Economics

(Statistics)

Chapter 4: Presentation of Data

Presentation of Data

Important terms and concepts –

- **Tabulation:** Orderly arrangement of data in rows and columns.
- **Objectives of Tabulation:**
  - Helps in understanding and
  - interpreting the data easily.
  - It helps in comparing data.
  - It saves space and time.
  - Tabulated data can be easily presented in the form of diagrams and graphs.
- **Main parts of a table:**
  - **Title of the table:** It is a brief explanation of contents of the table.
  - **Table number:** It is given to be used for reference.
  - **Captions:** A word or phrase which explains the content of a column of a table.
  - **Stubs:** Stubs explain contents of row of a table.
  - **Body of the table:** Most important part of table as it contains data.
  - **Head note:** Head note is inserted to convey complete information of title.
  - **Source note:** Refers to the source from which information has been taken.
  - **Foot note:** It is used for pointing exceptions to the data

Types of Table –

- **Simple Table:** Data are presented according to one characteristic only.
- **Double Table:** Data are presented about two interrelated characteristics of a particular variable.
- **Three way table:** This table gives information regarding three interrelated characteristics of a particular variable.
- **Manifold table:** This table explains more than three characteristics of the data.

Diagrammatic Presentation of Data -

- **Utility or uses of diagrammatic presentation:**
  - Makes complex data simple.
  - Diagrams are attractive.
  - Diagrams save time when compared to other methods.
  - Diagrams create a lasting impression on the minds of observers.

Limitations of diagrammatic presentation -

- They do not provide detailed information.
- Diagrams can be easily misinterpreted.
- Diagrams can take much time and labour.
- Exact measurement is not possible in diagrams.

Kinds of diagrams -

- **Line diagrams:** Lines are drawn vertically to show large number of items.
- **Bar diagram:**
  - **Simple Bar diagrams:** These diagrams represent only one particular type of data.
  - **Multiple Bar diagrams:** These diagrams represent more than one type of data at a time.
  - **Subdivided Bar diagram or Component Bar diagram:** These diagrams present total values and parts in a set of a data.
- **Pie diagrams:** Circle may be divided into various sectors representing various components.

GRAPHIC PRESENTATION OF DATA -

- **Advantages of Graphic Presentation:**
  - Graphs represent complex data in a simple form.
  - Values of median, mode can be found through graphs.
  - Graphs create long lasting effect on people's mind.
- **Disadvantages of graphic Presentation:**

- Graphs do not show precise values.
- Only experts can interpret graphs.
- Graphs may suggest wrong conclusions.

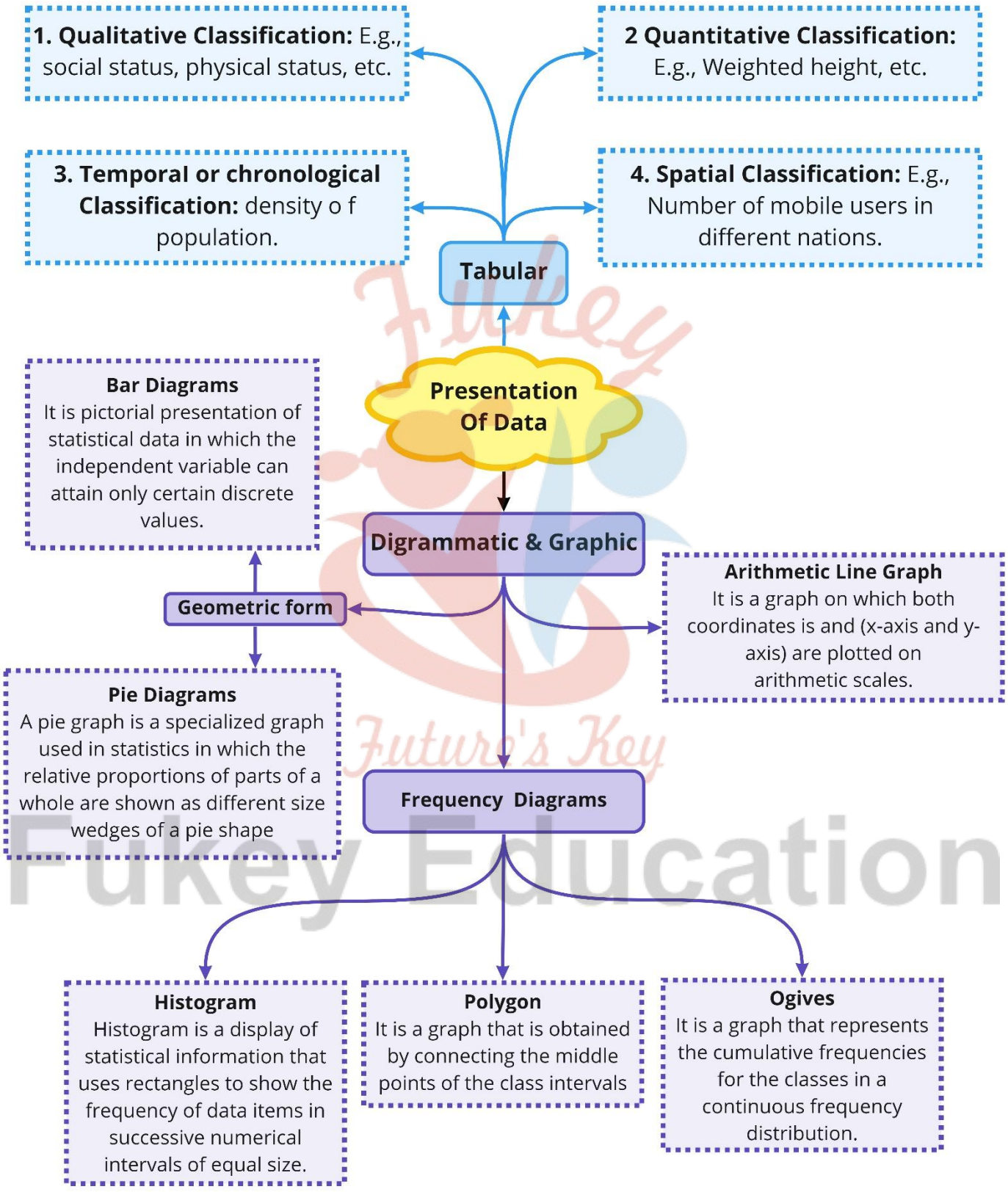
❖ **Rules of Constructing graph:**

- The heading of the graph should be simple, clear and self explanatory.
- Graphs should always be drawn with reference to some scale.
- False baselines should be drawn if the difference between zero and the smallest value is high.
- Index should be made if different lines are drawn as in time series graphs.

❖ **Types of Graphs:**

- **Line frequency graphs:** Such graphs are used to represent discrete series.
- **Histogram:** A two dimensional diagram whose length shows frequency and the breadth shows size of class interval.
- **Frequency Polygon:** A histogram becomes frequency polygon when a line is drawn joining midpoints of tops of all rectangles in a histogram. Frequency Curve: Smooth curve joining the points corresponding to the frequency and provides frequency curve of the data.
- **Ogive:** A curve obtained by plotting frequency data on the graph paper.

Class : 11th Economics (Statistics)
Chapter-4 : Presentation Of Data



Important Questions

Multiple Choice Questions-

1. The process of presenting data in the form of a table is called:

   (a) organisation

   (b) classification

   (c) presentation

   (d) tabulation

2. Series in which frequencies are continuously added corresponding to each class interval in the series

   (a) Cumulative frequency series

   (b) Frequency

   (c) Deviation

   (d) Mid value

3. 'Stub' of a table is the

   (a) Right part of the table describing the columns

   (b) Left part of the table describing the columns

   (c) Right part of the table describing the rows

   (d) Left part of the table describing the rows

4. Classification data based on the geographical differences of the data is

   (a) Qualitative

   (b) Quantitative

   (c) Spatial

   (d) Chronological

5. Whether classification is done first or tabulation`

   (a) Classification follows tabulation

   (b) Classification precedes tabulation

   (c) Both are done simultaneously

   (d) No criterion

6. Arrangement of data according to some logical order is termed as

(a) Collection series

(b) Sample series

(c) Statistical series

(d) None

7. The principal component of a table is:

(a) table number

(b) title

(c) head note

(d) all of these

8. Which of the following is a basis of classification of a table?

(a) Purpose

(b) Construction

(c) Originality

(d) All of these

9. The frequency distribution of two variables is known as

(a) Univariate distribution

(b) Sub- multivariate distribution

(c) Bivariate distribution

(d) Multivariate distribution

10. Complex table may be classified as:

(a) general purpose and special purpose table

(b) original and derived

(c) double, treble and manifold table

(d) none of these

11. In temporal classification, data are classified on the basis of:

(a) location

(b) time

(c) originality

(d) purpose

12. Sub-divided bar diagram is used to:

(a) Study relation between different components

(b) Compare different components of a variable

(c) Either (a) or (b)

(d) Both (a) and (b)

13. In tabulation, source of the data, if any, is shown in the:

(a) Source Note

(b) Body

(c) Stub

(d) Caption

14. Series of statistical data with one variable only is called

(a) None

(b) Discrete

(c) Continuous

(d) Individual Series

15. The most accurate mode of data presentation is:

(a) Diagrammatic method

(b) Tabulation

(c) Textual presentation

(d) None of these

Very Short Questions:

1. Define presentation of data.
2. What is tabulation?
3. Define table.
4. Explain a simple table.
5. What is a complex table?
6. Define a derived table.
7. What are the two principal parts of a table?
8. What are the different kinds of a table?

9. What are the two types of complex table?

10. What are a different forms of presentation of data?

Short & Long Questions:

1. Textual Presentation?
2. Tabular Presentation?
3. Components of a Table?
4. Guidelines for the construction of a table or features of a good table?
5. Kinds of Tables?
6. Classification of Data and Tabular Presentation?
7. Merits of Tabular Presentation?

Assertion Reason Question:

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

   (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)

   (b) Both Assertion (A) and Reason (R) are true, and Reason (R) is not the correct explanation of Assertion (A)

   (c) Assertion (A) is true, but Reason (R) is false.

   (d) Assertion(A) is false, but Reason (R) is true.

   Assertion (A): In histogram no space is left between consecutive rectangles.

   Reason (R): Histogram is a Graphical presentation of data and it is drawn for only continuous series.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

   (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A)

   (b) Both Assertion (A) and Reason (R) are true, and Reason (R) is not the correct explanation of Assertion (A)

   (c) Assertion (A) is true, but Reason (R) is false.

   (d) Assertion(A) is false, but Reason (R) is true.

   Assertion (A): Frequency polygon is the most common method of presenting grouped frequency distribution.

   Reason (R): Frequency polygon is derived from histogram.

Case Study Question:

1. 50 students were asked to choose their Favorite sport these are the results.

SPORT	CRICKET	FOOTBALL	HOCKEY	BASKETBALL	TENNIS
NO.OF STUDENT	12	10	11	9	8

1 What angle should be used for football.

(a) 36^o

(b) 72^o

(c) 90^o

(d) 10^o

2 In which form a data presented in a pie diagram?

(a) percentage

(b) Degrees

(C)Absolute values

(d) table

3 In a pie diagram/circle 1% is equal to.....

(a) 1

(b) 3.6

(c) 36

(d) 10

4 What angle should be used for tennis.

(a) 8^o

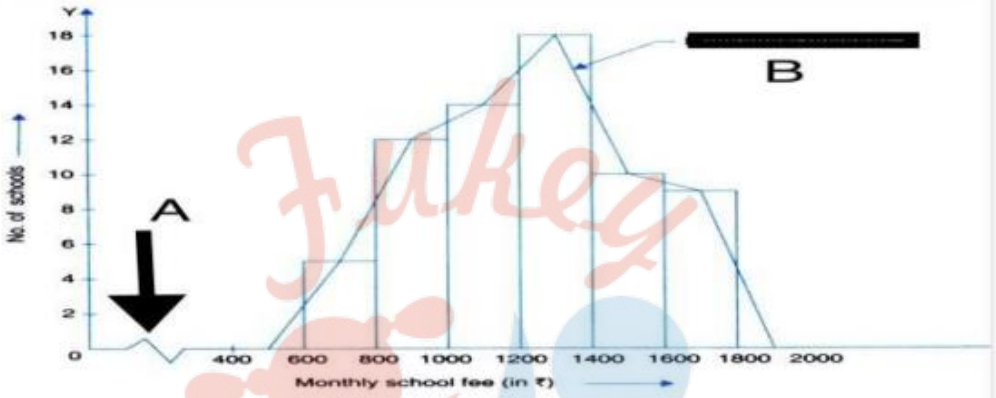
(b) 57.6^o

(c) 28.8^o

(d) 64^o

2. Answer the following questions based on the histogram Given below.

Monthly school fee ₹	No. of schools
600–800	5
800–1000	12
1000–1200	14
1200–1400	18
1400–1600	10
1600–1800	9



1 What A denotes in the above diagram.

(a) Jagged line

(b) horizontal line

(c) Broken line

(d) Both A and C

2Which group contains maximum monthly school fee?

(a) 1000-1200

(b) 1200-1400

(c) 1400-1600

(d) 800-1000

3 How many schools charge monthly school fee between 1200 to 1800?

(a) 44

(b) 37

(c) 42

(d)18

4 A _____ becomes a _____ if we Draw a line joining mid points of the tops of all rectangular.

(a) Histogram, Frequency polygon

(b) Frequency polygon, Histogram

(c) Frequency, Histogram

(d) Histogram, Frequency distribution

ANSWER KEY

Multiple Choice Answers-

1. D
2. A
3. D
4. C
5. B
6. C
7. D
8. D
9. C
10. C
11. B
12. D
13. A
14. D
15. B

Very Short Answers:

1. The presentation of data is a representation of data in an attractively and transparent manner that everybody understands and analyses.
2. Tabulation means presenting data in tabular form.
3. Table refers to the systematic representation of data with rows and columns.
4. A simple table only displays one characteristic of the data.
5. It is a table that shows more than one characteristic of the data.
6. A derived data is something where the information is not displayed according to the way it was collected. It is first into rations or percentages and then presented.

7. The two principal parts of a table are (i) Table number and (ii) Title
8. Tables can be classified into three parts. (i) Purpose (ii) Originality, and (iii) Construction
9. The two types of a complex table are (i) Double or two-way table and (ii) Manifold table
10. The different form of presentation of data are (i) Textual and descriptive presentation (ii) Tabular presentation, and (iii) Diagrammatic presentation

Short & Long Answers:

1. In textual presentation, data are a part of the text of study or a part of the description of the subject matter of study. Such a presentation is also called descriptive presentation of data. This is the most common form of data presentation when the quantity of data is not very large. Here are some examples:

Example 1

In a strike call given by the trade unions of shoe making industry in the city of Delhi, 50% of the workers reported for the duty, and only 2 out of the 20 industries in the city were totally closed.

Example 2

Surveys conducted by a Non-government Organisation reveal that, in the state of Punjab, area under pulses has tended to shrink by 40% while the area under rice and wheat has tended to expand by 20%, between the years 2001-2011.

Suitability

Textual presentation of data is most suitable when the quantum of data is not very large. A small volume of data presented as a part of the subject matter of study becomes a useful supportive evidence to the text. Thus, rather than saying that price of gold is skyrocketing, a statement like price of gold has risen by 50% during the financial year 2017- 18 is much more meaningful and precise. One need not support the text with voluminous data in the form of tables or diagram when the textual matter itself is very small and includes only a few observations. Indeed, textual presentation of data is an integral component of a small quantitative description of a phenomenon. It gives an emphasis of statistical truth to the otherwise qualitative observations.

Drawbacks

A serious drawback of die textual presentation of data is that one has to go through the entire text before quantitative facts about a phenomenon become evident. A picture or a set of bars showing increase in the price of gold during a specified period is certainly quite informative even on a casual glance of the reader. Textual presentation of data, on the other hand, does not offer anything to the reader at a mere glance of the text matter. The reader must read and comprehend (he entire text. When the subject under study is vast and involves comparison across different areas/countries, textual presentation of data would only add to discomfort of the reader.

2. In the words of Neiswanger, "A statistical table is a systematic organisation of data in columns and rows" Vertical dissections of table (||) are known as columns and horizontal dissections (=) are known as rows.

Tabulation is the process of presenting data in the form of a table. According to Prof. L.R. Connor, 'tabulation involves the orderly and systematic presentation of numerical data in a form designed to elucidate the problem under consideration. "

In the words of Prof. M.M. Blair, "Tabulation in its broadest sense is an orderly arrangement of data in columns and rows."

3. Following are the principal components of a table:

(1) Table Number: First of all, a table must be numbered. Different tables must have different numbers, e.g., 1, 2, 3, etc. These numbers must be in the same order as the tables. Numbers facilitate location of the tables.

(2) Title: A table must have a title. Title must be written in bold letters. It should attract the attention of the readers. The title must be simple, clear and short.
A good title must reveal:
(i) the problem under consideration,
(ii) the time period of the study,
(iii) the place of study, and
(iv) the nature of classification of data. A good title is short but complete in all respects.

(3) Head Note: If the title of the table does not give complete information, it is supplemented with a head note. Head note completes the information in the title of the table. Thus, units of the data are generally expressed in the form of lakhs, tonnes, etc. and preferably in brackets as a head-note.

(4) Stubs: Stubs are titles of the rows of a table. These titles indicate information contained in the rows of the table.

(5) Caption: Caption is the title given to the columns of a table. A caption indicates information contained in the columns of the table. A caption may have sub-heads when information contained in the columns is divided in more than one class. For example, a caption of 'Students' may have boys and girls as sub-heads.

(6) Body or Field: Body of a table means sum total of the items in the table. Thus, body is the most important part of a table. It indicates values of the various items in the table. Each item in the body is called 'cell'.

(7) Footnotes: Footnotes are given for clarification of the reader. These are generally given when information in the table need to be supplemented. «

(8) Source: When tables are based on secondary data, source of the data is to be given. Source of the data is specified below the footnote. It should give: name of the publication and publisher, year of publication, reference, page number, etc.

4. Construction of a table depends upon the objective of study. It also depends upon the wisdom of the statistician. There are no hard and fast rules for the construction of a table. However, some important guidelines should be kept in mind. These guidelines are features of a good table. These are as under:

(1) Compatible Title: Title of a table must be compatible with the objective of the study. The title should be placed at the top centre of the table.

(2) Comparison: It should be kept in mind that items (cells) which are to be compared with each other are placed in columns or rows close to each other. This facilitates comparison.

(3) Special Emphasis: Some items in the table may need special emphasis. Such items should be placed in the head rows (top above) or head columns (extreme left). Moreover, such items should be presented in bold figures.

(4) Ideal Size: Table must be of an ideal size. To determine an ideal size of a table, a rough draft or sketch must be drawn. Rough draft will give an idea as to how many rows and columns should be drawn for presentation of the data.

(5) Stubs: If rows are very long, stubs may be given at the right hand side of the table also.

(6) Use of Zero: Zero should be used only to indicate the quantity of a variable. It should not be used to indicate the non-availability of data. If the data are not available, it should be indicated by 'n.a.' or (-) hyphen sign.

(7) Headings: Headings should generally be written in the singular form. For example, in the columns indicating goods, the word 'good' should be used.

(8) Abbreviations: Use of abbreviations should be avoided in the headings or subheadings of the table. Short forms of the words such as Govt., m.p. (monetary policy), etc. should not be used. Also such signs as "(ditto)" should not be used in the body of the table.

(9) Footnote: Footnote should be given only if needed. However, if footnote is to be given, it must bear some asterisk mark (*) corresponding to the concerned item. (10) Units: Units used must be specified above the columns. If figures are very large, units may be noted in the short form as '000' hectare or '000' tonnes.

(11) Total: In the table, sub-totals of the items must be given at the end of each row. Grand total of the items must also be noted.

(12) Percentage and Ratio: Percentage figures should be provided in the table, if possible. This makes the data more informative.

(13) Extent of Approximation: If some approximate figures have been used in the table, the extent of approximation must be noted. This may be indicated at the top of the table as a part of head note or at the foot of the table as a footnote.

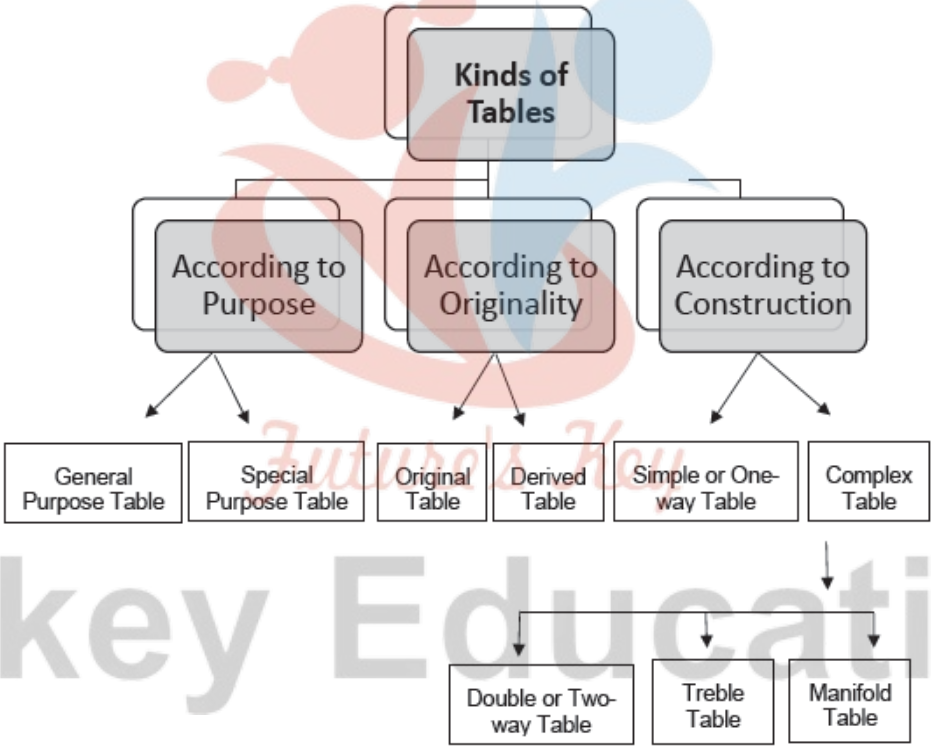
(14) Source of Data: Source of data must be noted at the foot of the table. It is generally noted next to the footnote.

(15) Size of Columns: Size of the columns must be uniform and symmetrical.

(16) Ruling of Columns: Columns may be divided into different sections according to similarities of the data.

(17) Simple, Economical and Attractive: A table must be simple, attractive and economical in space.

5. There are three basis of classifying tables, viz., (1) purpose of a table, (2) originality of a table, and (3) construction of a table. According to each of these bases, statisticians have classified tables as in the following flow chart:



Let us attempt a brief description of the various kinds of tables:

(1) Tables according to Purpose

According to purpose, there are two kinds of tables:

(i) General Purpose Table: General purpose table is that table which is of general use. It does not serve any specific purpose or specific problem under consideration. Such tables are just 'data bank' for the use of researchers for their various studies. These tables are generally attached to some official reports, like Census Reports oflndia. These are also called Reference Tables.

(ii) Special Purpose Table: Special purpose table is that table which is prepared with some specific purpose in mind. Generally, these are small tables limited to the problem under consideration. In these tables data are presented in the form of result of the analysis. That is why these tables are also called summary tables.

(2) Tables according to Originality

On the basis of originality, tables are of two kinds: (i) Original Table: An original table is that in which data are presented in the same form and manner in which they are collected. (ii) Derived Table: A derived table is that in which data are not presented in the form or manner in which these are collected. Instead the data are first converted into ratios or percentage and then presented.

(3) Tables according to Construction

According to construction, tables are of two kinds:

(i) Simple or One-way Table: A simple table is that which shows only one characteristic of the data. Table 2 below is an example of a simple table. It shows number of students in a college:

Number of Students in a College

Class	Number of Students
XI	200
B.A. (I)	100
B.A. (II)	80
B.A. (III)	60
Total	440

(ii) Complex Table: A complex table is one which shows more than one characteristic of the data. On the basis of the characteristics shown, these tables may be further classified as:

(a) Double or Two-way Table: A two-way table is that which shows two characteristics of the data. For example, Table 3, showing the number of students in different classes according to their sex, is a two-way table:

Number of Students in a College

(According to Sex and Class)

Class	Number of Students		Total
	Boys	Girls	
XI	160	40	200
B.A. (I)	40	60	100
B.A. (11)	60	20	80
B.A.(III)	50	10	60
Total	310	130	440

(b) Treble Table: A treble table is that which shows three characteristics of the data. For example, Table 4 shows number of students in a college according to class, sex and habitation.

Number of Students in a College

(According to Class, Sex and Habitation)

Class	Boys			Girls			Total		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
XI	50	110	160	10	30	40	60	140	200
B.A. (I)	10	30	40	15	45	60	25	75	100
B.A. (IT)	15	45	60	5	15	20	20	60	80
B.A. (III)	10	40	50	5	5	10	15	45	60
Total	85	225	310	35	95	130	120	320	440

(c) Manifold Table: A manifold table is the one which shows more than three characteristics of the data. Table 5, for example, shows number of students in a college according to their sex, class, habitation and marital status.

Number of Students in a College

(According to their Sex, Class, Habitation and Marital Status)

Class	Boys				Girls				Total
	Rural		Urban		Rural		Urban		
	Married	Unmarried	Married	Unmarried	Married	Unmarried	Married	Unmarried	
XI	5	55	10	90	2	8	5	25	200
B.A. (1)	5	15	15	35	4	4	4	18	100
B.A. (II)	5	10	15	30	2	3	5	10	80
B.A.(III)	5	5	20	20	3	2	2	3	60
Total	20	85	60	175	11	17	16	56	440

6. Tabular presentation is based on four-fold classification of data, viz., qualitative, quantitative, temporal, and spatial. Following are the details with suitable illustrations.

(1) Qualitative Classification of Data and Tabular Presentation:
Qualitative classification occurs when data are classified on the basis of qualitative attributes or qualitative characteristics of a phenomenon. Example: Data of unemployment may relate to rural-urban areas, skilled and unskilled workers, or male and female job-seekers. Table 6 below is an example of tabular presentation of data when data are classified on the basis of qualitative attributes or qualitative characteristics.

Unemployment in Punjab by Sex and Location (Per cent)

Sex	Location	
	Rural	Urban
Male	20	10
Female	30	20
Total	25	15

(This is an imaginary table. In this table, male and female are such characteristics/attributes which are qualitative and cannot be quantified.)

(2) Quantitative Classification of Data and Tabular Presentation:
Quantitative classification occurs when data are classified on the basis of quantitative characteristics of a phenomenon.

Example: Data on marks in Mathematics by the students of Class XII in CBSE examination. Table 7 shows tabular presentation of data when data are classified on the basis of quantitative characteristics.

Marks Obtained by Students of Class XII of XYZ School

Marks	Number of Students
20-30	3
30-40	7
40-50	12
50-60	22
60-70	32
70-80	36
80-90	09
90-100	01

Source: Result Sheets

Here, marks are a quantifiable variable and data are classified in terms of different class intervals of marks.

(3) Temporal Classification of Data and Tabular Presentation:

In temporal classification, data are classified according to time, and time becomes the classifying variable.

Example: Sale of Cell phones in different years during the period 2014-2018 in the city of Delhi. Table 8 shows tabular presentation of data on the basis of temporal classification.

Annual Sale of Cell Phones in the City of Delhi (2014-2018)

Year	Sale (Units)
2014	50,000
2015	70,000
2016	90,000
2017	1,00,000
2018	2,00,000

(4) **Spatial Classification:**

In spatial classification, place/location becomes the classifying variable. It may be a village, a town, a district, a state or a country as a whole.

Example: Number of Indian students studying in different countries of the world during

a particular year. Table 9 is an example of tabular presentation based on spatial classification of data.

Indian Students in different Countries of the World (2018)

Country	Number of Student
USA	50,000
UK	15,000
JAPAN	5,000
Russia	2,000
Australia	7,000

7. Following are the principal merits of tabular presentation of data:

(1) Simple and Brief Presentation: Tabular presentation is perhaps the most simplest form of data presentation. Data, therefore, are easily understood. Also, a large volume of statistical data is presented in a very brief form.

(2) Facilitates Comparison: The tabulation facilitates comparison of data by presenting the data in different classes.

(3) Easy Analysis: It is very easy to analyse the data from tables. It is by organising the data in the form of table that one finds out their central tendency, dispersion and correlation.

(4) Highlights Characteristics of Data: Tabulation highlights characteristics of data. Accordingly, it becomes easy to remember the statistical facts.

(5) Economical: Tabular presentation is a very economical mode of data presentation. It saves time as well as space.

Assertion Reason Answer:

1. (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
2. (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

Case Study Answer:

1. **Answer:**

   Q.1-b, Q.2-a, Q.3-b, Q.4-b

2. **Answer:**

   Q.1-d, Q.2-b, Q.3-b, Q.4-a