Statistics

Exercise 14A

Question 1:

Statistics is a branch of science which deals with the collection, presentation, analysis and interpretation of numerical data.

Question 2:

Fundamental characteristics of statistics :

(i) It deals only with the numerical data.

(ii) Qualitative characteristic such as illiteracy, intelligence, poverty etc cannot be measured numerically

(iii) Statistical inferences are not exact.

Question 3:

Primary data: Primary data is the data collected by the investigator himself with a definite plan in his mind. These data are very accurate and reliable as these being collected by the investigator himself.

Secondary Data: Secondary data is the data collected by a person other than the investigator.

Secondary Data is not very reliable as these are collected by others with purpose other than the investigator and may not be fully relevant to the investigation.

Question 4:

(i)Variate : Any character which can assume many different values is called a variate.

(ii) Class Interval :Each group or class in which data is condensed is called a class interval.

(iii) Class-Size : The difference between the true upper limit and the true lower limit of a class is called class size.

(iv) Class-mark : The average of upper and lower limit of a class interval is called its class mark.

i.e Class mark = $\frac{upper\ \ limit\ \ +\ \ lower\ \ limit}{2}$

(v) Class limit: Class limits are the two figures by which a class is bounded . The figure on the left side of a class is called lower lower limit and on the right side is called its upper limit.

(vi) True class limits : In the case of exclusive form of frequency distribution, the upper class limits and lower class limits are the true upper limits and the true lower limits. But in the case of inclusive form of frequency distribution , the true lower limit of a class is obtained by subtracting 0.5 from the lower limit of the class. And the true upper limit of the class is obtained by adding 0.5 to the upper limit.

(vii) Frequency of a class : The number of observations falling in a class determines its frequency.

(viii) Cumulative frequency of a class: The sum of all frequencies up to and including that class is called , the cumulative frequency of that class.

Question 5:

Minimum observation is 0 and maximum observation is 6. The classes of equal size covering the given data are : (0-2), (2-4), (4-6) and (6-8).

Thus , the frequency distribution may be given as under:

No of children	Tally marks	Frequency
0 – 2	𝍸 𝍸 |	11
2 – 4	𝍸 𝍸 ||	17
4 – 6	𝍸 ||||	9
6 – 8	|||	3
	Total	40

Question 6:

Minimum observation is 1 and minimum observation is 24. The classes of equal size converging the given data are : (0-5), (5-10), (10-15), (15-20), (20-25)

Thus, the frequency distribution may be given as under :

Marks	Tally Marks	Frequency
0 – 5	𝍸 I	6
5 – 10	𝍸 𝍸	10
10 – 15	𝍸 III	8
15 – 20	𝍸 III	8
20 – 25	𝍸 III	8
	Total	40

Question 7:

Minimum observation is 6 and maximum observation is 23 .So the range is 23-6=17

The classes of equal size covering the given data are : (6-9), (9-12) , (12-15) , (15-18), (18-21), (21-24) ,

Thus the frequency distribution may be given as under :

Class interval (age)	Tally Marks	No. of students Frequency
6 – 9	𝍸	5
9 – 12	IIII	4
12 – 15	IIII	4
15 – 18	𝍸 II	7
18 – 21	III	3
21 – 24	𝍸 II	7
	Total	30

Question 8:

Minimum observation is 210 and maximum observation =320

So the range is (320-210)=110

The classes of equal size covering the given data are :

(210-230), (230-250), (250-270) , (270-290), (290-310), (310-330)

Thus the frequency distribution may be given as under :

Class interval (Monthly wages)	Tally Marks	No. of workers Frequency
210 – 230	IIII	4
230 – 250	IIII	4
250 – 270	𝍸	5
270 – 290	III	3
290 – 310	𝍸 II	7
310 – 330	𝍸	5
	Total	28

Question 9:

Minimum observation is 30 and maximum observation is 110

So, range is 100-30=80

The classes of equal size covering the given data are :

(30-40) ,(40-50) , (50-60) ,(60-70) , (70-80), (80-90),(90-100),(100-110), (110-120)

Thus , the frequency and cumulative frequency table may be given as under :

Class intervals (weight in g.)	Tally Marks	No. of oranges	Cumulative frequency
30 – 40	||||	4	4
40 – 50	𝍸 |	6	10
50 – 60	|||	3	13
60 – 70	𝍸	5	18
70 – 80	𝍸 ||||	9	27
80 – 90	𝍸 |	6	33
90 – 100	||	2	35
100 – 110	|||	3	38
110 – 120	||	2	40
	Total	40	

Question 10:

Minimum observations is 804 and maximum observation is 898 So, range is 898-804 =94

The class es of equal size covering the given data are :

(800-810), (810-820) , (820-830),(840-850), (850-860), (860-870), (870-880) ,(880-890), (890-900)

Thus the frequency table may be given as under :

Class intervals Weekly wages	Tally marks	No. of workers Frequency
800 – 810	|||	3
810 – 820	||	2
820 – 830	|	1
830 – 840	𝍸 |||	8
840 – 850	𝍸	5
850 – 860	|	1
860 – 870	|||	3
870 – 880	|	1
880 – 890	|	1
890 – 900	𝍸	5
	Total	30

Question 11:

Minimum observation 52 and maximum observation is 130

So , The range is 130-52=78

The classes of equal size covering the given data are :

(50-60), (60-70), (70-80), (80-90), (90-100), (100-110), (110-120), (120-130),(130-140)

Thus , the frequency table may be given as under :

Class interval (in Rupees)	Tally Marks	No. house frequency
50 – 60	||	2
60 – 70	𝍸 |	6
70 – 80	|||	3
80 – 90	𝍸 |||	8
90 – 100	𝍸	5
100 – 110	𝍸 ||	7
110 – 120	||||	4
120 – 130	||||	4
130 – 140	|	1
	Total	40

Question 12:

Age (in years)	Number of Patients (Frequency)	Cumulative Frequency
10 – 20	90	90
20 – 30	50	140
30 – 40	60	200
40 – 50	80	280
50 – 60	50	330
60 – 70	30	360
Total	360	

Question 13:

Marks(below)	Number of students (Cumulative Frequency)	Class Intervals	Frequency
10	5	0 – 10	5
20	12	10 – 20	12 – 5 = 7
30	32	20 – 30	32 – 12 = 20
40	40	30 – 40	40 – 32 = 8

50	45	40 – 50	45 – 40 = 5
60	48	50 – 60	48 – 45 = 3
		Total	48

Question 14:

Marks(below)	Number of students (Cumulative Frequency)	Class Intervals	Frequency
10	17	0 – 10	17
20	22	10 – 20	22 – 17 = 5
30	29	20 – 30	29 – 22 = 7
40	37	30 – 40	37 – 29 = 8
50	50	40 – 50	50 – 37 = 13
60	60	50 – 60	60 – 50 = 10
		Total	60

Question 15:

Marks(below)	Number of students (Cumulative Frequency)	Class Intervals	Frequency
More than 60	0	More than 60	0
More than 50	16	50 – 60	16-0=16
More than 40	40	40 – 50	40-16=24
More than 30	75	30 – 40	75-40=35

More than 20	87	20 – 30	87-75=12
More than 10	92	10 – 20	92-87=5
More than 0	100	0 – 10	100-92=8
		Total	100