

14

STATISTICAL DESCRIPTION OF DATA

THIS CHAPTER INCLUDES

- Collection of Data
- Presentation of Data
- Frequency Distribution
- Graphical representation of Frequency Distribution

CHAPTER AT A GLANCE

Topic	Important Highlight
Introduction of Statistics	<p>Definition of Statistics We may define statistics either in a singular sense or in a plural sense. Statistics, when used as a plural noun, may be defined as data qualitative as well as quantitative, that are collected, usually with a view of having statistical analysis. However, statistics, when used as a singular noun, may be defined, as the scientific method that is employed for collecting, analysing and presenting data, leading finally to drawing statistical inferences about some important characteristics it means it is 'science of counting' or 'science of averages'.</p> <p>Application of statistics Among various applications of statistics, let us confine our discussions to the fields of Economics, Business Management and Commerce and Industry.</p>

Economics

Modern developments in Economics have the roots in statistics. In fact, Economics and Statistics are closely associated. Time Series Analysis, Index Numbers, Demand Analysis etc. are some overlapping areas of Economics and Statistics.

Business Management

Now a days, because of the never-ending complexity in the business and industry environment, most of the decision making processes rely upon different quantitative techniques which could be described as a combination of statistical methods and operations research techniques.

Statistics in Commerce and Industry

In this age of cut-throat competition, like the modern managers, the industrialists and the businessmen are expanding their horizons of industries and businesses with the help of statistical procedures. Data on previous sales, raw materials, wages and salaries, products of identical nature of other factories etc. are collected, analysed and experts are consulted in order to maximise profits.

Limitations of Statistics

Before applying statistical methods, we must be aware of the following limitations:

- I. Statistics deals with the aggregates. An individual, to a statistician has no significance except the fact that it is a part of the aggregate.
- II. Statistics is concerned with quantitative data. However, qualitative data also can be converted to quantitative data by providing a numerical description to the corresponding qualitative data.

	<p>III. Future projections of sales, production, price and quantity etc. are possible under a specific set of conditions. If any of these conditions is violated, projections are likely to be inaccurate.</p> <p>IV. The theory of statistical inferences is built upon random sampling. If the rules for random sampling are not strictly adhered to, the conclusion drawn on the basis of these unrepresentative samples would be erroneous.</p>
<p>Collection of Data</p>	<p>We may define 'data' as quantitative information about some particular characteristic(s) under consideration. A variable may be either discrete or continuous. When a variable assumes a finite or a countably infinite number of isolated values, it is known as a discrete variable. A variable, on the other hand, is known to be continuous if it can assume any value from a given interval.</p> <p>We can broadly classify data as</p> <p>(a) Primary;</p> <p>(b) Secondary.</p> <p>The data which are collected for the first time by an investigator or agency are known as primary data whereas the data are known to be secondary if the data, as being already collected, are used by a different person or agency. If, however, another person, uses the data as already collected. Then the data would be secondary.</p> <p>Collection of Primary Data</p> <p>The following methods are employed for the collection of primary data:</p> <p>(i) Interview method;</p> <p>(ii) Mailed questionnaire method;</p> <p>(iii) Observation method;</p> <p>(iv) Questionnaires filled and sent by</p>

enumerators.

Interview method again could be divided into (a) Personal Interview method, (b) Indirect Interview method and (c) Telephone Interview method.

In personal interview method, the investigator meets the respondents directly and collects the required information then and there from them.

Mailed questionnaire method comprises of framing a well-drafted and soundly-sequenced questionnaire covering all the important aspects of the problem under consideration and sending them to the respondents with pre-paid stamp after providing all the necessary guidelines for filling up the questionnaire.

In observation method, data are collected, as in the case of obtaining the data on the height and weight of a group of students, by direct observation or using instrument. Although this is likely to be the best method for data collection, it is time consuming, laborious and covers only a small area.

Questionnaire form of data collection is used for larger enquiries from the persons who are surveyed. Enumerators collect information directly by interviewing the persons having information : Question are explained and hence data is collected.

Sources of Secondary Data

There are many sources of getting secondary data. Some important sources are listed below:

- (a) International sources like WHO, ILO, IMF, World Bank etc.
- (b) Government sources like Statistical Abstract by CSO, Indian Agricultural Statistics by the Ministry of Food and Agriculture and so on.
- (c) Private and quasi-government sources like ISI, ICAR, NCERT etc.
- (d) Unpublished sources of various research

	institutes, researchers etc.
Presentation of Data	<p>Classification or Organisation of Data: It may be defined as the process of arranging data on the basis of the characteristic under consideration into a number of groups or classes according to the similarities of the observations. Following are the objectives of classification of data:</p> <p>(a) It puts the data in a neat, precise and condensed form so that it is easily understood and interpreted.</p> <p>(b) It makes comparison possible between various characteristics, if necessary, and thereby finding the association or the lack of it between them.</p> <p>(c) Statistical analysis is possible only for the classified data.</p> <p>(d) It eliminates unnecessary details and makes data more readily understandable.</p> <p>Data may be classified as:</p> <p>(i) Chronological or Temporal or Time Series Data;</p> <p>(ii) Geographical or Spatial Series Data;</p> <p>(iii) Qualitative or Ordinal Data;</p> <p>(iv) Quantitative or Cardinal Data.</p> <p>When the data are classified in respect of successive time points or intervals, they are known as time series data.</p> <p>Data arranged region wise are known as geographical data.</p> <p>Data classified in respect of an attribute are referred to as qualitative data.</p> <p>Lastly, when the data are classified in respect of a variable, say height, weight, profits, salaries etc.,</p>

	<p>they are known as quantitative data. Data may be further classified as frequency data and non-frequency data. The qualitative as well as quantitative data belong to the frequency group whereas time series data and geographical data belong to the non-frequency group.</p>
<p>Mode of Presentation of Data</p>	<p>Next, we consider the following mode of presentation of data:</p> <p>(a) Textual presentation; (b) Tabular presentation or Tabulation; (c) Diagrammatic representation.</p> <p>(a) Textual presentation: This method comprises presenting data with the help of a paragraph or a number of paragraphs.</p> <p>(b) Tabular presentation or Tabulation: Tabulation may be defined as systematic presentation of data with the help of a statistical table having a number of rows and columns and complete with reference number, title, description of rows as well as columns and foot notes, if any.</p> <p>(c) Diagrammatic representation of data: Another alternative and attractive representation of statistical data is provided by charts, diagrams and pictures.</p> <p>I. Line diagram or Historiogram: When the data vary over time, we take recourse to line diagram. In a simple line diagram, we plot each pair of values of (t, y_t), y_t representing the time series at the time point t in the t-y_t plane. The plotted points are then joined successively by line segments and the resulting chart is known</p>

	<p>as line-diagram.</p> <p>II. Bar diagram: There are two types of bar diagrams namely, Horizontal Bar diagram and Vertical Bar diagram. While horizontal bar diagram is used for qualitative data or data varying over space, the vertical bar diagram is associated with quantitative data or time series data.</p>
<p>Frequency Distribution</p>	<p>Frequency data occur when we classify statistical data in respect of either a variable or an attribute. A frequency distribution may be defined as a tabular representation of statistical data, usually in an ascending order, relating to a measurable characteristic according to individual value or a group of values of the characteristic under study. When tabulation is done in respect of a discrete random variable, it is known as Discrete or Ungrouped or simple Frequency Distribution and in case the characteristic under consideration is a continuous variable, such a classification is termed as Grouped Frequency Distribution.</p> <p>Some important terms associated with a frequency distribution:</p> <p>Class Limit (CL): Corresponding to a class interval, the class limits may be defined as the minimum value and the maximum value the class interval may contain. The minimum value is known as the lower class limit (LCL) and the maximum value is known as the upper class limit (UCL).</p> <p>Class Boundary (CB): Class boundaries may be defined as the actual</p>

	<p>class limit of a class interval.</p> $\text{LCB} = \text{LCL} - \frac{D}{2}$ <p>and $\text{UCB} = \text{UCL} + \frac{D}{2}$</p> <p>Mid-point or Mid-value or class mark: Corresponding to a class interval, this may be defined as the total of the two class limits or class boundaries to be divided by 2.</p> $\text{mid-point} = \frac{\text{LCL} + \text{UCL}}{2}$ <p>Width or size of a class interval: The width of a class interval may be defined as the difference between the UCB and the LCB of that class interval.</p> <p>Cumulative Frequency: The cumulative frequency corresponding to a value for a discrete variable and corresponding to a class boundary for a continuous variable may be defined as the number of observations less than the value or less than or equal to the class boundary.</p>
<p>Graphical Representation of a Frequency Distribution</p>	<p>(i) Histogram or Area diagram: In order to draw a histogram, the class limits are first converted to the corresponding class boundaries and a series of adjacent rectangles, one against each class interval, with the class interval as base or breadth and the frequency or frequency density usually when the class intervals are not uniform as length or altitude, is erected.</p> <p>(ii) Frequency Polygon: In order to draw a frequency polygon, we plot</p>

	<p>(x_i, f_i) for $i = 1, 2, 3, \dots, n$ with x_i denoting the mid-point of the its class interval and f_i, the corresponding frequency, n being the number of class intervals. The plotted points are joined successively by line segments and the figure, so drawn, is given the shape of a polygon, a closed figure, by joining the two extreme ends of the drawn figure to two additional points $(x_0, 0)$ and $(x_{n+1}, 0)$.</p> <p>(iii) Ogives or Cumulative Frequency Graph: By plotting cumulative frequency against the respective class boundary, we get ogives. As such there are two ogives – less than type ogives, obtained by taking less than cumulative frequency on the vertical axis and more than type ogives by plotting more than type cumulative frequency on the vertical axis and thereafter joining the plotted points successively by line segments.</p>
Frequency Curve	<p>A frequency curve is a smooth curve for which the total area is taken to be unity. It is a limiting form of a histogram or frequency polygon. The frequency curve for a distribution can be obtained by drawing a smooth and free hand curve through the mid-points of the upper sides of the rectangles forming the histogram.</p> <p>There exist four types of frequency curves namely:</p> <ul style="list-style-type: none"> (a) Bell-shaped curve; (b) U-shaped curve; (c) J-shaped curve; (d) Mixed curve. <p>On a bell-shaped curve, the frequency, starting from a rather low value, gradually reaches the maximum value, somewhere near the central part</p>

14.12**■ Solved Scanner CA Foundation Paper - 3C (New Syllabus)**

Income in ₹ :	1500-1999	2000-2499	2500-2999	3000-3499
No. of Persons :	13	32	20	25

What is the percentage of persons earning more than ₹ 2,500 ?

- (a) 45 (b) 50
(c) 52 (d) 55 **(1 mark)**

Answer:

(b) No. of persons earning more than ₹ 2,500 = 20 + 25 = 45

∴ The percentage of persons earning more than

$$₹ 2,500 = \frac{45}{90} \times 100 = 50 \%$$

2007 - Feb [4] In tabulation, source of data, if any, is shown in the :

- (a) Stub (b) Body
(c) Caption (d) Footnote **(1 mark)**

Answer:

(d) The source of data, if any, in any kind of tabulation is shown in the footnote.

2007 - Feb [5] Divided bar chart is good for :

- (a) Comparing various components of a variable
(b) Relating the different components to the whole.
(c) (a) and (b)
(d) (a) or (b) **(1 mark)**

Answer:

(c) Divided Bar Chart, also known as percentage Bar Diagrams, is good for both the things i.e. for comparing different components of a variable as well as the relating of the different components to the whole.

2007 - May [6] Relative frequency for a particular class lies between :

- (a) 0 and 1 (b) 0 and 1, both inclusive
(c) -1 and 0 (d) -1 and 1 **(1 mark)**

Answer:

- (a) Relative frequency of a class interval is defined as the ratio of the class frequency to the total frequency. Therefore, Relative frequency for a particular class lies between 0 and 1.

2007 - May [7] Find the number of observations between 350 and 400 from the following data :

Value :	More than 200	More than 350	More than 400	More than 450	
No. of observations :	48	25	12	0	
(a) 13		(b) 15			
(c) 17		(d) 19			(1 mark)

Answer:

- (a) The number of observation which are more than 350 is inclusive of those observations which are more than 400 and 450.
 \therefore Deducting those number of observations which are more than 400 and 450 from the number of observations which are 350, we will get the number of observations lying between 350 and 400.
 So, the number of observations lying between 350 and 400 = $25 - 12 - 0 = 13$.

2007 - May [8] When the width of all classes is same, frequency polygon has not the same area as the Histogram :

- (a) False (b) True
 (c) Both (d) None **(1 mark)**

Answer:

- (a) When the width of all classes is same frequency, polygon has the same area as the histogram.

2007 - May [9] The graphical representation of a cumulative frequency distribution is called :

- (a) Histogram (b) Ogive
 (c) Both (d) None **(1 mark)**

Answer:

(b) The graphical representation of a cumulative frequency distribution is called Ogive i.e. by plotting the cumulative frequency against the respective class boundary, we get ogives which can be less than type ogive or more than type ogive depending upon the type of cumulative frequency distribution.

2007 - Aug [10] A table has _____ parts.

- (a) Four (b) Two
(c) Five (d) None (1 mark)

Answer:

(c) A table has five parts namely.

- (i) Stub
(ii) Caption
(iii) Body
(iv) Box head
(v) Footnote.

2007 - Aug [11] Cost of sugar in a month under the heads raw materials, labour, direct production and others were 12, 20, 35 and 23 units respectively. What is the difference between the central angles for the largest and smallest components of the cost of sugar ?

- (a) 72° (b) 48°
(c) 56° (d) 92° (1 mark)

Answer:

(d) Total components of the cost of sugar

$$= (12 + 20 + 35 + 23) \text{ units}$$

$$= 90 \text{ units}$$

Largest component of cost of sugar

$$= 35 \text{ units}$$

$$\text{i.e. } \frac{35}{90} \times 360^\circ = 140$$

Smallest component of cost of sugar

$$= 12 \text{ units}$$

$$\text{i.e. } \frac{12}{90} \times 360^\circ = 48^\circ$$

∴ Difference between the central angles for the largest and smallest components of the cost of sugar
 $= 140^\circ - 48^\circ = 92^\circ$

2007 - Aug [12] Frequency density corresponding to a class interval is the ratio of :

- (a) Class Frequency to the Total Frequency
- (b) Class Frequency to the Class Length
- (c) Class Length to the Class Frequency
- (d) Class Frequency to the Cumulative Frequency. **(1 mark)**

Answer:

- (b) Frequency density of a class interval is defined as the ratio of the frequency of that class interval to the corresponding class length.

2007 - Nov [13] In order to compare two or more related series, we consider:

- (a) Multiple Bar Chart
- (b) Grouped Bar Chart
- (c) (a) or (b)
- (d) (a) and (b) **(1 mark)**

Answer:

- (c) Multiple Bar Chart also known as Grouped Bar Chart is one dimensional diagram in which two or more bars adjoining each other are constructed to represent the values of different variables or the values of various components of the same variable.

Multiple Bar Chart or Grouped Bar Chart is considered to compare two or more related series.

2007 - Nov [14] An area diagram is :

- (a) Histogram
- (b) Ogive
- (c) Frequency Polygon
- (d) None of these **(1 mark)**

Answer:

- (a) Histogram is a graph that represents the class frequencies in a frequency distribution by vertical adjacent rectangles. A Histogram is two- dimensional, i.e. a histogram comprises of both length as well as the width. As the Product of length and width indicates the area. Therefore Area Histogram is referred to as an Area Diagram. Its area represents the total frequency as distributed throughout the classes.

2007 - Nov [15] Most extreme values which would ever be included in a class interval are called:

- (a) Class Interval (b) Class Limits
(c) Class Boundaries (d) None of these (1 mark)

Answer:

- (c) Most extreme values which would be ever included in a class- interval are called as class boundaries, also referred to as actual class limit, are defined as the limits up to which the two limits, (actual) of each class may be extended to fill up the gap that exist between the classes.

2007 - Nov [16] In 2000, out of total of 1,750 workers of a factory, 1,200 were members of a trade union. The number of women employed was 200 of which 175 did not belong to a trade union. In 2004, there were 1,800 employees who belong to a trade union and 50 who did not belong to trade union. Of all the employees in 2004, 300 were women of whom only 8 did not belong to the trade union. On the basis of this information, the ratio of female members of the trade union in 2000 and 2004 is :

- (a) 292 : 25 (b) 8 : 175
(c) 175 : 8 (d) 25 : 292 (1 mark)

Answer:

- (d) TITLE : Sex distribution of Trade Union and Non- union members.

Year	2000			2004		
	Male	Female	Total	Male	Female	Total
Member	1175	25	1200	1508	292	1800
Non-member	375	175	550	42	8	50
Total	1550	200	1750	1550	300	1850

Required ratio of female members of the trade union is 2000 : 2004
= 25 : 292

2008 - Feb [17] The lower class boundary is :

- (a) An upper limit to Lower Class Limit (b) A lower limit to Lower Class Limit
(c) Both (a) & (b) (d) None of these (1 mark)

Answer:

- (b) Lower class Boundary

Lower class limit - $\frac{1}{2}$ (upper class limit of the class - lower class limit of the succeeding class). Therefore, lower class boundary is a lower limit to lower class limit.

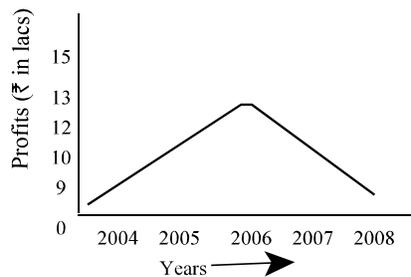
2008 - Feb [18] The distribution of profits of a company follows :

- (a) J - shaped frequency curve
 - (b) U - shaped frequency curve
 - (c) Bell - shaped frequency curve
 - (d) Any of these
- (1 mark)**

Answer:

(c) The bell- shaped curve looks like a bell. On a bell- shape curve, the frequency, starting from a rather low value, gradually reaches the maximum value, somewhere near the central part and then gradually decreases to reach its lowest value at the other extremity. Similar is the case of profits of a company. It rises till the resources are fully utilized and if the resources are still utilized then due to over-utilization of resources, the profits start declining. This can be clearly depicted through the data given below:

Year	Profits (₹ in lacs)
2004	10
2005	12
2006	15
2007	13
2008	9



2008 - Feb [19] Out of 1000 persons, 25 per cent were industrial workers and the rest were agricultural workers. 300 persons enjoyed world cup matches on T.V. 30 per cent of the people who had not watched world cup

matches were industrial workers. What is the number of agricultural workers who had enjoyed world cup matches on TV?

- (a) 230 (b) 250
(c) 240 (d) 260 (1 mark)

Answer:

(d)

Category	T.V.	NTV	TOTAL
Agricultural workers	260	490	750
Industrial workers	40	210	250
Total	300	700	1000

Therefore, number of agricultural workers who had enjoyed world Cup matches on T.V. = 260

2008 - Feb [20] Median of a distribution can be obtained from ;

- (a) Histogram (b) Frequency Polygon
(c) Less than type Ogives (d) None of these (1 mark)

Answer:

(c) Olives are considered for obtaining quartiles graphically. If a perpendicular is drawn from the point of intersection of the two o-gives, i.e. less than type ogive and more than type give, on the horizontal axis, then x- value of this point gives us the value of median, the second or middle quartile.

2008 - June [21] In indirect oral investigation :

- (a) Data is not capable of numerical expression
(b) Not possible or desirable to approach informant directly.
(c) Data is collected from the books.
(d) None of these (1 mark)

Answer:

(b) Indirect oral investigation is a method in which a third person is contacted who is expected to know the necessary details about the

persons for whom the enquiry is meant. This method is suitable when it is not possible or deliverable to approach informant directly.

2008 - June [22] Circular diagrams are always :

- (a) One - dimensional (b) Two - dimensional
(c) Three - dimensional (d) Cartograms (1 mark)

Answer:

(b) Circular diagram is a Two- dimension diagram in which a circle is prepared and the radius of circle is determined on the basis of minimum square root value of the variable. Two- dimensional diagram is a diagram which is prepared on the basis of two dimension i.e. length and width.

2008 - June [23] The column headings of a table are known as :

- (a) Body (b) Stub
(c) Box - head (d) Caption (1 mark)

Answer:

(d) Each column is given a heading to explain what the figures in the columns represent. These column headings of a table are known as caption.

2008 - June [24] Some important sources of secondary data are _____ :

- (a) International and Government sources
(b) International and primary sources
(c) Private and primary sources
(d) Government sources (1 mark)

Answer:

(a) The Government source like Indian trade journal - weekly, Reserve Bank of India Bulletin - monthly, etc. and International sources like WHO, World Bank, IMF, etc. are some of the important sources of secondary data.

2008 - Dec [25] From the following data find the number class intervals if class length is given as 5.

73, 72, 65, 41, 54, 80, 50, 46, 49, 53.

- (a) 6 (b) 5
(c) 7 (d) 8 (1 mark)

Answer:

(d) We have, Range = Maximum value – Minimum value = 80 – 41 = 39

Class length = 5

No. of class Intervals \times class lengths \cong Range

\Rightarrow No. of class Intervals \times 5 \cong 39

\Rightarrow No. of class Intervals = $\frac{39}{5} \cong 8$

(We always take the next integer as the no. of class intervals so as to include both the minimum and maximum values).

2008 - Dec [26] The most appropriate diagram to represent the data relating to the monthly expenditure on different items by a family is:

(a) Histogram

(b) Pie-diagram

(c) Frequency polygon

(d) Line graph.

(1 mark)

Answer:

(b) Pie diagram

2008 - Dec [27] Which of the following is a statistical data ?

(a) Ram is 50 years old.

(b) Height of Ram is 5'6" and of Shyam and Hari is 5'3" and 5'4" respectively.

(c) Height of Ram is 5'6" and weight is 90kg

(d) Sale of A was more than B and C.

(1 mark)

Answer:

(b) Option (b) represents statistical data which can be understood by referring the definition of statistics keeping note of the following points.

(1) Statistics are aggregate of facts. A single figure cannot be called as statistics because it cannot be compared to draw any conclusion out of it.

(2) All statistical facts are expressed in numbers. Qualitative expressions like young, old, etc. do not constitute statistics.

(3) Statistics should be placed in relation to each other so as to facilitate comparison. For this purpose, the data must be homogenous and not heterogenous. e.g. height and weight are heterogenous in character.

2008 - Dec [28] Sales of XYZ Ltd. for 4 months is :

Months	Sales
Jan.	10,000
Feb.	15,000
May	18,000
Apr.	9,000

The above data represents :

- (a) Discrete (b) Continuous
(c) Individual (d) None of these. **(1 mark)**

Answer:

- (c)** Given data represents unclassified and ungrouped data. Therefore, the given series is an **individual series**.

2009 - June [29] Mid values are also called _____

- (a) Lower limit (b) Upper limit
(c) Class mark (d) None. **(1 mark)**

Answer:

- (c)** Mid-values are also called class mark.

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

2009 - June [30] Which of the following is not a two-dimensional figure ?

- (a) Line Diagram (b) Pie Diagram
(c) Square Diagram (d) Rectangle Diagram. **(1 mark)**

Answer:

- (b)** Pie Diagram is a one – dimensional figure i.e. it is based on one dimension – radius.

Rest all other are two – dimensional figures.

2009 - June [31] Less than type and more than type gives meet at a point known as :

- (a) Mean (b) Median
(c) Mode (d) None **(1 mark)**

Answer:

- (b) By plotting cumulative frequency against the respective class boundary, we get olives. There are two type of olives :
- (i) Less than type ogive.
 - (ii) More than type ogive.

Olives may be considered for obtaining quartiles graphically. If a perpendicular is drawn from the point of intersection of two olives on the horizontal axis, then the x-value of this point gives us the value of median, the second or middle quartile.

Therefore, the meeting point of less than type ogive and more than type ogive is known as 'Median'.

2009 - Dec [32] Arrange the dimensions of Bar diagram, Cube diagram, Pie diagram in sequence.

- (a) 1, 2, 3
 - (b) 2, 1, 3
 - (c) 2, 3, 1
 - (d) 3, 2, 1
- (1 mark)**

Answer:

- (c) Bar diagram is two dimensional having length and breadth as dimensions.

Cube diagram has 3 dimensions viz. length, breadth and height and hence is three-dimensional.

Pie - diagram is one-dimensional having radius as dimension.

Therefore, if we arrange it in sequence, we get:

Pie-diagram, bar, diagram and cube-diagram i.e. 2, 3, 1.

2009 - Dec [33] With the help of histogram one can find.

- (a) Mean
 - (b) Median
 - (c) Mode
 - (d) First Quartile.
- (1 mark)**

Answer:

- (c) Histogram is used to find Mode. [Self Explanatory]

2009 - Dec [34] Nationality of a person is :

- (a) Discrete variable
 - (b) An attribute
 - (c) Continuous variable
 - (d) None
- (1 mark)**

Answer:

- (b) A qualitative characteristic is known as an attribute.

So the nationality of a person is an attribute as it is a qualitative characteristic.

2009 - Dec [35] If we plot less than and more than type frequency distribution, then the graph plotted is _____.

- (a) Histogram (b) Frequency Curve
(c) Ogive (d) None of these **(1 mark)**

Answer:

(c) If we plot less than and more than type frequency distribution, then the graph plotted is Ogive.

Ogive are of two types - Less than type ogive and more than type ogive.
[self-explanatory]

2010 - June [36] The primary rules that should be observed in classification:

- (i) As far as possible, the class should be of equal width
(ii) The classes should be exhaustive
(iii) The classes should be unambiguously defined.

Then which of the following is correct:

- (a) only (i) and (ii) (b) only (ii) and (iii)
(c) only (i) and (iii) (d) all (i), (ii) and (iii). **(1 mark)**

Answer:

(b) Requisites of a good classification are:

- (1) It should be exhaustive
(2) It should be mutually exclusive
(3) It should be unambiguous
(4) It should be stable and flexible
(5) It should be homogeneous
(6) It should be a revealing classification

2010 - June [37] Using Ogive Curve, we can determine:

- (a) Median (b) Quartile
(c) Both (a) and (b) (d) None. **(1 mark)**

Answer:

(c) Olives are considered for obtaining quartiles graphically. If a perpendicular is drawn from point of intersection of two Olives on

horizontal axis, then x-value of this point gives us the value of median (2nd or middle quartile).

2010 - June [38] With the help of histogram one can find.

- (a) Mean (b) Median
(c) Mode (d) First Quartile. (1 mark)

Answer:

(c) Please refer 2009 - Dec [33] on page no. 23

2010 - Dec [39] Mode can be obtained from:

- (a) Frequency polygon. (b) Histogram.
(c) Ogive (d) All of the above. (1 mark)

Answer:

(b) Mode can be obtained from histogram

2010 - Dec [40] The most appropriate diagram to represent the data relating to the monthly expenditure on different items by a family is:

- (a) Histogram (b) Pie-diagram.
(c) Frequency polygon (d) Line graph. (1 mark)

Answer:

(b) Please refer 2008 - Dec [26] on page no. 21

2010 - Dec [41] The data obtained by the internet are:

- (a) Primary data (b) Secondary data
(c) Both (a) and (b) (d) None of these. (1 mark)

Answer:

(b) Secondary data

2010 - Dec [42] The statistical measure computed from the sample observations alone have been termed as:

- (a) estimate (b) parameter
(c) statistic (d) attribute. (1 mark)

Answer:

(c) Statistic

2011 - June [43] When the two curves of ogive intersect, the point of intersection provides :

- (a) First Quartile (b) Second Quartile
 (c) Third Quartile (d) Mode. (1 mark)

Answer:

(b) We know, that the two curves viz. Less than Ogive & More than Ogive intersect at a point called MEDIAN or we can say Second Quartile.

2011 - June [44] Frequency Density can be termed as:

- (a) Class frequency to the cumulative frequency
 (b) Class frequency to the total frequency
 (c) Class frequency to the class length
 (d) Class length to the class frequency. (1 mark)

Answer:

(b) Frequency Density (F.D) = $\frac{\text{Class Interval}}{\text{Class length}}$

2011 - June [45] The Chronological classification of data are classified on the basis of :

- (a) Attributes (b) Area
 (c) Time (d) Class Interval (1 mark)

Answer:

(c) Chronological Classification data are classified on the basis of "TIME".

2011 - June [46] Arrange the following dimension wise : pie-diagram, bar-diagram and cubic diagram.

- (a) 1,2,3 (b) 3,1,2
 (c) 3,2,1 (d) 2,1,3 (1 mark)

Answer:

(d) **Pie-Diagram** : Two Dimensional Diagram (2)

These Diagrams are also called as "Area-Diagrams".

Used when different segments or components of values are also to be presented.

Bar-Diagram : One Dimensional Diagram (1) means such diagrams where only one dimensional measurement i.e. height is used. There is no importance of width or thickness in these diagrams. The heights of bars are taken on the basis of values.

14.26**■ Solved Scanner CA Foundation Paper - 3C (New Syllabus)**

Cubic-Diagram :Three Dimensional Diagram (3) are those in which three dimensions viz length, breadth & height are taken into account. used when these is wide range of data and three different but inter-related features of data are to be represented simultaneously.

2011 - Dec [47] The frequency of class 20-30 in the following data is:

Class	0-10	10-20	20-30	30-40	40-50
Cumulative Frequency	5	13	28	34	38

(a) 5

(b) 28

(c) 15

(d) 13

(1 mark)**Answer:**

(c)	Class	Cumulative freq.	Frequency
	0 - 10	5	5
	10 - 20	13	$13 - 5 = 8$
	20 - 30	28	$28 - 13 = 15$
	30 - 40	34	$34 - 28 = 6$
	40 - 50	38	$38 - 34 = 4$

Here the freq. of class '20 - 30' is '15'

2011 - Dec [48] The Graphical representation by which median is calculated is called

(a) Ogive Curve

(b) Frequency Curve

(c) Line diagram

(d) Histogram

(1 mark)**Answer:****(a)** The median is calculated by Ogive Curve

2011 - Dec [49] Which of the following is not a two dimensional diagram?

(a) Square diagram

(b) Line diagram

(c) Rectangular diagram

(d) Pie-chart

(1 mark)**Answer:****(b)** Line diagram is not two dimensional diagram

2012 - June [50] From which graphical representation, we can calculate partition values ?

- (a) Lorenz curve
- (b) Ogive curve
- (c) Histogram
- (d) None of the above.

(1 mark)

Answer:

(b) We can calculate partition values with the help of **O'Give Curve** for graphical representation.

2012 - June [51] The data given below refers to the marks gained by a group of students:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
No. of Students	15	38	65	84	100

Then the no. of students getting marks more than 30 would be _____.

- (a) 50
- (b) 53
- (c) 35
- (d) 62

(1 mark)

Answer:

(c) Converting the given "Less than" type frequency distribution to Normal frequency distribution :

Class interval	(f) frequency
0 - 10	15
10 - 20	23
20 - 30	27
30 - 40	19
40 - 50	16

Hence,

The no. of students getting marks more than 30 is $19 + 16 = 35$.

2012 - June [52] Cost of Sugar in a month under the heads raw materials, labour, direct production and others were 12,20,35 & 23 units respectively. The difference between their central angles for the largest & smallest components of the cost of Sugar is:

14.28**Solved Scanner CA Foundation Paper - 3C (New Syllabus)**(a) 92° (b) 72° (c) 48° (d) 56° **(1 mark)****Answer:****(a)****Cost of SUGAR :**

HEAD	Units	Angular-Value
Raw-Material	12	$\frac{12}{90} \times 360 = 48^\circ$ (Smallest)
Labour	20	$\frac{20}{90} \times 360 = 80^\circ$
Direct Production	35	$\frac{35}{90} \times 360 = 140^\circ$ (Largest)
Others	<u>23</u>	$\frac{23}{90} \times 360 = 92^\circ$
	90 Units	

\therefore Difference between their central angles of largest components = $140^\circ - 48^\circ = 92^\circ$

2012 - Dec [53] What is a exclusive series?

(a) In which both upper and lower limit are not included in class frequency.

(b) In which lower limit is not included in class frequency.

(c) In which upper limit is not included in class frequency.

(d) None of the above.

(1 mark)**Answer:****(c)** In exclusive series, upper limit is not included in class frequency.**2013 - June [54]** A pie diagram is used to represent the following data:

Source: Customs Excise Income tax Wealth tax

Revenue in

million rupees: 120 180 240 180

The central angles in the pie diagram corresponding to income tax and wealth tax respectively:

(a) $(120^\circ, 90^\circ)$ (b) $(90^\circ, 120^\circ)$ (c) $(60^\circ, 120^\circ)$ (d) $(90^\circ, 60^\circ)$ **(1 mark)**

Answer:

$$\begin{aligned}
 \text{(a) Central Angle} &= \frac{\text{Revenue of Income tax}}{\text{Total Revenue}} \times 360^\circ \\
 &= \frac{240}{120 + 180 + 240 + 180} \times 360^\circ \\
 &= \frac{240}{720} \times 360^\circ = 120^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{Central Angle of wealth tax} &= \frac{\text{Revenue of wealth tax}}{\text{Total Revenue}} \times 360^\circ \\
 &= \frac{180}{720} \times 360^\circ \\
 &= 90^\circ
 \end{aligned}$$

2013 - Dec [55] Difference between the maximum and minimum value of a given data is called:

- (a) Width (b) Size
 (c) Range (d) Class (1 mark)

Answer:

(c) Difference between the maximum and minimum value of given data is called **Range**.

2013 - Dec [56] If class interval is 10 - 14, 15 - 19, 20 - 24, then the first class is:

- (a) 10 - 15 (b) 9.5 - 14.5
 (c) 10.5 - 15.5 (d) 9 - 15 (1 mark)

Answer:

(b) Class intervals is 10 - 14, 15 - 19, 20 - 24,
 $D = 15 - 14 = 1$
 $\frac{D}{2} = \frac{1}{2} = 0.5$
 First class is $(10 - 0.5) - (14 + 0.5)$
 $= 9.5 - 14.5$

2013 - Dec [57] The difference between the upper and lower limit of a class is called _____.

14.30**■ Solved Scanner CA Foundation Paper - 3C (New Syllabus)**

- (a) Class Interval (b) Mid Value
(c) Class boundary (d) Frequency (1 mark)

Answer:

- (a) The difference between the upper and lower limit of class is called class interval (class width).

2014 - June [58] There were 200 employees in an office in which 150 were married. Total male employees were 160 out of which 120 were married. What was the number of female unmarried employees?

- (a) 30 (b) 10
(c) 40 (d) 50 (1 mark)

Answer:

- (b) Total Employees in the office = 200
No. of Employees who are married = 150
No. of Employees who are unmarried = $200 - 150 = 50$
No. of Total male Employees = 160
No. of Married male Employees = 120
 \therefore No. of unmarried male Employees = $160 - 120 = 40$
No. of females who are unmarried = $50 - 40 = 10$

2014 - June [59] "The less than Ogive" is a:

- (a) U-Shaped Curve (b) J-Shaped Curve
(c) S-Shaped (d) Bell Shaped Curve (1 mark)

Answer:

- (c) "The less than Ogive" is a s - shaped.

2014 - June [60] The following data relates to the marks of a group of students.

Marks	No. of Students
More than 70%	07
More than 60%	18
More than 50%	40
More than 40%	60

More than 30% 75
 More than 20% 100

How many students have got marks less than 50%?

- (a) 60 (b) 82
 (c) 40 (d) 53 (1 mark)

Answer:

(a)

Marks (in%) C.I.	Frequency
20 - 30	100 - 75 = 25
30 - 40	75 - 60 = 15
40 - 50	60 - 40 = 20
50 - 60	40 - 18 = 22
60 - 70	18 - 07 = 11
70 - 80	= 07
No. of students who got marks less than 50% = 25 + 15 + 20 = 60	

2014 - June [61] To draw Histogram, the frequency distribution should be:

- (a) Inclusive type (b) Exclusive type
 (c) Inclusive and Exclusive type (d) None of these. (1 mark)

Answer:

(b) To Draw Histogram, the frequency distribution should be exclusive type.

2014 - Dec [62] The most appropriate diagram to represent the five - year plan outlay of India in different economic sectors is:

- (a) Pie diagram (b) Histogram
 (c) Line-Graph (d) Frequency Polygon (1 mark)

Answer:

(a) Pie diagram

2014 - Dec [63] If the fluctuations in the observed value are very small as compared to the size of the item, it is presented by:

- (a) Z chart (b) Ogive curve
 (c) False base line (d) Control chart (1 mark)

Answer:

(c) If the fluctuations in the observed value are very small as compared to the size of the item, it is present by **false base line**.

2014 - Dec [64] For constructing a histogram, the class-intervals of a frequency distribution must be:

- (a) equal (b) unequal
(c) equal or unequal (d) none of these (1 mark)

Answer:

(a) For constructing a histogram, the class-intervals of a frequency distribution must be **equal**.

2014 - Dec [65] 100 persons are classified into male/female and graduate/non-graduate classes. This data classification is:

- (a) Cardinal data (b) Ordinal data
(c) Spatial Series data (d) Temporal data (1 mark)

Answer:

(b) ordinal data

2015 - June [66] If we draw a perpendicular on x-axis from the point of intersection of both 'less than' and 'more than' frequency curves we will get the value of _____

- (a) mode (b) median
(c) arithmetic mean (d) third quartile (1 mark)

Answer:

(b) If we draw a perpendicular on x-axis from the point of intersection of both 'less than' and 'more than' frequency curve. We will get the value of 'Median'.

2015 - June [67] Histogram is used for the presentation of the following type of series:

- (a) Time series (b) Continuous frequency distribution
(c) Discrete frequency distribution (d) Individual observation (1 mark)

Answer:

(b) Histogram is used for the presentation of the **continuous frequency distribution** of the series.

2015 - June [68] Curve obtained by joining the points whose x coordinates are the upper limits of the class intervals and y coordinates are the corresponding cumulative frequencies is called.

- (a) Frequency Polygon
- (b) Frequency curve
- (c) Histogram
- (d) Ogive. (1 mark)

Answer:

(d) Curve obtained by joining the points whose x co-ordinate are the upper limits of the class intervals and y co-ordinates are the corresponding cumulative frequencies is called '**o**' give.

2015 - June [69] The number of observations between 150 and 200 based on the following data is:

Value:	More than 100	More than 150	More than 200	More than 250
No. of observations:	76	63	28	05

- (a) 46
- (b) 35
- (c) 28
- (d) 23 (1 mark)

Answer:

(b)

C.I.	Frequency
100-150	76-63 = 13
150-200	63-28 = 35
200-250	28-05 = 23
250-300	05

The No. of observation b/w 150 and 200 is 35

2015 - June [70] The number of car accidents in seven days in a locality are given below:

2015 - Dec [74] Find the number of observation between 250 and 300 from the following data:

Value more than:	200	250	300	500
No. of observation:	56	38	15	0

- (a) 38 (b) 23
 (c) 15 (d) None of the above (1 mark)

Answer:

(b)

C.I	Frequency
200-250	$56 - 38 = 18$
250-300	$38 - 15 = 23$
300-350	$15 - 0 = 15$
350-400	$0 - 0 = 0$

No. of observation b/w 250 and 350 = 23

2016 - June [75] Data collected on religion from the census reports are:

- (a) Primary data (b) Secondary data
 (c) Sample data (d) (a) or (b) (1 mark)

Answer:

(b) DATA collected on religion from the census reports are **secondary data**.

2016 - Dec [76] In collection of data which of the following interview methods:

- (a) Personal interview method (b) Telephone interview method
 (c) Published data (d) (a) and (b) (1 mark)

Answer:

(d) Personal Interview Method and Telephone Interview Method are the Interview Method.

2016 - Dec [77] For constructing a histogram the class intervals of a frequency distribution must be of the following type:

- (a) Equal (b) Unequal
 (c) Equal or Unequal (d) None of these (1 mark)

Answer:

(c) For constructing a histogram the class intervals of a frequency distribution must be equal or unequal.

2016 - Dec [78] Profits made by XYZ Bank in different years refer to:

- (a) An attribute (b) A discrete variable
(c) A continuous variable (d) None of these. **(1 mark)**

Answer:

(c) Profit made by XYZ Bank in different years refer to a continuous variable because Blue chips company's profit always increased.

2016 - Dec [79] Mode of presentation data:

- (a) Textual presentation (b) Tabulation
(c) Oral presentation (d) (a) and (b) **(1 mark)**

Answer:

(d) Mode of presentation data are textual presentation and tabulation.

2017 - June [80] If the data represent costs spent on conducting an examination under various needs, then the most suitable diagram will be:

- (a) Pie diagram (b) Frequency diagram
(c) Bar diagram (d) Multiple bar diagram **(1 mark)**

Answer:

(a) If the data represent cost spent on conducting an examination under various heads then the most suitable diagram will be **Pie diagram**.

2017 - June [81] Frequency density corresponding to class interval is the ratio of:

- (a) Class frequency to the total frequency
(b) Class frequency to the class length
(c) Class length to the class frequency
(d) Class frequency to the cumulative frequency **(1 mark)**

Answer:

(b) The ratio of class frequency to the class length is known as frequency density.

2017 - June [82] The point of intersection of less than ogive and greater than ogive curve gives us:

- (a) Mean (b) Mode

(c) Median

(d) None of the above. (1 mark)

Answer:

(c) The point of intersection of less than '0' give and greater than '0' give curve gives us Median.