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Subject # Probability & Statistics

Q. No:1

Part.a:

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Q No: 01

i) Grouped frequency distribution

By scanning the data, we find that the largest number of baby born is "10" and the smallest number is "0" so, that the range is:

Range = largest value - Smallest value

10 - 0

10

Suppose we take "6" classes of equal size

so, width of equal class interval would be 10/6 ≈ 1.66 ⇒ (2)

Frequency Distribution of Number of children born

Class	Class Boundries	Tally	Frequency	cf
0 - 1	-0.5 - 1.5	𝍸	5	5
2 - 3	1.5 - 3.5	𝍸 𝍸 𝍸 𝍸 ||	22	27
4 - 5	3.5 - 5.5	𝍸 𝍸 ||	12	39
6 - 7	5.5 - 7.5	𝍸 ||	7	46
8 - 9	7.5 - 9.5	|||	3	49
10 - 11	9.5 - 11.5	|	1	50
	...	...	50	

i) Ungrouped frequency Distribution.

by Scanning the data, we find that the number of children born is a discrete variable and the range is small, So, that the data can be conveniently sorted by taking the values of classes as 0, 1, 2 3, 4, 5, 6, 7, 8, 9, 10 the frequency, distribution is then constructed as:.

Number of Children born	Tally	Frequency (f)
0	I	1
1	IIII	4
2	IIII III	8
3	IIII IIII IIII	14 → Mode
4	IIII II	7
5	IIII	5
6	IIII	4
7	III	3
8	II	2
9	I	1
10	I	1
		50

Part.b:

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Median for group data

Median $= l + \frac{h}{f}\left(\frac{n}{2} - c\right)$

l: lower class boundry

n: Class Interval

f: frequency

putting the values.

~~0 5 1 6~~

$\frac{n}{2}^{th}$ term $= \frac{50}{2} = 25$

low class boundry: 1.5

Upper " " : 3.5

class boundry: $h = 3.5 - 1.5 = 2$

$f = 22$

$c = 5$

Put the values.

$= 1.5 + \frac{2}{22}(25 - 5)$

$= 1.5 + \frac{x^1}{11}(20)$

$= 1.5 + \frac{20}{11}$

$= 1.5 + 1.82$

Median $=$ **3.32** (grouped data)

Median of Ungrouped data.

Arrange Data in Ascending Order,

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

3 3 3 3 3 3 3 3 [3] 3 3 4 4 4 4 4

4 4 5 5 5 5 5 6 6 6 6 7 7 7 8 8

9 10.

$$\text{Median} = \frac{n}{2}$$

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

$$= 25^{th} \text{ value} = (3)$$

Mode of Ungrouped data.

Maximum ~~frequency~~ number of the ungrouped data is called mode.

Mode = 3 → which is used 14 time

Mode of grouped data.

Formula: $\ell + \frac{f_m - f_0}{2f_m - f_1 - f_0} \times h.$

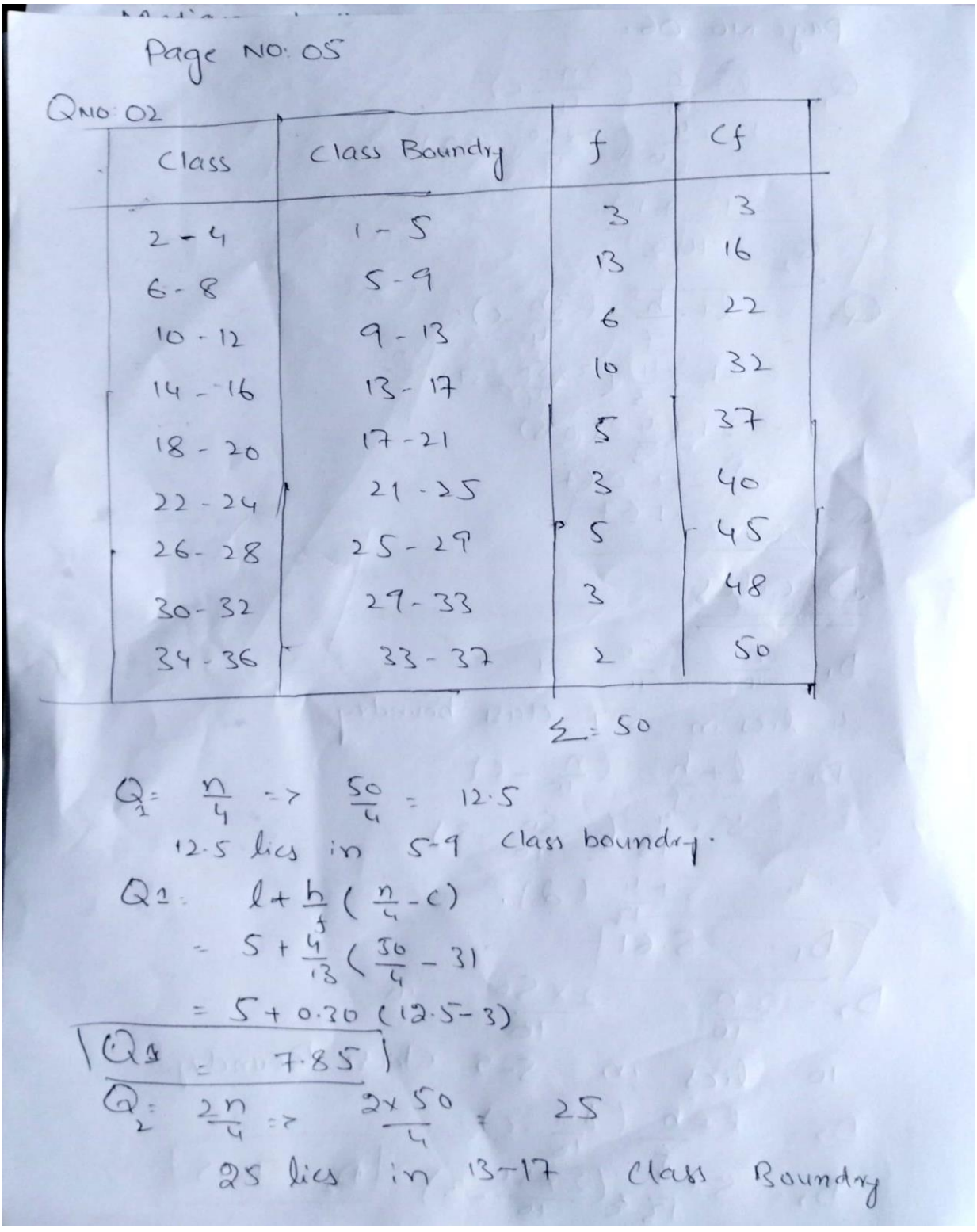
$$= \frac{15 + 22 - 5}{2(22) - 12 - 5} \times 2$$

$$= 15 + \frac{17}{27} \times 2$$

Mode. = 2.76

Q. No:2

Ans:



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Class	Class Boundry	f	Cf
2 - 4	1 - 5	3	3
6 - 8	5 - 9	13	16
10 - 12	9 - 13	6	22
14 - 16	13 - 17	10	32
18 - 20	17 - 21	5	37
22 - 24	21 - 25	3	40
26 - 28	25 - 29	5	45
30 - 32	29 - 33	3	48
34 - 36	33 - 37	2	50

$\Sigma = 50$

$Q_1 = \frac{n}{4} \Rightarrow \frac{50}{4} = 12.5$

12.5 lies in 5-9 class boundry.

$Q_1 = l + \frac{h}{f}\left(\frac{n}{4} - c\right)$

$= 5 + \frac{4}{13}\left(\frac{50}{4} - 31\right)$

$= 5 + 0.30\,(12.5 - 3)$

$Q_1 = 7.85$

$Q_2 = \frac{2n}{4} \Rightarrow \frac{2 \times 50}{4} = 25$

25 lies in 13-17 class Boundry

$$Q_2 = l + \frac{h}{f}\left(\frac{2n}{4} - c\right)$$

$$= 13 + \frac{4}{10}\left(\frac{2\times 50}{4} - 22\right)$$

$$= 13 + 1.2$$

$$\boxed{Q_2 = 14.2}$$

$$Q_3 = l + \frac{h}{f}\left(\frac{3n}{4} - c\right)$$

$$= 21 + \frac{4}{3}\left(\frac{3\times 50}{4} - 37\right)$$

$$= 21 + \frac{4}{3}(0.5)$$

$$= 21 + 0.67$$

$$\boxed{Q_3 = 21.67}$$

Deciles

$$D_1 = \frac{n}{10} = \frac{50}{10} = 4$$

4 lies in 5-9 class boundry.

$$D_1 = l + \frac{h}{f}\left(\frac{n}{10} - c\right)$$

$$= 5 + \frac{4}{13}\left(\frac{50}{10} - 3\right)$$

$$= 5 + \frac{4}{13}(2).$$

$$\boxed{D_1 = 5.61}$$

$$D_2 = \frac{2n}{10} = \frac{2\times 50}{10} = 10$$

10 lies in 5-9 class Boundry

$$D_2 = l + \frac{h}{f}\left(\frac{2n}{10} - c\right)$$

$$D_2 = 5 + \frac{4}{13}\left(\frac{2\times 50}{10} - 3\right) \quad \boxed{D_2 = 7.15}$$

$D_3 = \frac{3n}{10} = \frac{3\times50}{10} = 15$

15 lies in 5-9 class boundry

$D_3 = 5 + \frac{4}{13}\left(\frac{3\times50}{10} - 3\right)$

$= 5 + \frac{4}{13}(15-3)$

$= 5 + 0.307(12)$

$D_3 = 8.69$

$D_4 = l + \frac{h}{f}\left(\frac{4n}{10} - c\right)$

$\frac{4n}{10} = \frac{4\times50}{10} = 20$

20 lies in 9-13 class boundry.

$D_4 = 9 + \frac{4}{6}(20-16)$

$= 9 + \frac{4}{6}(4)$

$= 9 + 2.67$

$D_4 = 11.67$

$D_5 = \frac{5n}{10} = \frac{5\times50}{10} = 25$

25 lies in 13-17

$D_5 = l + \frac{h}{n}\left(\frac{5n}{10} - c\right)$

$= 13 + \frac{4}{10}\left(\frac{5\times50}{10} - 22\right)$

$= 13 + \frac{4}{10}(3)$

$D_5 = 14.2$

$D_6 = \frac{6n}{10} = \frac{6\times50}{10} = 30$

$D_6 = 13 + \frac{4}{10}\left(\frac{6\times50}{10} - 22\right)$

$= 13 + \frac{4}{10}(8)$

$D_6 = 16.2$

$D_7 = \frac{7n}{10} = \frac{7\times50}{10} = 35$

35 lies in 17-21

$= 17 + \frac{4}{5}\left(\frac{7\times50}{10} - 32\right)$

$= 17 + \frac{4}{5}(3)$

$D_7 = 19.4$

$D_8 = \frac{8n}{10} = \frac{8\times50}{10} = 40$

40 lies in 21-25 CB

$D_8 = 21 + \frac{4}{3}\left(\frac{8\times50}{10} - 37\right)$

$= 21 + \frac{4}{7}(3)$

$D_8 = 25$

$D_9 = \frac{9n}{10} = \frac{9\times50}{10} = 45$

45 lies in 25-29

$D_9 = 25 + \frac{4}{5}\left(\frac{9\times50}{10} - 40\right)$

$= 25 + \frac{4}{5}(45-40)$

$= 25 + \frac{4}{5}(5)$

$D_9 = 29$

Q. No:3

Ans:

Random Statistics:

In statistics a random variable is an assignment of numerical value to each possible outcome of an event space. These association facilities the identification and the calculation of probabilities of each event.

Inferential Statistics:

Inferential Statistics is a branch of statistics through which we collect the data, analysis the data, summarize the data, interpretate the data and tabulate the data to get precise result in non-numerical form.

OR

The process of reaching generalizations about the whole by examining a portion is called inferential statistics.

Descriptive Statistics:

The collection of data, analysis of data, summarization of data, interpretation of data, tabulation of data at last we get a precise result in numerical form is called descriptive statistics.

OR

Descriptive statistics is concerned with the summarization and describing a body of data.

Sources of Primary Data:

i. Direct personal investigation.
ii. Indirect investigation
iii. Interview method
iv. Collection through Enumerators.
v. Questioner method
vi. Collection through local sources
vii. Computer interview method

Nominal Scale:

It can be define as “the classification of the observation into mutually exclusive qualitative classes is said to be nominal scale”

E.g:

i. Students are classified as male and female. We may use number 1 and 2.

ii. Rainfall may be classified as heavy, moderate and light.
We may use number 1,2, and 3

The numbers when they are used, only identify the categories. In this scale no particular order is used.

