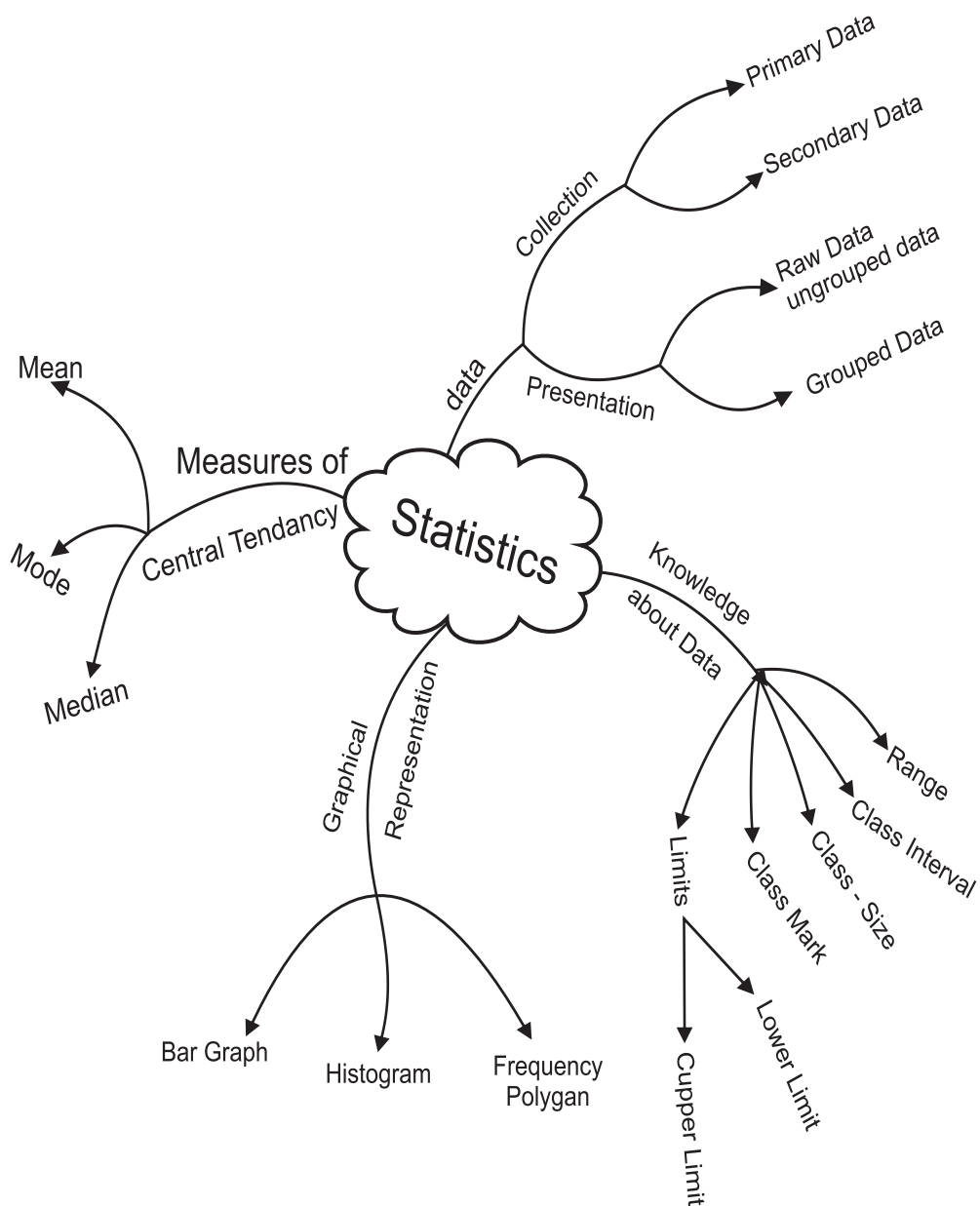


CHAPTER-14

STATISTICS

MIND MAP



CHAPTER-14

STATISTICS

KEY POINTS

- In Statistics we study collection, presentation, analysis and interpretation of data.
- Facts or figures collected with a definite purpose are called data.
- The number of times an observation occurs in the given data is called frequency of the observation.
- Class intervals are the groups in which all observations are divided.
- For class-interval 20-30, 30 is called upper class limit and 20 is called lower class limit.
- Class mark = $\frac{\text{Lower class limit} + \text{upper class limit}}{2}$
- Average or mean = $\frac{\text{Sum of all observations}}{\text{number of observations}}$
- For raw data, mean $(\bar{x}) = \frac{\sum_{i=1}^n x_i}{n}$ Mean $(\bar{x}) = \frac{X_1 + X_2 + \dots + X_n}{n}$
- When frequency f_i is given Mean $\bar{x} = \frac{\sum_{i=1}^n f_i x_i}{\sum_{i=1}^n f_i}$
- Mode is the value of observation which occurs most frequently.
- For Median arrange the data in ascending order or descending order.

If number of observation ' n ' is odd

Then Median = $\frac{(n+1)^{\text{th}}}{2}$

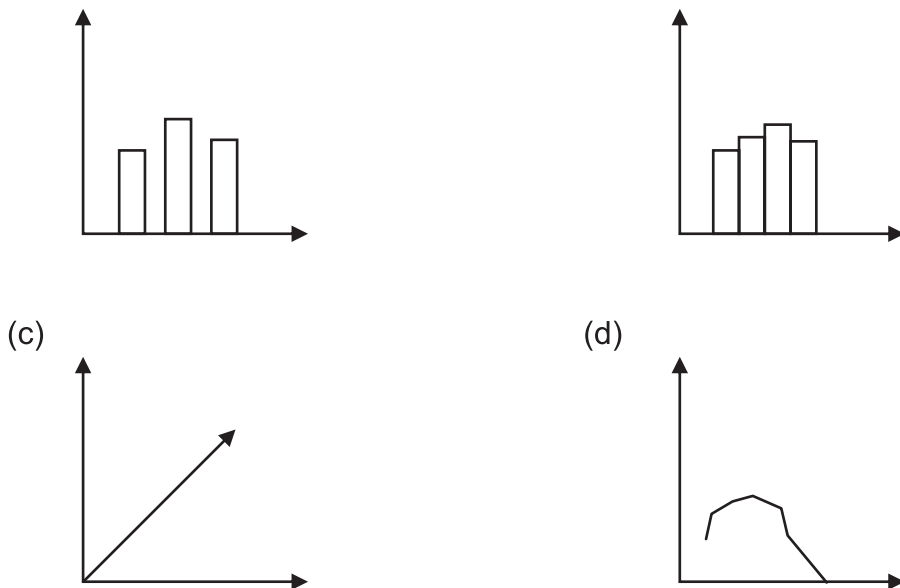
If number of observation ' n ' is even

Then Median = $\frac{\left(\frac{n}{2}\right)^{\text{th}} \text{term} + \left(\frac{n}{2} + 1\right)^{\text{th}} \text{term}}{2}$

STATISTICS

PART-A

1. Facts or Figures, collected with a definite purpose are -
(a) Frequency (b) Data
(c) Tally Marks (d) Bars
2. To compare this years result with last years result, teacher went to the class and collected this years number of distinctions from the students. For last years number of distinctions, she opened the result register & wrote the required number of distinctions. The data Collected by her from the students & register respectively, are examples of -
(a) Primary data & secondary data (b) Primary data & raw data
(c) Both primary data (d) Secondary data
& Primary data
3. How is a histogram different from bar graph.
(a) Histogram is same as bar graph but joined together.
(b) no difference
(c) We use class - intervals in histogram instead to variables.
(d) (A) & (B) both are correct.
4. Which of the figures represent a histogram correctly-



5. In a Histogram when we join midpoints of the tops of the rectangles (bars) we get :
 - (a) Bar Graph
 - (b) line graph
 - (c) Frequency Polygon
 - (d) Pie graph
6. To draw a frequency polygon we need _____ of the class interval for x-axis and frequency of the respective class for y-axis.
 - (a) upper limit
 - (b) lower limit
 - (c) class-mark
 - (d) range
7. In a continuous frequency distribution, class mark of a class is 15 and lower limit is 13, then its upper limit is :
 - (a) 16
 - (b) 14
 - (c) 13
 - (d) 17
8. If class mark of a class-interval is 8.5. The class size is 5, then the class limits of the corresponding class-interval is
 - (a) 6.5-11.5
 - (b) 6-11
 - (c) 5.5-10.5
 - (d) 7-12
9. Let x be the class mark & y be the upper limit of a class- interval in a continuous frequency-distribution.
The lower limit of the class is :
 - (a) $2x+y$
 - (b) $2x-y$
 - (c) $x-y$
 - (d) $x+y$
10. The mean of x_1, x_2, \dots, x_n is 10, then the mean of $5x_1, 5x_2, \dots, 5x_n$ is
 - (a) 50
 - (b) 10
 - (c) 15
 - (d) 5
11. The mean of first five prime numbers is
 - (a) 3.6
 - (b) 5
 - (c) 5.6
 - (d) 6
12. The mean of 5 observations is 10. If each observation of the data is increased by 5, the new mean is -
 - (a) 50
 - (b) 15
 - (c) 5
 - (d) No change, 10
13. The mean of 10 observations is 15. The sum of all observations is -
 - (a) 15
 - (b) 10
 - (c) 75
 - (d) 150

14. a_1, a_2, a_3, a_4 & a_5 are five consecutive odd integers, then their mean is .
 (a) $a_1 + 4$ (b) $5(a_1 + a_2 + \dots + a_5)$
 (c) $\frac{a_1 \times a_2 \times a_3 \times a_4 \times a_5}{5}$ (d) $a_1 + 5$
15. If the mean of $x, x+2, x+4, x+6, x+8$ is 11, then the mean of first three observations is -
 (a) 9 (b) 10
 (c) 8 (d) 11
16. The mean of first three observations is 15 and the mean of next two observation is 20. The mean of all five observations is -
 (a) 45 (b) 15
 (c) 17 (d) 40
17. The mean of first two observations is 6 & the mean of first three observations is 7. The third observation is-
 (a) 8 (b) 7
 (c) 6 (d) 9
18. Mean of 20 observations is 15.5. Later on it was found that the observation 24 was taken as 42. The correct mean is -
 (a) 14 (b) 14.2
 (c) 14.4 (d) 14.6
19. If the mode of the data.
 $13, 27, 24, 13, 17, 16, 17, 21, 22, x, 13, 17$, is 17 then the value of x is -
 (a) 16 (b) 17
 (c) 21 (d) 13
20. If the median of the data arranged in ascending order-
 $7, 10, 14, x+4, x+8, x+11, 27, 30$ is 19 then x is -
 (a) 13 (b) 19
 (c) 26 (d) 20
21. The mean of the prime factors of 24 is -
 (a) 2 (b) 2.5
 (c) 4 (d) 7.5
22. If 9 observations are arranged in descending order which observation will be the median ?
 (a) 3rd (b) 4th
 (c) 5th (d) 6th

23. 15 observations are arranged in ascending order. 9th observation is increased by 2. Then the new median will.
- (a) increases by 2 (b) Decrease by 2
(c) no change (d) Becomes two times
24. Out of total of 20 observations arranged in ascending order. 9th, 10th & 11th observations are 36, 40 and 44 then median is .
- (a) 36 (b) 42
(c) 40 (d) 44
25. If mode of 4, 9, 5, 4, 9, 4, 9 and $x-10$ is 9 then x is-
- (a) 10 (b) 12
(c) 14 (d) 19
26. In a frequency distribution table the numbers 4, 6 and 8 have frequencies $(x-3)$, x & $(x+1)$ respectively. If their mean is 8 then x is -
- (a) 8 (b) 0
(c) 1 (d) 2

Fill in the Blanks :-

27. In a bar graph 0.2 cm length of a bar represents 100 people. The length of bar which represents 1300 people is _____ .
28. The marks of 5 students in a subject out of 50 are 32, 48, 50, 27 & 37, the range is _____ .
29. A set of data contains 64 as the highest value and its range is 13, the lowest value of the data is _____ .
30. The mid point of a class is called _____ .
31. The class mark of the class interval 4.7 – 6.3 is _____ .

Write True or False :-

32. The difference of the highest & the lowest value in the data is called class - size of the data. ☐
33. Cumulative frequency of the last class is the total of all frequencies in the data. ☐
34. The mean of 35 observations is 45. If the new mean is 51, then each of the observations is increased by 8. ☐

35. **Match the columns**

Column 1	Column 2
(1) The mean of one digit prime numbers is	(a) $\bar{x}-3$
(2) The median of 11 observations is	(b) 2
(3) The value of x for which mode of 2, 2, 8, 4, 4, x, 6 is 2 is	(c) $\bar{x}+3$
(4) If 3 is subtracted from each observation whose mean is \bar{x} then new mean is	(d) 4.25
	(e) 6th term

PART-B

36. Write the class size end class limits of 104, 114, 124, 134,
37. If the mean of the observations x , $2x+1$, $2x+5$, $2x+9$ is 30. What is mean of last two observations?
38. Find the mean from the following table.

x_i	5	6	7	8	4
f_i	3	2	1	3	2

39. The mean of five numbers is 27. If one of the number is excluded, the mean gets reduced by 2. What is the value of the excluded number ?
40. Find the mode of the data 15, 14, 19, 20, 14, 15, 16, 14, 15, 18, 14, 19, 15, 17, 15, If last observation is changed to 14 then find the new mode.
41. The mean monthly salary of 40 workers of a factory is x in a particular year. Each one was given ₹ 3000 as Diwali Bonus. What will be the mean monthly salary in that month.
42. In the question 20 instead of bonus, ₹ 300 be deducted from each workers salary for April to February, what will be their mean monthly salary for December month ?
43. For what value of x the mode of the following data : 13, 24, 13, 27, 17, 16, 17, x , 22, 21, 13, 17 is 17 ?
44. The average age of Shikha and her husband Amit is 48 years. The average age of Shikha, Amit and their daughter Advika is 39 years. Find the age of Advika.

45. The mean of 6, 10, 11, x, 12, y is 10. Also y is 7 more than x. Find the value of x and y.

PART-C

46. In three unit tests of Mathematics Priyal got 75, 82 and 90 marks. How many marks must she obtain in Unit Test IV to have an average of 85 in all the four unit tests ?
47. Time taken in seconds by 25 students in an examination to solve certain question is given below.

20, 16, 20, 27, 27, 28, 30, 33, 37, 50, 40, 42, 46, 28, 43, 46, 46, 48, 49, 52, 58, 59, 60, 64, 52.

By, taking class interval of size 10, make a frequency distribution table.

48. Find the mean from the following table

x_i	5	15	25	35	45
f_i	6	4	9	6	5

49. Draw the histogram from the following data

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

50. 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.

51. 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.

52. Find the value of 'p' from the following distribution if the mean is 6.

xi	2	4	6	10	p+5
fi	3	3	3	1	2

53. Given below is the data of students who participated in different activities.

Activity	Sports	Meditation	Yoga	Walking
No. of Girls	42	35	100	120
No. of Boys	90	64	130	86

Draw double bar graph.

54. Draw histogram to represent the data given below.

Age (in years)	No of children
1 - 2	5
2 - 3	4
3 - 5	10
5 - 7	12
7 - 10	9
10 - 15	10
15 - 17	8

55. The mean marks of boys & girls in periodical test are 36 and 39 respectively. If the mean marks of all the students of class IX in that test are 37. Find the ratio of the number of boys to the number of girls.

PART-D

56. The mean of the following data is 50.

xi	10	30	50	70	90
fi	17	5a+3	32	7a-11	19

find 'a' & the frequencies for $x_i = 30$ & $x_i = 70$

57. Draw a frequency polygon for the following data

Marks	Frequency
0 - 10	03
10 - 20	09
20 - 30	18
30 - 40	16
40 - 50	12
50 - 60	02

58. If the 26 English alphabets are taken such that A=1, B=2, C=3, Z=26 then find

(i) The mean and median of the numbers corresponding to the vowels.

(ii) Which alphabet corresponds to the median.

59. In a school a student who scored 80% or above in his/her previous class is eligible for "Merit scholarship" Marks obtained by two students Nishi and Vinayak of class IX in their previous class (VIII) in all subjects are given below.

Name	Hindi	English	Maths	Science	SSt.	Skt.
Nishi	78	74	86	85	73	83
Vinayak	79	76	88	83	71	85

Find average percentage score of Nishi and Vinayak, which of the two are eligible for merit scholarship ?

60. The blood group of 30 students of class IX are recorded as follows.

A, B, B, B, O, B, B, A, AB, A, O, B, O, AB, O

AB, AB, B, AB, B, A, O, AB, B, A, O, AB, A, A, AB

a) Make a frequency distribution table for the above data.

b) Mr. 'X' meets an accident and needs blood, His blood group is AB. How many of these students are universal Donars and how many are Universal Receptient.

61. 15 students of Govt. school spend the following numbers of hours in a month for cleanliness of their street 25, 15, 20, 20, 9, 20, 25, 15, 7, 13, 20, 12, 10, 15, 8

Find mean, median and mode from above data.

62. A doctor suggests two ways for treatment of a particular disease one by taking medicine only and other by doing meditation and yoga.

Age group	No. of patients taking medicines	No. of patients doing meditation & yoga
20-30	20	05
30-40	30	12
40-50	42	20
50-60	40	30
60-70	30	20

- i) Draw Frequency polygons for the above data on the graph.
63. Represent the marks of both the sections on the same graph by two frequency polygons.

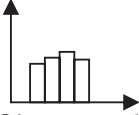
The following table shows number of voluntary blood donors as per day in voluntary blood donation camp organized in Delhi.

Days	No. of Donars
Sunday	100
Monday	80
Tuesday	110
Wednesday	80
Thursday	60
Friday	70
Saturday	120

- i) Draw a bar graph showing above information.
- ii) On which day donation was maximum and on which day it was minimum.

STATISTICS

Answers

1. (b) Data
2. (d) Secondary data & Primary Data
3. (c) We use class - intervals in histogram
4. (b) 
5. (c) Frequency Polygon.

6. (c) Class mark
7. (d) 17
8. (b) 6-11
9. (b) $2x-y$
10. (a) 50
11. (c) 5.6
12. (b) 15
13. (d) 150
14. (a) $a_1 + 4 \frac{(a_1 + a_1 + 2 + a_1 + 4 + a_1 + 6 + a_1 + 8)}{5}$
15. (a) 9
16. (c) 17
17. (d) 9
18. (d) 14.6
19. (b) 17
20. (a) 13
21. (b) 2.5
22. (c) 5th
23. (c) No change
24. (b) 42
25. (d) 19
26. (d) $2 \{18x-4 = 8x (x-3+x+x+1)\}$
27. 2.6 cm
28. 23
29. 51
30. Class- Mark
31. 5.5
32. False
33. True
34. False
35. (i) d, (ii) e, (iii) b, (iv) a
36. 10, 99-109, 109-119, 119-129, 129-139
37. 37
38. 6
39. 35
40. 15:14
41. $x + 3000$
42. $x-300$
43. 17
44. 21 years
45. $x=7, y=14$
46. 93
47.

15-25	25-35	35-45	45-55	55-65
3	6	4	7	5
48. 25
49.

Class	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Freq.	17	5	7	8	13
- 50.

52. $p=8$

55. $2:1$

56. $5, 28, 24$

58. $102, 9, I$

59. $79.83, 80.33$ Vinayak

60. $(b)-6, 30$

61. Mean = 15.6, Median = 15, Mode = 20

63. Saturday, Thursday

PRACTICE TEST

Time : 50 Min.

Statistics

M.M. 20

1. Write class size and class limits of the following: (1)
47, 52, 57, 62, 67, 72, 77
2. Find the value of "x" if mode of the following data is 5. Find x. (1)
2, 4, 3, 5, 4, 5, 6, 4, x, 7, 5
3. The median of the following observations arranged in ascending order is 25. Find x. (2)
11, 13, 15, 19, $x + 2$, $x + 4$, 30, 35, 39, 46
4. Find the median of the first 10 natural numbers. Is it equal to their mean? (2)
5. The mean of 40 observations was 160. It was detected on rechecking that the value of 165 was wrongly copied as 125 for computation of mean. Find the correct mean. (3)
6. If the mean of the following distribution is 6. Find the value of "R". (3)

X	2	4	6	8	$R + 5$
F	3	2	3	1	2

7. Draw histogram of the weekly pocket expenses of students of a School given below (4)

Weekly Expenses(Rs.)	No. of Students
10 – 20	10
20 – 30	15
30 – 50	40
50 – 60	25
60 – 90	30
90 – 100	5

8. Draw Histogram and Frequency polygon. (4)

Marks	0 - 10	10-20	20-30	30-40	40-50	50-60	60 - 70
No. of Students	5	10	4	6	7	3	2