7. Statistics

Extra Question

1 Mark Questions

1) State whether the given information is primary or secondary data.

The information of heights of students was gathered from school records and sent to the head office , as it was to be sent urgently.

Ans : Secondary data.

2) Find the class mark of the class 35-40.

Soln : The class mark of the class 35-40

$$= \frac{the\ lower\ class\ limit + the\ cupper\ class\ limit}{2}$$

$$= \frac{35+40}{2}$$

$$= \frac{75}{2}$$

$$= 37.5$$

The class mark of class 35-40 is 37.5

3) Find the median of the observations 59, 75, 68, 70, 74, 75, 80

Soln : Write the given data in the ascending order.

59, 68, 70, 74, 75, 75, 80.

n = 7 (odd number)

∴ median is the value of the middle number.

The middle number is 74.

∴ Median is 74.

4) The weights of 10 students (in kg) are given below :

40, 35, 42, 43, 37, 35, 37, 37, 42, 37. Find the mode of the data.

Soln : Given data in ascending order

35, 35, 37, 37, 37, 37, 40, 42, 42, 42, 43

∴ The observation repeated maximum number of times = 37

∴ Mode of the given data is 37 kg.

5) Find the mode of the following data (2 mark)

Marks	35	36	37	38	39	40
No. of students	09	07	09	04	04	02

Soln: Here, the maximum frequency is 9

since,

mode = observations having maximum frequency

But, this is the frequency of two observations.

∴ Mode = 35 and 37.

6) Yield of soyabean per acre in quintal in Mukund's field for 7 years was 10,7,5,3, 9, 6, 9. Find the mean of yield per acre .

Soln : Mean $= \frac{The\ sum\ of\ all\ observations\ in\ the\ data}{Total\ number\ of\ observations}$

$= \frac{10+7+5+3+9+6+9}{7}$

$= \frac{49}{7}$

$\therefore$ Mean $= 7$

$\therefore$ The mean of yield per acre is 7 quintal.

7) For class interval 35-45, write the lower class limit and the upper class limit.

Soln : Here, the class interval is 35 - 45.

$\therefore$ The lower class limit = 35

The upper class limit = 45

8) Find the class mark of the class 10.5 to 20.5

Ans : class mark $= \frac{10.5+20.5}{2} = \frac{31.0}{2}$

Class Mark = 15.5

9) The mode of 18, 14, 22, 23, 14, 18, 17, 18, 28, 28, 14, 25, 14.

Soln : Mode is the value of the observations which occur more frequently.

Here, the mode is 14.

10) The mean of eleven number is 47. If a number is added then the mean is increased by 2. Then what is the new number?

Ans : $\text{Mean} = \frac{Sum\ of\ number}{Total\ number}$

$47 = \frac{Sum\ of\ number}{11}$

$\therefore$ Sum of number $= 47 \times 11$

$\therefore$ Sum of number $= 517$

Now, new mean $= 49$

$\therefore 49 = \frac{Sum\ of\ number}{12}$

$\therefore$ Sum of number $= 49 \times 12$

$= 588$

$\therefore$ New number $= 588 - 517$

$= 71$

2 Marks Question

11) If class mark is 10 and class width is 6, then find the class.

Ans : Let the lower class limit be x and upper class limit by y.

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

$\therefore 10 = \frac{x+y}{2}$

$\therefore x + y = 20$ …….. (i)

Class width = upper class limit - lower class limit ….(ii)

$6 = y - x$

$6 = -x + y$……..(ii)

adding equation (i) and (ii)

$$\begin{array}{r} x + y = 20 \\ -\ x + y = 6 \\ \hline 2y = 26 \end{array}$$

$y = \frac{26}{2} = 13.$ …… (iii)

Substituting (iii) in (i)

$x + 13 = 20$

$x = 20 - 13$

$x = 7$

∴ The required class is 7-13.

12) The ages of 10 girls are given below : 40, 35, 42, 43, 37, 35, 37, 37, 42, 37. Find the mode of the data.

Soln : Data in ascending order :

35, 35, 37, 39, 39, 39,40, 42, 42, 43

Here, 37 occurs maximum number of times.

∴ Mode = 39

∴ Mode of the given data is 39.

13) In the following table, the information is given about the number of families and the siblings in the families less than 14 years of age. Find the mode of the data.

No. of siblings	1	2	3	4
Families	15	25	5	5

Soln : Here, maximum frequency is 25 and it is for 2 siblings.

∴ Mode = 2

∴ Mode of children under 14 year is 2.

14) Complete the following table.

Classes	Tally Marks	Frequency (No. of students))
12-13	𝍸	
13-14	𝍸 𝍸 IIII	
14-15		
15-16	IIII	
	Total (N) = $\sum f = 35$	

Soln :

Classes	Tally Marks	Frequency (No. of students)
12-13	$\cancel{\text{IIII}}$	5
13-14	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$ IIII	14
14-15	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$ II	12
15-16	IIII	4
	Total (N) = $\sum f = 35$	

15) The mean of 5 observations is 50. One of the observation was removed from the data, hence the mean become 45. Find the observation which was removed .Complete the following activity

Mean of 5 observations is 50

$\therefore$ sum of 5 observations = $\square \times \square$

$= \square$

If one observation is excluded, the mean is 45 Mean of $\square$

Observation $= \square \times 45$

$= \square$

The excluded number $= \square - \square$

$= \square$

Soln : Mean of 5 observations is 50

$\therefore$ sum of 5 observations = 5 × 50

= 250

If one observation is excluded, the mean is 45 Mean of 4 observation = 4 × 45

= 180

The excluded number = 250 − 180

= 70

16) Complete the following table (3 mark)

Classes	Tally Marks	Frequency (No. of students))
12-13	~~IIII~~	-
13-14		20
14-15	~~IIII~~ ~~IIII~~	-
15-16	~~IIII~~ III	-
	Total (N) = $\sum f = 46$	

Ans :

Classes	Tally Marks	Frequency (No. of students)
12-13	𝍸	5
13-14	𝍸 𝍸 𝍸 𝍸	20
14-15	𝍸 𝍸	10
15-16	𝍸 III	8
	Total (N) = $\sum f = 46$	

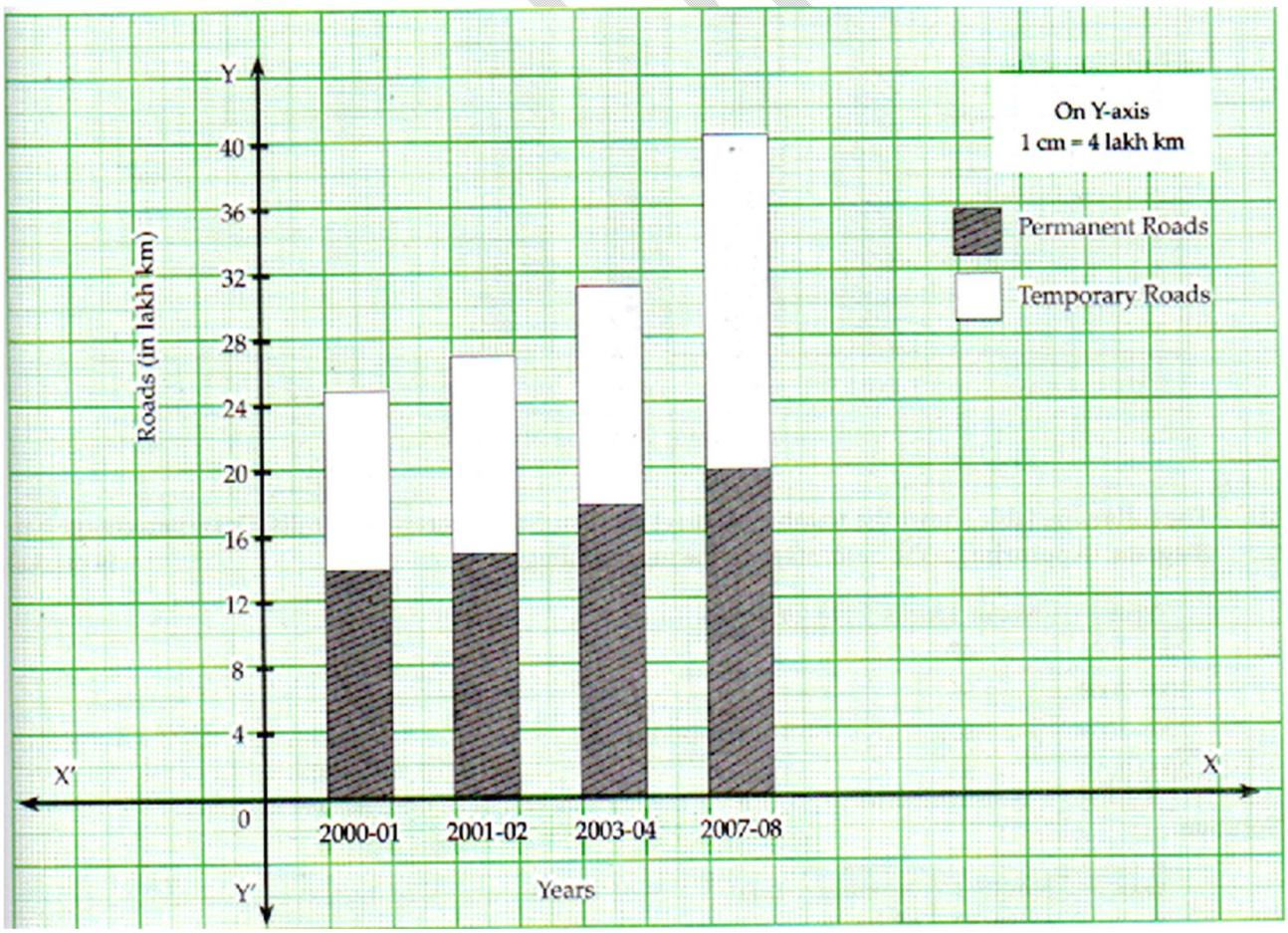
17) In the table given below, the information is given about roads. Using this draw sub-divided bar-diagram.

Year	Permanent Roads (Lakh km.)	Temporary Roads (Lakh km.)
2000-2001	14	10
2001-2002	15	11
2003-2004	17	13
2007-2008	20	19

Ans : Sub- divided bar diagram:

Year	Permanent Roads (in Lakh km.)	Temporary Roads (in Lakh km.)	Total
2000-2001	14	10	24
2001-2002	15	11	26
2003-2004	17	13	30
2007-2008	20	19	39

Sub-divided bar diagram:



18) Complete the following Table

Year	Number Of trucks	Number of buses	Total	% of trucks	% of buses
2005-2006	47	9	56	$\frac{47}{56} \times 100 = 84\%$	
2007-2008	56	13	69	$\frac{\square}{\square} \times 100 = 81\%$	100 - 81=19%
2008-2009	60	16	76	$\frac{\square}{76} \times 100 =$	100– 79 =21%
2009-2010	63	18	81	$\frac{\square}{76} \times 100 = 78\%$	100 – 78= $\square$

Ans :

Year	Number Of trucks	Number of buses	Total	% of trucks	% of buses
2005-2006	47	9	56	$\frac{47}{56} \times 100 = 84\%$	100 - 84 = 16
2007-2008	56	13	69	$\frac{56}{69} \times 100 = 81\%$	100-81=19%
2008-2009	60	16	76	$\frac{60}{76} \times 100 = 79\%$	100– 79 =21%
2009-2010	63	18	81	$\frac{63}{81} \times 100 = 78\%$	100 – 78= 22

19) The value of π upto 50 decimal places is given below:

3.14159265358979323846264338327950288419716939937510

From this information prepare ungrouped frequency distribution table of digits appearing after the decimal point. (3 mark)

Ans :

Class (Digit)	Tally Marks	Frequency (f)
0	II	2
1	$\cancel{\text{IIII}}$	5
2	$\cancel{\text{IIII}}$	5
3	$\cancel{\text{IIII}}$ III	8
4	IIII	4
5	$\cancel{\text{IIII}}$	5
6	IIII	4
7	IIII	4
8	$\cancel{\text{IIII}}$	5
9	$\cancel{\text{IIII}}$ III	8
	Total (N) = $\sum f = 50$	

20) In a village, the milk was collected from 50 milkmen at a collection center in litres as given below:

27 75 5 99 70 12 15 20 30 35 45 80
77 90 92 72 4 33 22 15 20 28 29 14
16 20 72 81 85 10 16 9 25 23 26 46
55 56 66 67 51 57 44 43 6 65 42 36
7 35

By taking suitable classes, prepare grouped frequency distribution table. (3 marks)

Ans :

Class (Milk in litre	Tally Marks	Frequency (No. of milkmen)
0-20	$\cancel{IIII}$ $\cancel{IIII}$ II	12
20-40	$\cancel{IIII}$ $\cancel{IIII}$ $\cancel{IIII}$	15
40-60	$\cancel{IIII}$ IIII	09
60-80	$\cancel{IIII}$ III	08
80-100	$\cancel{IIII}$ I	06
	Total (N) = $\sum f = 50$	

3 Marks Question

21) If the mean of the following data is 20.2 then find the value of p.

xi	10	15	20	25	30
fi	6	8	*P*	10	6

Ans :

xi	*fi*	*fixi*
10	6	60
15	8	120
20	P	*20p*
25	10	250
30	6	180
	$\sum fi$ = 30 + p	$\sum fixi$= 610 + 20 p

Mean $(\overline{x}) = \frac{\sum fixi}{\sum fi}$

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

$\therefore$ 20.2 (30 + P) = 610 + 20p

$\therefore$ 606 + 20.2p = 610 + 20p

$\therefore$ 20.2p – 20p = 610 – 606

$\therefore$ 0.2p = 4

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

$\therefore$ p = 20

22) Following 10 observations are arranged in ascending order as follows. 2, 3, 5, 9, x + 1, x+3, 14, 16, 19, 20, if the median of the data is 11, find the value of x

Ans : Given data in ascending order :

2, 3, 5, 9, x + 1, x + 3, 14, 16, 19, 20

$\therefore$ Number if observations (n) = 10 (i.e. even)

$\therefore$ Median is the average of middle two observations.

Here, the 5^{th} and 6^{th} numbers are in the middle position.

$\therefore$ Median = $\frac{(x+1)+(x+3)}{2}$

$\therefore$ 11 = $\frac{2x+4}{2}$

$\therefore 22 = 2x+4$

$\therefore 22 - 4 = 2x$

$\therefore 18 = 2x$

$\therefore x = \frac{18}{2}$

$\therefore x = 9$

23) The calculated mean of 50 observations was 80. It was later discovered that observation 19 was recorded by mistake as 91 .what was the correct mean?

Soln : Here mean = 80, number of observations = 50

$$\text{Mean} = \frac{The\ sum\ of\ all\ observations}{Total\ number\ of\ observarions}$$

$\therefore$ The sum of all observations = Mean × Total number of observations

$\therefore$ The sum of 50 observations = 80 × 50

= 4000

One of the observation was 19. However, by mistake it was recorded as 91.

Sum of observations after correction

= Sum of 50 observation + correct observation – incorrect observation

= 4000 + 19 – 91

= 3928

∴ corrected mean = $\frac{sum\ of\ observations\ after\ correction}{total\ number\ of\ observation}$

= $\frac{3928}{50}$

= 78.56

∴ The corrected mean is 78.56

24) The mean of nine numbers is 77. If one more number is added to it, then the mean increases by 5. Find the number added in the data.

Ans : Mean = $\frac{The\ sum\ of\ all\ observations}{total\ number\ of\ observations}$

∴ The sum of all observations = Mean ×Total number of observations

∴ Sum of 9 numbers = 77 × 9

= 693 ….. (i)

If one more number is added, then mean increased by 5.

Mean of 10 numbers = 77 + 5

= 82

∴ Sum of the 10 numbers = 82 × 10

= 820 …. (ii)

∴ Number added = sum of the 10 numbers – sum of the 9 numbers

= 820 – 693 [from (i) & (ii)]

= 127

∴ The number added in the data is 127.

25) The data is given for 62 students in a certain class regarding their Mathematics marks out of 100. Take the classes 0-10, 10-20, …. And prepare frequency distribution table and cumulative frequency table more than or equal to type

55, 60, 81, 90, 45, 65, 45, 52, 30, 85, 20, 10, 75, 95, 09, 20, 25, 39, 45, 50, 78, 70, 46, 64, 42, 58, 31, 82, 27, 11, 78, 97, 07, 22, 27, 36, 35, 40, 75, 80, 47, 69, 48, 59, 32, 83, 23, 17, 77, 45, 05, 23, 37, 38, 35, 25, 46, 57, 68, 45, 47, 49

From the prepared table, answer the following questions.

(i) How many students obtained 40 marks or above 40?

(ii) How many students obtained 90 marks or above 90?

(iii) How many students obtained 60 marks or above 60?

(iv) What is the cumulative frequency more than or equal to type of the class 0-10?

Ans :

Class (Mark)	Tally Marks	Frequency	Cumulative frequency more than or equal to type
0-10	III	3	62
10-20	III	3	62 – 3 = 59
20-30	~~IIII~~ IIII	9	59-3 = 56
30-40	~~IIII~~ IIII	9	56 – 9 = 47
40-50	~~IIII IIII~~ III	13	47 – 9 = 38
50-60	~~IIII~~ I	6	38 – 13 = 25
60-70	~~IIII~~	5	25 – 6 = 19
70-80	~~IIII~~ I	6	19 – 5 = 14
80-90	~~IIII~~	5	14 – 6 = 8
90-100	III	3	8 – 5 = 3
	Total (N) = 62		

(i) The number of students scoring 40 or more than 40 marks is 38.

(ii) The number of students scoring 90 or more than 90 marks is 3.

(iii) The number of students scoring 60 or more than 60 mark is 19.

(iv) The cumulative frequency more than or equal to type of class 0-10 is 62.

26) In the tables given below, class mark and frequencies are given Construct the frequency tables taking inclusive classes.

Class mark	Frequency
5	3
15	9
25	15
35	13

Soln: Let , the lower class limit and the upper class limit of the class mark 5 be x_1 and x_2 respectively.

Then , $5 = \frac{x_1+x_2}{2}$

$\therefore\ x_1 + x_2 = 10$ …….. (i)

Class width = 35 – 25 = 25 -15 = 15 -5 = 10

∴ The difference between the upper class limit and lower class limit = 10.

$x_2 - x_1 = 10$ …….. (ii)

from (i) and (ii)

$x_1 = 0$ and $x_2 = 10$

∴ the first class is 0-10 , similarly the other classes can be found.

Inclusive classes :

Class	Class mark	Frequency
0-09	4.5	3
10-19	14.5	9
20-29	24.5	15
30-39	34.5	13
40-49	44.5	-

27) 38 People donated to an organisation working for disabled persons. The amount in rupees were as follows ;

101, 500, 401, 201, 301, 160, 210, 125, 175, 190, 450, 151, 101, 351, 251, 451, 151, 260, 360, 410, 150, 125, 161, 195, 351, 170, 225, 260, 290, 310, 360, 425, 420, 100, 105, 170, 250, 250, 100.

(i) By taking classes 100-149, 150-199 200-249, ….. prepare grouped frequency distribution table.

(ii) From the table, find the number of people who donated Rs. 350 or more.

Ans : i) The frequency distribution table is as follows :

Class	Tally Marks	Frequency
100-149	$\cancel{\text{IIII}}$ II	7
150-199	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$	10
200-249	III	3
250-299	$\cancel{\text{IIII}}$	5
300-349	II	2
350-399	IIII	4
400-449	IIII	4
450-499	II	2
500-549	I	1
	Total (N) = $\sum f = 38$	

ii) The number of persons donating Rs. 350 or more is

4 + 4 + 2 +1 = 11.

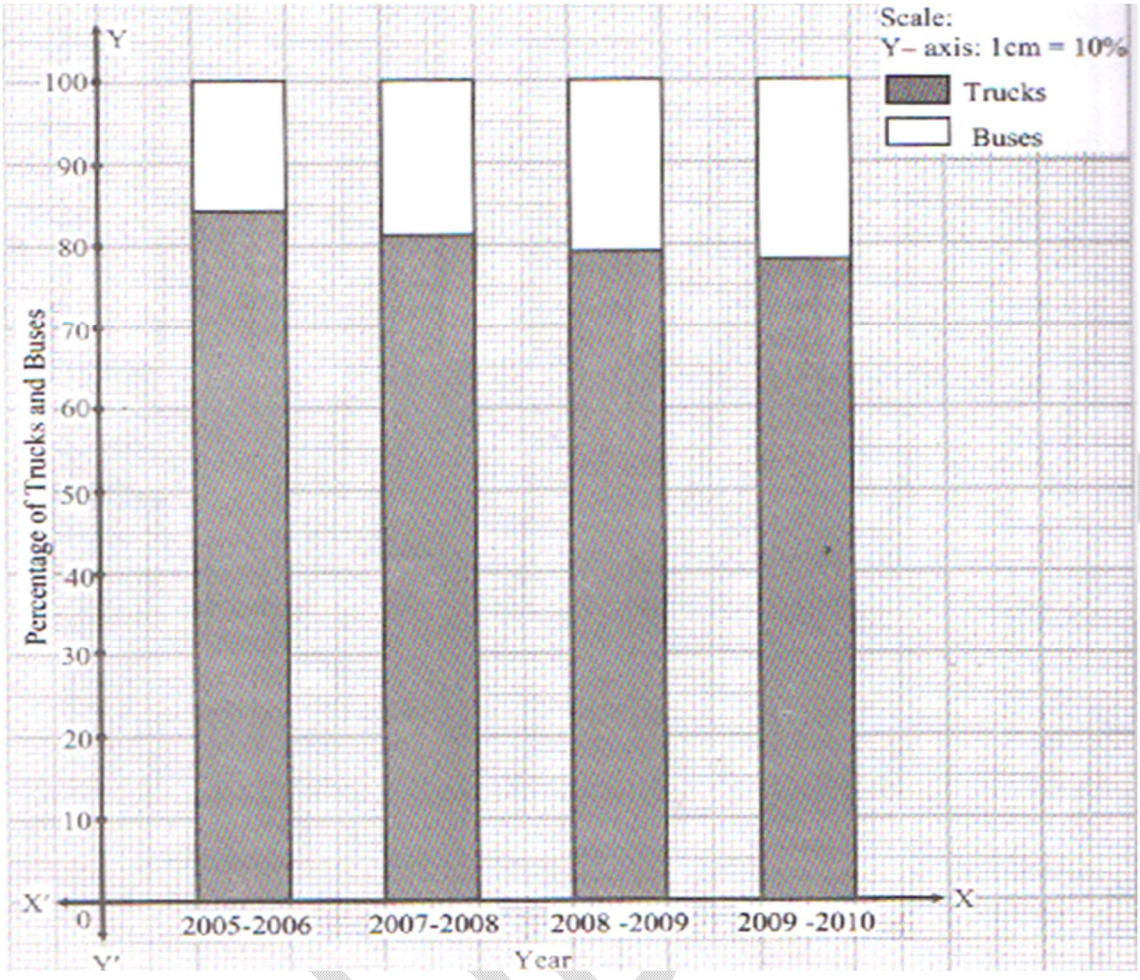
28) The following table shows the number of Buses and Trucks in nearest lakh units. Draw percentage bar diagram. (Approximate the percentages to the nearest integer)

Year	2005-2006	2007-2008	2008-2009	2009-2010
No. of Truck	47	56	60	63
No. of Buses	9	13	16	18

Ans :

Year	2005-2006	2007-2008	2008-2009	2009-2010
No. of Truck	47	56	60	63
No. of Buses	9	13	16	18
Total	56	69	76	81
Percentage of Trucks	$\frac{47}{56} \times 100 =$ 83.93% ~ 84%	$\frac{56}{69} \times 100 =$ 81.16% ~ 81%	$\frac{60}{76} \times 100 =$ 78.95% ~ 79%	$\frac{63}{81} \times 100 =$ 77.78% ~ 78%
Percentage of Buses	100 – 84 = 16%	100 – 81 = 19%	100 – 79 = 21%	100 – 78 = 22%

percentage bar diagram:

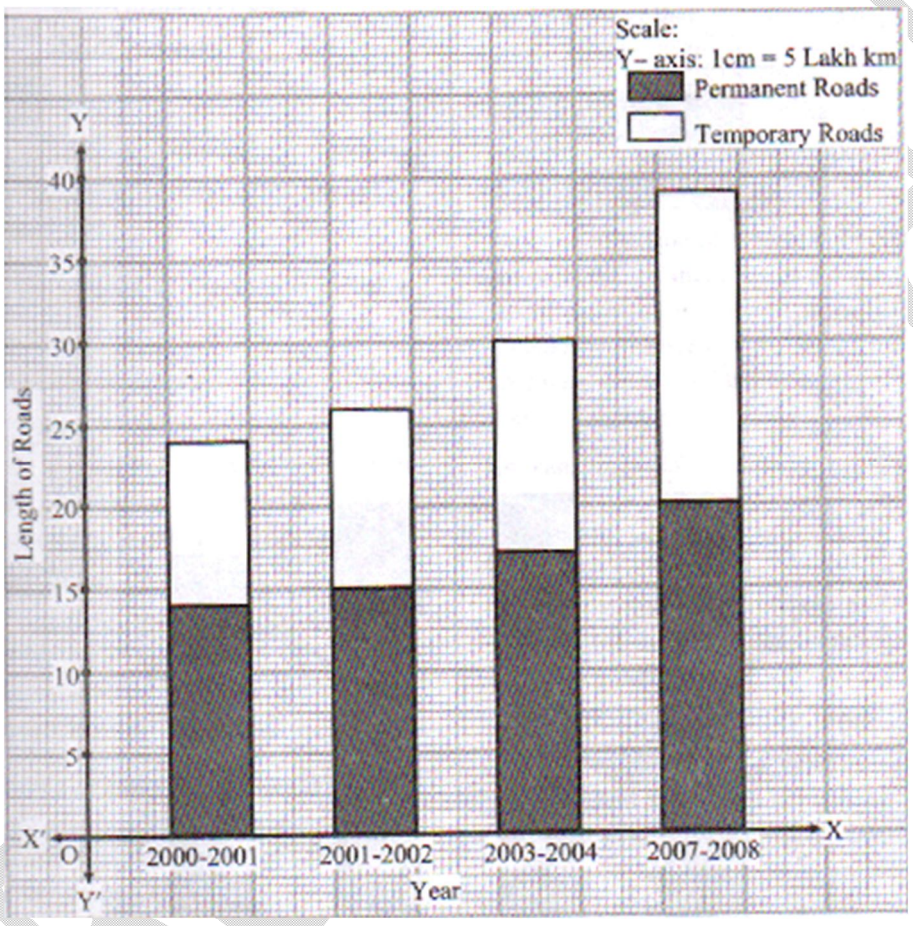


29) In the table given below, the information is given about roads. Using this draw sub-divided and percentage bar diagram (Approximate the percentages to the nearest integer)

Year	Permanent Roads (Lakh km.)	Temporary Roads (Lakh km.)
2000-2001	14	10
2001-2002	15	11
2003-2004	17	13
2007-2008	20	19

Ans : Sub divided bar diagram :

Year	Permanent Roads (Lakh km.)	Temporary Roads (Lakh km)	Total
2000-2001	14	10	24
2001-2002	15	11	26
2003-2004	17	13	30
2007-2008	20	19	39



30) Complete the following cumulative frequency table.

Class (Monthly Income in Rs.)	Frequency (Number of individuals)	More than or equal to type cumulative frequency.
1000-5000	45	
5000-10,000	19	
10, 000-15, 000	16	
15, 000-20,000	2	
20,000-25,000	5	

Ans :

Class (Monthly Income in Rs.)	Frequency (Number of individuals)	More than or equal to type cumulative frequency.
1000-5000	45	87
5000-10,000	19	87-45 = 42
10, 000-15, 000	16	42-19 = 23
15, 000-20,000	2	23-16=7
20,000-25,000	5	7-2=5
	Total = 87	

31) The mean salary of 20 workers is ₹ 10,250.If the salary of office superintendent is added, the mean will be increase by ₹ 750. Find the salary of the office superintendent. (3 marks)

Ans : The mean salary of 20 workers is ₹ 10, 250

∴ the total salary of 20 workers is

₹ 10, 250 × 20 = ₹ 2,05, 000 …….. (i)

The mean becomes ₹ (10250 + 750) = ₹ 11, 000

If the office superintendent's salary is included.

Hence, the total salary of 21 persons =

(20 workers + superintendent)

= ₹ 11000 × 21

= ₹ 2, 31, 000……(ii)

∴ Superintendent's salary = ₹ [2,31,000 – 2,05,000]

[from (1) and (2)]

= 26, 000 ₹

The salary of the office superintendent is 26,000.

32) Find the mean of the following data

xi	2	4	6	8	10	12
Fi	5	10	16	7	4	8

Ans :

Xi	Fi	fixi
2	5	10
4	10	40
6	16	96
8	7	56
10	4	40
12	8	96
	N = 50	$\sum fixi$= 338

Mean $(\overline{x}) = \frac{\sum fixi}{N} = \frac{338}{50}$

∴ Mean = 6.76

33) Find the median weight of the data

Weight(kg)	35	36	38	40	42	44	45
No. of students	6	5	8	9	2	7	4

Ans :

Weight (kg)	No. of students	c.f.(less than type)
35	6	6
36	5	11
38	8	19
40	9	28
42	2	30
44	7	37
45	4	41
	N = 41	

No. of observations = 41 (odd number)

$\therefore$ Median = $\left(\frac{N+1}{2}\right)^{th}$ term

$= \frac{41+1}{2}$

$= \frac{42}{2} = 21^{st}$ term

Now, 21^{st} term is 40.

$\therefore$ Median = 40

34) Calculate the median for the following data

Marks(out of 60)	32	27	26	24	23	21
No.of students	6	4	7	9	16	2

Ans :

Marks	No. of students	c.f.(less than type)
32	6	6
27	4	10
26	7	17
24	9	26
23	16	42
21	2	44
	$N = 44$	

No. of observations = 44 (even number)

$\therefore$ Median =Mean of $\left(\frac{N}{2}\right)^{th}$ term and

$\left(\frac{N+2}{2}\right)^{th}$ term.

$\left(\frac{N}{2}\right)^{th}$ term $= \frac{44}{2} =$ 22nd term is 24 .

$\left(\frac{N+2}{2}\right)^{th}$ term $= \frac{46}{2} =$ 23nd term is 24.

$\therefore$ Median $= \frac{24+24}{2} = 24$

35) The mean weight of 150 students in a class is 60 kg. The mean weight of the boys is 70kg, while that of the girls is 55 kg. find the number of boys and girls in the class.

Ans : Let the number of boys be x.

∴ The number of girls = (150 -x)

Total weight of 150 students = [(Total weight of x boys) + (Total weight of (150 -x) girls)]

∴ 150 × 60 = 70x + 55 (150 – x)

∴ 9000 = 70x + 8250 – 55x

∴9000 – 8250 = 70x– 55x

∴ 15x = 750

∴ x = 50

∴ The number of boys = x = 50 and

the number of girls = (150- x) = 100.

36) The mean of 25 students of a class is 48 kg. If the mean weight of first 13 students is 50 kg and that of last 13 students is 46 kg, find the weight of 13^{th} student?

Ans : Mean weight of 25 students = 48 kg.

∴ sum of weights of 25 students = 48 × 25

= 1200 kg.

Now, mean weight of first 13 students = 50kg.

∴ sum of weights of first 13 students = 50 × 13

= 650 kg.

Mean weight of last 13 students 46 kg.

∴ Sum of weights of last 13 students = 46 × 13

= 598 kg.

∴ Sum of weights of first 13 and last 13

Students = 650 + 598 = 1248 kg.

Then, weight of 13^{th} student = 1248 – 1200

= 48 kg.

37) The average temperature for Monday, Tuesday and Wednesday was 40^0 c. The average for Tuesday, Wednesday and Thursday was 41^0 c. If the temperature on Thursday be 42^0c ,what was the temperature on Monday?

Ans : The average temperature on Monday, Tuesday, Wednesday was 40^0 *c*

∴ Sum of temperature on Monday, Tuesday, Wednesday

= 40 × 3 = 120^0 c.

The average temperatures on Tuesday, Wednesday, Thursday = 41 × 3 = 123^0c

Temperature on Thursday = 42^0c

∴ Temperature on Monday = (120 + 42 – 123)

= 39^0c

38) The ages of teachers of a school are 53, 37, 39, 51, 46, 42, 44, 47, 55, 48. Find the median .(3 mark)

Ans : Data in ascending order:

37, 39, 42, 44, 46, 47, 48, 51, 53, 55.

Here, n=10 (even number)

Median = Mean of $\left(\frac{N}{2}\right)^{th}$ term and

$\left(\frac{N+2}{2}\right)^{th}$ term.

∴ $\frac{n}{2}=\frac{10}{2}$=5th term and

$\left(\frac{N+2}{2}\right)=\left(\frac{10+2}{2}\right)=\left(\frac{12}{2}\right)$=6th term

5th term = 46 and 6th term =47

Median= $\frac{46+47}{2}=\frac{93}{2}$ = 46.5

Then median is 46.5.

39) In a basket 10 tomatoes are present. The weight of each tomato is given in gram is as follows 60, 70, 90, 95, 50, 65, 70, 80, 85, 95. Find the median weight of tomato.

50, 60, ☐ , 70, ☐ , 80, 85, ☐ , ☐ , ☐

Here,] n = ☐

Median= mean of ☐ th term and ☐ th term

$\therefore median\ of\ weight\ of\ tomato =$ ☐

Ans : arrange the given data in ascending order

50, 60, 65 , 70, 70 , 80, 85, 90 , 95 , 95

here] n = 10

Median= mean of 5 th term and 6 th term

Median $= \frac{70+80}{2} = \frac{150}{2}$

$\therefore median\ of\ weight\ of\ tomato =$ 75 gm

40) There are 10 observations arranged in ascending order as given below:

45, 47, 50, 52, x, x + 2, 60, 62, 63, 74.

The median of these observations is 53. Find the value of x. Also find the mean and the mode of the data.

Soln : 45, 47, 50, 52, x, x + 2, 60, 62, 63, 74.

Here, n = 10 (Even number)

∴ Median is the average of the middle two number.

∴ median is the average of x and x + 2.

$\therefore 53 = \frac{x+x+2}{2}$

∴ 106 = 2x + 2

∴ 2x = 106 – 2

∴ 2x = 104

∴ x = 52.

The observations are,

45, 47, 50, 52, 52, 54, 60, 62, 63, 74.

$\text{Mean} = \frac{\textit{The sum of all observations in the data}}{\textit{total number of obsefvation}}$

$= \frac{45+47+50+52+52+54+60+62+63+74}{10}$

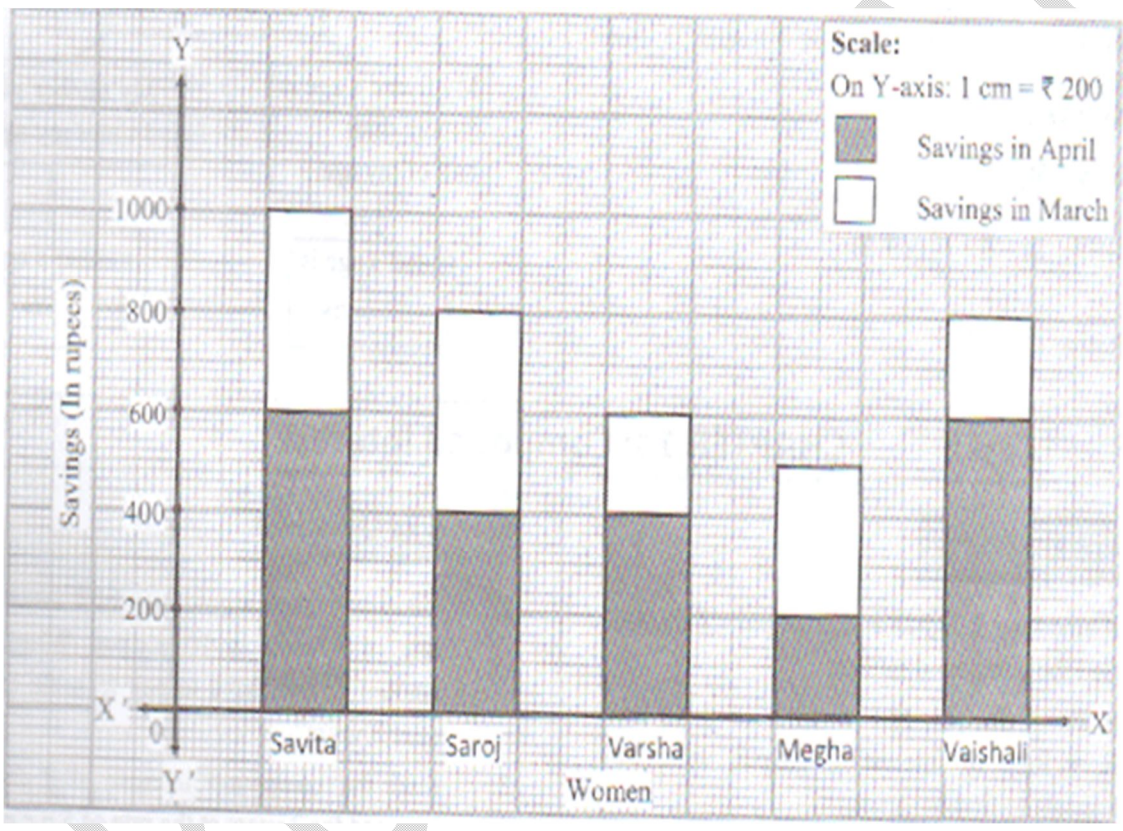
$= \frac{559}{10}$

Mean = 55.9

The observation in the ascending order are 45, 47, 50, 52, 52, 54, 60, 62, 63, 74.

Here, the maximum frequency of observation is 52.

41) Observe the following graph and answer the questions. (4 m)



(i) State the type of the graph.

Ans : Subdivided bar graph

(ii) How much is the saving of Vaishali in the month of April?

Ans : ₹ 600

(iii) How much more is the total Savings of Savita than the total savings of Megha?

Ans : ₹ 500

42) The monthly maximum temperature of a city is given in degree Celsius in the following data. By taking suitable classes, prepare the grouped frequency distribution table.

29.2, 29.0, 28.1, 28.5, 32.9, 29.2, 29.2, 34.2, 36.8, 32.0, 31.0, 30.3, 30.0 33, 32.5, 35.5, 34.0, 32.9, 31.5, 30.5, 31.4, 31.4, 30.3, 34.7, 35.0, 32.5, 33.5, 29.0, 29.5, 29.9, 33.2, 30.2

From the table, answer the following questions.

(i) For how many days the maximum temperature was less than 34^0 C?

(ii) For how many days the maximum temperature was 34^0 C or more than 34^0 C (4 Mark)

Ans :

temperature	Tally Marks	Frequency
28-30	~~IIII~~ III	8
30-32	~~IIII~~ III	8
32-34	~~IIII~~ III	8
34-36	~~IIII~~	5
36-38	I	1
	Total (N) = 30	

(i) Number of days for which the maximum temperature was less than 34^0 C = 8 + 8 + 8 = 24

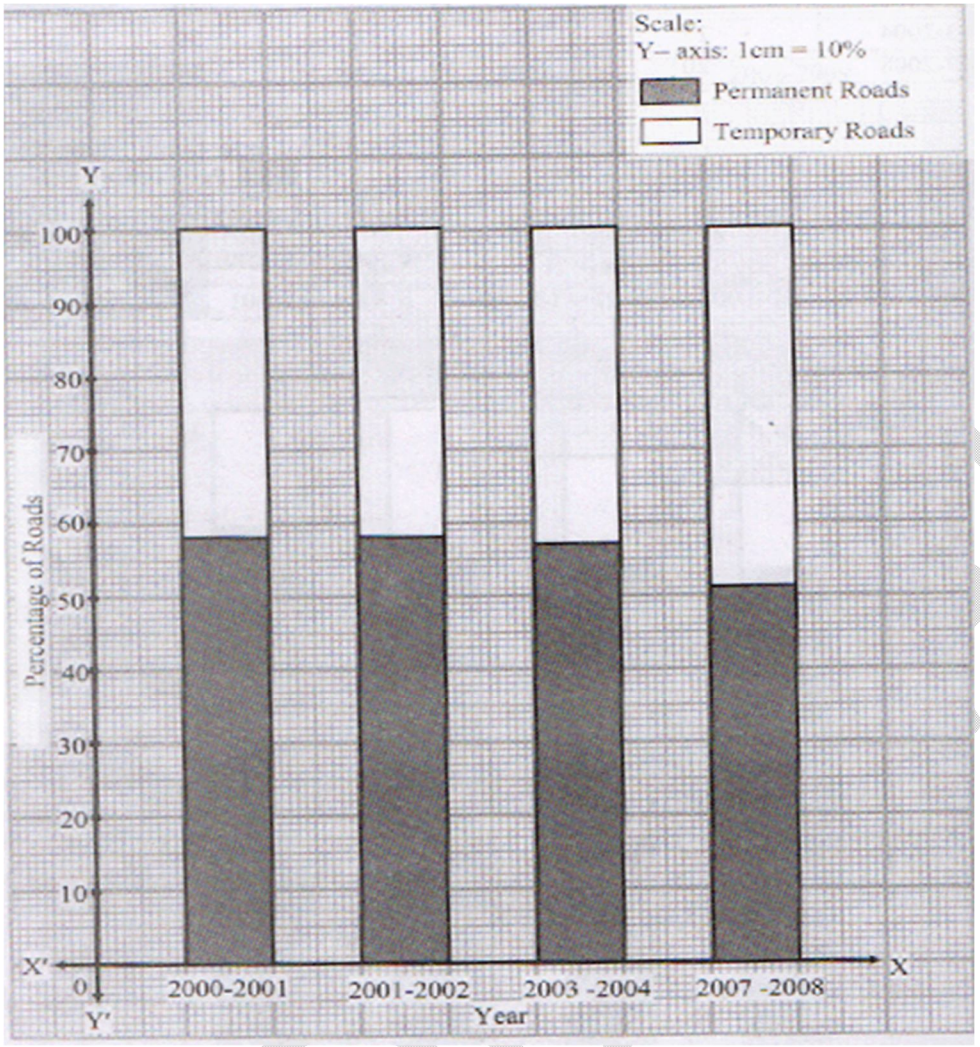
(ii) Number of days for which the maximum temperature was 34^0 C or mote than 34^0 C = 5 + 1 = 6

43) In the table given below, the information is given about roads. Using this draw percentage bar diagram. (3 marks)

Year	Permanent Roads (Lakh km.)	Temporary Roads (lakh km.)
2000-2001	14	10
2001-2002	15	11
2003-2004	17	13
2007-2008	20	19

Ans : Percentage bar diagram :

Year	2000-2001	2001-2002	2003-2004	2007-2008
Permanent Roads (Lakh km.)	14	15	17	20
Temporary Roads (Lakh km.)	10	11	13	19
Total	24	26	30	39
Percentage of Permanent Roads	$\frac{14}{24} \times 100$ = 58.33%. ~ 58%	$\frac{15}{26} \times 100$ = 57.69% ~ 58%	$\frac{17}{30} \times 100$ = 56.67% ~ 57%	$\frac{20}{39} \times 100$ = 51.28% ~ 51%
Percentage of Temporary Roads	100 – 58 = 42%	100 – 58 = 42%	100 – 57 = 43%	100 – 51 = 49%



44) In the following table, the information is given about the number of families and the siblings in the families less than 14 years of age. Find the mode of data (1Mark)

No. of siblings	1	2	3	4
families	15	25	5	5

Ans : Here, the maximum frequency is 25.

Since, mode = observation having maximum frequency.

∴ The mode of the given data is 2.

45) The data is given for 62 students in a certain class regarding their mathematics marks out of 100. Take the classes 0-10, 10-20…and prepare frequency distribution table and less than type cumulative frequency table. (3 mark)

Ans :

Class (Mark)	Frequency (No. of students)	Less than cumulative frequency
0-10	3	3
10-20	3	3 + 3 = 6
20-30	9	6 + 9 = 15
30-40	9	15 + 9 = 24
40-50	13	24 + 13 = 37
50-60	6	37 + 6 = 43
60-70	5	43 + 5 = 48
70-80	6	48 + 6 = 54
80-90	5	54 + 5 =59
90-100	3	59+3 = 62
	Total (N) = 62	

46) By Using data in ex (45) answer the following questions :

(i) How many students obtained less than 40 marks ?

Ans : 24 students obtained less than 40 marks.

(ii) How many students obtained less than 10 marks?

Ans : 3 students obtained less than 10 marks.

(iii) How many students obtained less than 60 marks?

Ans : 43 students obtained less than 60 marks

(iv) Find the cumulative frequency of the class 50-60

Ans : cumulative frequency of the class 50-60 is 43.

47) If class-mark is 10 and class width is 6, then find the class. (3 M)

Ans : Let the upper class limit be x and the lower class limit be y.

Class mark = 10 …….. (Given)

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

$\therefore 10 = \frac{x+y}{2}$

$\therefore x + y = 20$ …… (i)

Class width = Upper class limit – Lower class limit

$\therefore x - y = 6$ ……. (ii)

Adding equations (i) and (ii),

$$\begin{array}{r} x + y = 20 \\ x - y = 6 \\ \hline 2x \quad = 26 \end{array}$$

$\therefore x = 13$

Substituting x = 13 in equation (i)

$13 + y = 20$

$\therefore\ y = 20 - 13$

$y = 7$

$\therefore$ The required class is 7-13.

48) Complete the following table. (4 mark)

Class (age)	Tally Marks	Frequency (No. of Students)
12-13	$\cancel{\text{IIII}}$	
13-14	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$ IIII	
14-15		
15-16	IIII	
	(N) = $\sum f = 35$	

Ans : Let frequency of the class 14-15 be x, then, from table ,

$5 + 14 + x + 4 = 35$

$\therefore\ 23 + x = 35$

$\therefore\ x = 35 - 23$

$x = 12$

Class (age)	**Tally Marks**	**Frequency (No. of Students)**
12-13	$\cancel{\text{IIII}}$	5
13-14	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$ IIII	14
14-15	$\cancel{\text{IIII}}$ $\cancel{\text{IIII}}$ II	12
15-6	IIII	4
	(N) = $\sum f = 35$	

49) There are 68 students of 9th standard from Model High School, Nandpur. They have scored the following marks out of 80 in the written examination of mathematics. (3 mark)

70, 50, 60, 66. 45,	46, 38, 30, 40, 47
56, 68, 80, 79, 39,	43, 57, 61, 51, 32
42, 43, 75, 43, 36,	37, 61, 71, 32, 40,
45, 32, 36, 42, 43,	55, 56, 62, 66, 72,
73, 78, 36, 46, 47,	52, 68, 78, 80, 49,
59, 69, 65, 35, 46,	56, 57, 60, 36, 37,
45, 42, 70, 37, 45,	66, 56, 47.

Prepare a frequency distribution table (less than type) taking classes 30-40, 40-50, ….

Using the table answer the following questions:

(i) How many students scored less than 80 marks?

(ii) How many students scored less than 40 marks?

(iii) How many students scored less than 60 marks?

Ans: Table

temperature	Tally Marks	Frequency	Cumulative Frequency (less than type)
30-40	𝍸 𝍸 IIII	14	14
40-50	𝍸 𝍸 𝍸 𝍸	20	14 + 20 = 34
50-60	𝍸 𝍸 I	11	34 + 11 = 45
60-70	𝍸 𝍸 II	12	45 + 12 = 57
70-80	𝍸 IIII	9	57 + 9 = 66
80-90	II	2	66 + 2 = 68
	Total (N) = 68		

(i) 66 Students scored less than 80 marks.

(ii) 14 students scored less than 40 marks.

(iii) 45 students scored less than 60 marks.

50) Find the class mark of class 60 -70 . (2 mark)

Soln:

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

$$\therefore \text{Class mark} = \frac{60+70}{2}$$

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

$$= 65$$

∴ The class mark of the class 60-70 is 65

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