Short Answer Type Questions – II

[3 marks]

Que 1. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30

0.05	0.08	0.08	0.09	0.04	0.17
0.16	0.15	0.02	0.06	0.18	0.20
0.11	0.08	0.12	0.13	0.22	0.07
0.08	0.01	0.10	0.06	0.09	0.18
0.11	0.07	0.05	0.07	0.01	0.04

days is as follows:

(i) Make a grouped frequency distribution table for this data with interval as 0.00 – 0.04, 0.04 – 0.08, and so on.
(ii) For how many days, was the concentration of sulphur dioxide more than 0.11 parts per million?

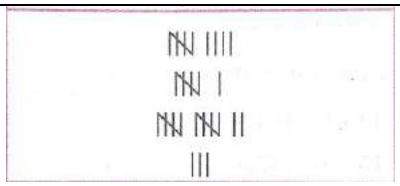
Sol. Frequency distributions of above data in tabular form is given as:

Concentration of sulphur dioxide (in ppm)	Tally marks	Frequency
0.00 – 0.04	𝍸	4
0.04 – 0.08	𝍸 |||	8
0.08 – 0.12	𝍸 ||||	9
0.12 – 0.16	|||	3
0.16 – 0.20	||||	4
0.20 – 0.24	||	2
Total		**30**

(ii) The concentration of sulphur dioxide was more than 0.11 ppm for 9 days.

Que 2. The blood groups of 30 students of class VIII are recorded as follows:
A, B, O, O, AB, O, A, O, B, A, O, O
A, AB, O, A, A, O, AB, B, A, O, B, A, B, O.
Represent this data in the form of a frequency distribution table. Which is the most common and which is the rarest blood group among these students?

Sol. Frequency Distribution table

Blood group	Tally marks	Frequency
A B O AB		9 6 12 3
Total		**30**

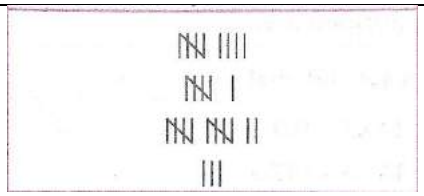
Blood group O is most common as it has height frequency, i.e., 12.
Blood group AB is rarest as is has lowest frequency, i.e., 3.

Que 3. Three coins were tossed 30 times simultaneously. Each time the number of heads occurring was noted down as follows:

0	1	2	2	1	2	3	1	3	0
1	3	1	1	2	2	0	1	2	1
3	0	0	1	1	2	3	2	2	0

Prepare a frequency distribution table for the data given above.

Sol. Frequency distribution of above data in tabular form is given as:

Number of heads	Tally marks	Frequency
0 1 2 3		6 10 9 5
Total		**30**

Que 4. Convert the given frequency distribution into a continuous grouped frequency distribution:

Class interval	Frequency
150 – 158	7
154 – 157	7
158 – 161	15
162 – 165	10
166 – 169	5
170 – 173	6

In which interval would 153.5 and 157.5 be included?

Sol. Consider the classes 150 – 153 and 154 – 157.
The lower limit of 154 – 157 = 154
The upper limit of 150 – 153 = 153
The difference = 154 – 153 = 1
Half the difference = $\frac{1}{2} = 0.5$

So, the new class interval formed from 150 – 153 is (150 – 0.5) – (153 + 0.5), i.e., 149.5 – 153.5.
Continuous classes formed are:

Class interval	Frequency
149.5 – 153.5	7
153.5 – 157.5	7
157.5 – 161.5	15
161.5 – 165.5	10
165.5 – 169.5	5
169.5 – 173.5	6

153.5 is included in the class interval 153.5 – 157.5 and 157.5 in 157.5 – 161.5.

Que 5. Thirty children were asked about the number of hours they watched TV programmes in the previous week. The results were found as follows:

1	6	2	3	5	12	5	8	4	8
10	3	4	12	2	8	15	1	17	6
3	2	8	5	9	6	8	7	14	12

(i) Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals as 5 – 10.
(ii) How many children watched television for 15 or more hours a week?

Sol. (i) The frequency distribution of above data in tabular form is given as:

Number of hours	Tally marks	Frequency
0 – 5	𝍸 𝍸	10
5 – 10	𝍸 𝍸 III	13
10 – 15	𝍸	5
15 – 20	II	2
Total		**30**

(ii) Two children watched television for 15 or more hours a week.

Que 6. Obtain the mean of the following distribution:

Sol.

Frequency	Variable
4	4
8	6
14	8
11	10
3	12

$\Rightarrow \ \overline{x} = \frac{\Sigma fx}{\Sigma f} \ \Rightarrow \ \overline{x} = \frac{322}{40} \ \Rightarrow \ \overline{x} \ = \ 8.05$

Que 7. If the mean of the following data is 20.2, find the value of p:

x	10	15	20	25	30
y	6	8	p	10	6

Sol.

x	f	fx
10	6	60
15	8	120
20	p	20 p
25	10	250
30	6	180
	Σf = 30 + p	**Σfx = 610 + 20 p**

Sol.

$$\overline{x} = \frac{\Sigma fx}{\Sigma f}$$

$\therefore \qquad 20.2 = \frac{610+20p}{30+p}$

$\Rightarrow \ \ 20.2(30 + p) \ = \ 610 + \ 20p$
$\Rightarrow \ \ 606 + 20.2p \ = \ 610 + 20p$
$\Rightarrow \ \ 20.2p - 20p = 610 \ - \ 606$
$\Rightarrow \qquad 0.2p = \ 4$

$\Rightarrow \qquad p = \frac{4}{0.2} = \frac{40}{2} \qquad \Rightarrow \ p \ = \ 20$