25)}$$

$$= \frac{5 \times 8}{20}$$

$$= 2$$



SHORT ANSWER Type-I Questions (SA-I)

[2 marks]

24. Given below is a cumulative frequency distribution table showing the marks scored by 50 students of a class.

Marks	Number of students
Below 20	17
Below 40	22
Below 60	29
Below 80	37
Below 100	50

Form a frequency table from the above data.
[Delhi Gov. QB 2022]

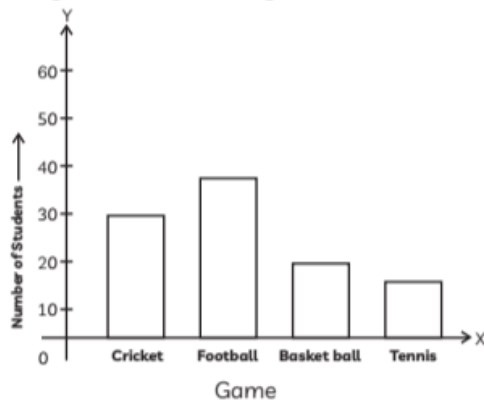
Ans.

Class Interval	Frequency
0-20	17
20-40	5
40-60	7
60-80	8
80-100	13

25. The following table shows the number of students participating in various games on sports day of Rameshwara College.

Game	Number of students
Cricket	28
Football	35
Basket ball	17
Tennis	13

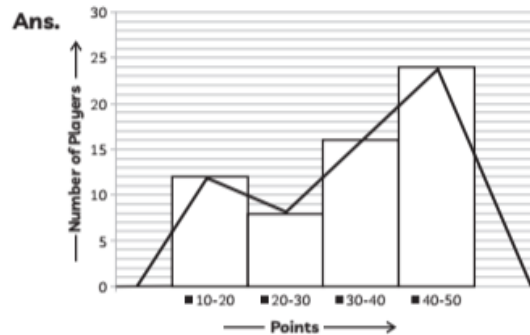
- Ans. Draw a bar graph to represent above data using 1cm = 10 units on y - axis.



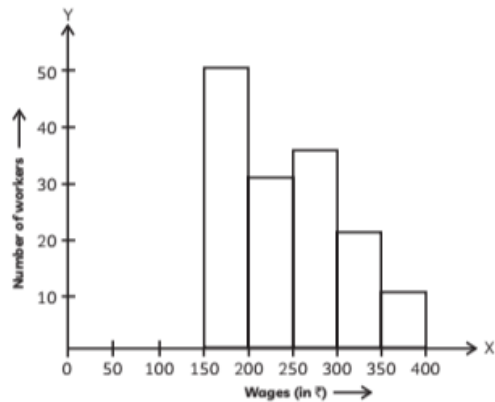
26. The table below shows the points scored by 60 players.

Points	Number of players
10-20	12
20-30	8
30-40	16
40-50	24

Make the frequency polygon.



27. The following figure represents a histogram depicting daily wages of workers in a factory. Construct the frequency distribution table.



Ans.

Wages (in ₹)	Number of Workers
150-200	50
200-250	30
250-300	35
300-350	20
350-400	10
Total	145

28. For a particular year, following is the distribution of ages (in years) of upper primary school teachers in a district:

Age (in years)	Number of Teachers
15-20	10
20-25	30
25-30	50
30-35	50
35-40	30
40-45	6
45-60	4

(A) Determine the class size.

(B) Find the class mark of the class 45-50.

Ans. (A) Class size = upper limit of each class interval - lower limit of each class interval
Here, class size = $20 - 15$

$$= 5$$

(B) Class mark of the class 45-50

$$= \frac{45 + 50}{2}$$

$$= \frac{95}{2}$$

$$= 47.5$$

SHORT ANSWER Type-II Questions (SA-II)

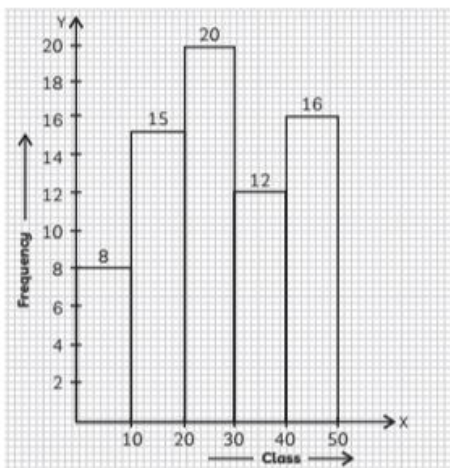
[3 marks]

29. Draw the histogram from the following data.

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	15	20	12	16

[Delhi Gov. QB 2022]

Ans.



30. Prepare a continuous grouped frequency distribution table from the following data.

Midpoint	Frequency
5	4
15	8
25	13
35	12
45	6

Also, find the size of the class interval.

Ans. Here, we see that the difference between two midpoints is $15 - 5$ i.e., 10. It means the width of the class interval is 10. Let the lower limit of the first class interval be a . Then, its upper limit = $a + 10$.

Now, mid value of the first class interval = 5

$$\Rightarrow \text{Mid value} = \frac{\text{Lower limit} + \text{Upper limit}}{2}$$

$$\Rightarrow 5 = \frac{a + a + 10}{2}$$

$$\Rightarrow 2a + 10 = 10$$

$$\Rightarrow 2a = 0$$

$$\Rightarrow a = 0$$

So, the first class interval is 0-10. Now, we prepare a continuous grouped frequency distribution table as follows:

Midpoint	Class Interval	Frequency
5	0 - 10	4
15	10 - 20	8
25	20 - 30	13
35	30 - 40	12
45	40 - 50	6

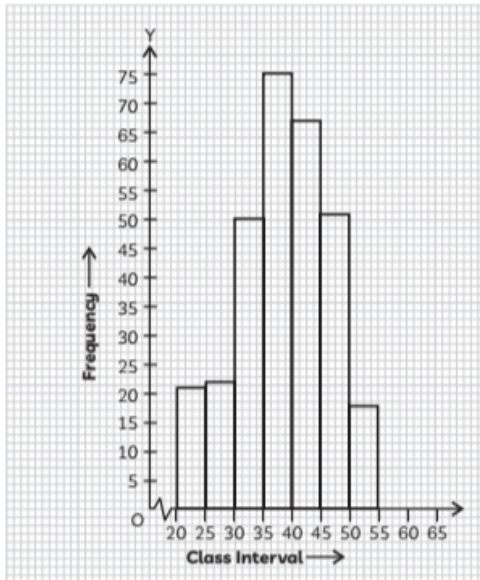
Hence, the size of the class interval is 10 i.e., $10 - 0$.

31. Draw a histogram for the given data:

Class Interval	Frequency
20 - 25	21
25 - 30	22
30 - 35	50
35 - 40	75
40 - 45	67
45 - 50	51
50 - 55	18



Ans. Let us represent class-intervals along x-axis and corresponding frequencies along y-axis on a suitable scale, the required histogram is as follows:

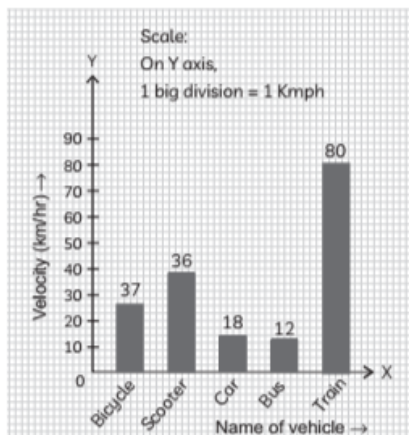


32. The approximate velocities of some vehicles are given below:

Name of Vehicle	Velocity (in km/hr)
Bicycle	27
Scooter	36
Car	18
Bus	12
Train	80

Draw a bar graph to represent the above data.

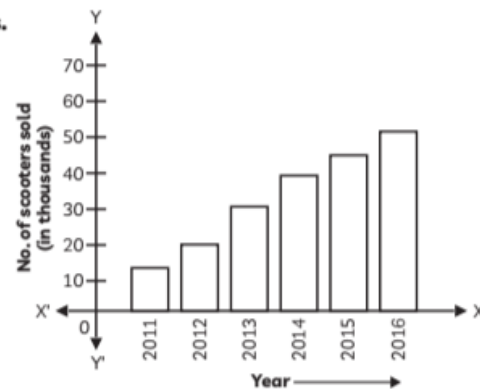
Ans.



33. The following table shows the number of scooters sold by a dealer during six consecutive years. Draw a bar graph to represent this data.

Year	Number of scooters sold (In thousands)
2011	16
2012	20
2013	32
2014	36
2015	40
2016	48

Ans.



34. Draw a histogram and a frequency polygon for the following frequency distribution.

Length (in mm)	Frequency
1 - 10	8
11 - 20	3
21 - 30	6
31 - 40	12
41 - 50	2
51 - 60	7

Ans. As data is not continuous, so to make a histogram we need continuous data.

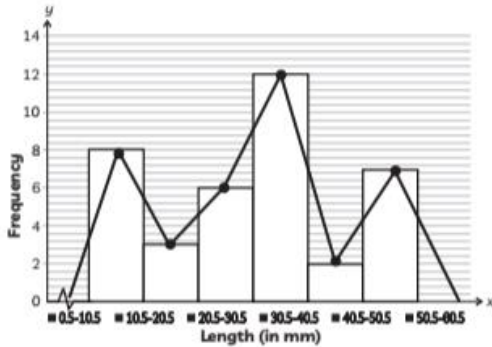
$$\text{Gap} = 11 - 10 = 1$$

$$\text{So, Half of gap} = \frac{1}{2} = 0.5$$

∴ We add 0.5 to each upper class limit and subtract 0.5 from each lower class limit to make the class intervals continuous.



Length (in mm)	Frequency
0.5 – 10.5	8
10.5 – 20.5	3
20.5 – 30.5	6
30.5 – 40.5	12
40.5 – 50.5	2
50.5 – 60.5	7



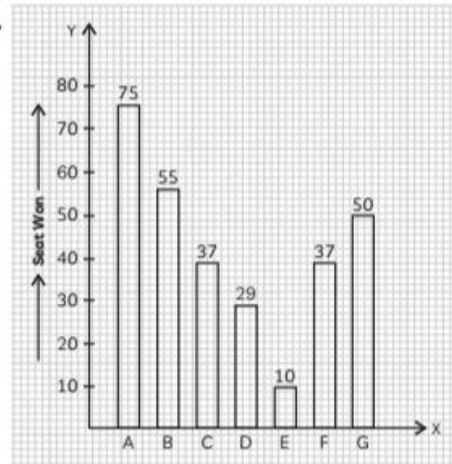
35. Given below are the seats won by different political parties in a state assembly election.

Political Party	A	B	C	D	E	F	G
Seat Won	75	55	37	29	10	37	50

Draw a bar graph for above data.

[Delhi Gov. QB 2022]

Ans.



LONG ANSWER Type Questions (LA)

[4 & 5 marks]

36. Following is the frequency distribution of total marks obtained by the students of different sections of class VIII.

Marks obtained	Number of students
100 – 150	60
150 – 200	100
200 – 300	100
300 – 500	80
500 – 800	180

Draw a histogram for the distribution given.

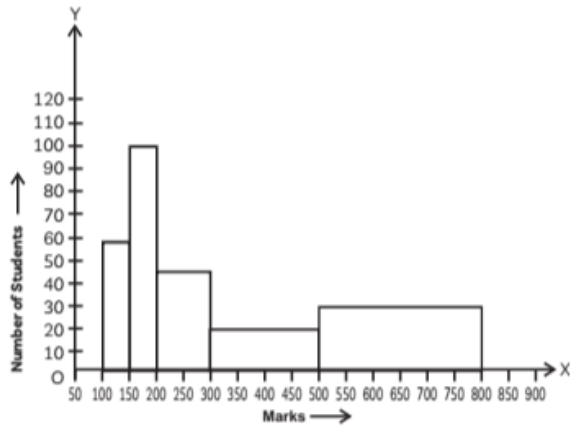
Ans. The widths of the class intervals vary for each data in the table given. These widths serve as the width of the rectangle in the histograms.

So, before drawing histogram, the length of the rectangles is to be found in each case. This is due to the property of histogram that the area of the rectangles should be proportional to the frequencies.

Length of each rectangle is given as $\frac{c}{C} \times f$,

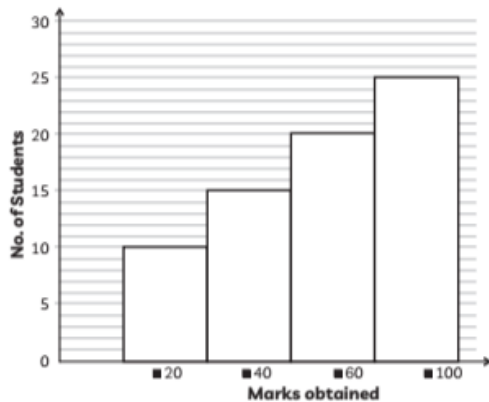
where c is the minimum class width, C is the class width of the particular class and f is the frequency. In the above case $c = 50$. Consider the following table.

Marks obtained	Frequency	Width of the class (C)	Length of the rectangle
100 – 150	60	50	$\frac{50}{50} \times 60 = 60$
150 – 200	100	50	$\frac{50}{50} \times 100 = 100$
200 – 300	100	100	$\frac{50}{100} \times 100 = 50$
300 – 500	80	200	$\frac{50}{200} \times 80 = 20$
500 – 800	180	300	$\frac{50}{300} \times 180 = 30$



37. The frequency distribution of the given data has been represented graphically as follows:

Marks obtained	Number of students
0 - 20	10
20 - 40	15
40 - 60	20
60 - 100	25



Do you think this representation is correct? Why?

Ans. No, here the widths of the rectangles are varying, so, we need to make certain modifications in the length of the rectangles so that areas are proportional to the frequencies.

We proceed as follows:

- (1) Select a class interval with the minimum class size, here the minimum class size is 20.
- (2) The length of the rectangles are then modified to be proportionate to the class size 20.

Now, we get the following modified table

Marks obtained (Class Interval)	Number of students (frequency)	Width of the class	Length of the Rectangle
0 - 20	10	20	$\frac{20}{20} \times 10 = 10$
20 - 40	15	20	$\frac{20}{20} \times 15 = 15$
40 - 60	20	20	$\frac{20}{20} \times 20 = 20$
60 - 100	25	40	$\frac{20}{40} \times 25 = 12.5$

So, the correct histogram with varying width is given below

