

## INTRODUCTION TO DATA INTERPRETATION

Not a day passes without our coming across figures and statistics. Study and manipulation of such data leads us to an important area - namely Data Interpretation. Data can be organised in a number of ways so that larger volume of data can be presented in a more compact and precise form. Data thus presented has to be deciphered correctly by the user of the data. This process of deciphering the data from its compactly presented form is called Data Interpretation.

Unorganised and haphazard data does not make any sense - more so to top management for whom time is a very valuable and rare commodity. Hence, any data, be it daily production figures, daily sales figures, financial performance or productivity, will have to be presented in a concise manner - at the same time being precise so that top management can study it with least of effort and time thus also facilitating faster decision making.

In this section, we will cover Data Interpretation questions on which are almost certain in every MBA entrance exams either as a part of Mathematics or as a separate section.

Over the last few years, persons setting the question papers for competitive exams have developed enormous liking for this area. Consequently, the variety of questions asked and the degree of difficulty have increased over a period of time.

### Methods of Presenting Data:

Numerical data can be presented in one or more of the following ways

- |                            |                            |                              |
|----------------------------|----------------------------|------------------------------|
| (i) Data Tables            | (ii) Pie Charts            | (iii) 2 - Dimensional Graphs |
| (iv) Bar Charts            | (v) 3 - Dimensional Graphs | (vi) Venn Diagrams           |
| (vii) Geometrical Diagrams | (viii) Pert Charts         | (ix) Others                  |

The "Others" category covers miscellaneous forms like descriptive case format, etc. customised for the situation. Data can also be presented by using a combination of two or more of the above forms.

While some data can be presented in many different forms, some other data may be amenable to be presented only in a few ways. In real life situations, the style of data presentation is based on the end-objective. In certain situations data has to be presented as a combination of two or more forms of data presentation.

Let us understand each of the above forms of data presentation with an example.

### DATA TABLE

Here data is presented in the form of simple table. While any type of data can be presented in table form, that too in a very accurate manner, interpreting the data in table form is more difficult and time consuming than the other modes, all of which are basically pictorial or graphical in presentation.

Data tables can be of a number of types. They can be of a single-table variety or combination of tables. Some examples of tables are given below.

**TABLE – 1**

#### **Movement of Goods by Different Modes of Transport (in 000's of metric-ton-kms)**

| Year | Road | Rail  | Air | Water | Total |
|------|------|-------|-----|-------|-------|
| 1985 | 1000 | 1500  | 120 | 20    | 2640  |
| 1986 | 1600 | 2000  | 129 | 24    | 3753  |
| 1987 | 2907 | 3090  | 139 | 28    | 6164  |
| 1988 | 4625 | 5200  | 152 | 27    | 10004 |
| 1989 | 6346 | 7540  | 174 | 33    | 14093 |
| 1990 | 7920 | 10250 | 212 | 40    | 18422 |
| 1991 | 9540 | 13780 | 266 | 50    | 23636 |

Note: All figures are fictitious.

#### **From the table we can deduce the following:**

- Rate of growth by each mode of transport in successive years as well as cumulative annual growth.
- Rate of growth of total haulage by all modes of transport together in any year.
- Contribution by each mode of transport to the total haulage in any given year.
- Trends of growth over time for various modes of transport.
- Given the cost of transportation for each mode, we can calculate total annual cost of transportation over the years for various modes of transport as well make a cost comparison.
- Finding out the mode of transportation in any given year that forms the largest percentage of total haulage.
- For a given mode of transport, finding out the year in which the percentage increase in haulage over the previous year was the highest.

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Triumphant Institute of Management Education Pvt. Ltd. (T.I.M.E.) HO: 95B, 2<sup>nd</sup> Floor, Siddamsetty Complex, Secunderabad – 500 003.

Tel : 040-27898195 Fax : 040-27847334 email : info@time4education.com website : www.time4education.com SM1001904/1

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TABLE – 2

Railway Time Table – Coromandel Express

| Place         | Cumulative mileage | Arrival Time (in hrs.) | Departure Time (in hrs.) |
|---------------|--------------------|------------------------|--------------------------|
| Madras        | 0                  | -                      | 08.00                    |
| Nellore       | 200                | 11.20                  | 11.30                    |
| Vijayawada    | 525                | 15.30                  | 16.00                    |
| Rajahmundry   | 700                | 19.20                  | 19.30                    |
| Visakhapatnam | 1100               | 01.10                  | 01.30                    |
| Bhubaneswar   | 1450               | 03.45                  | 04.00                    |
| Kharagpur     | 1600               | 07.25                  | 07.30                    |
| Calcutta      | 1925               | 09.30                  | -                        |

From the above Time Table, we can obtain the following:

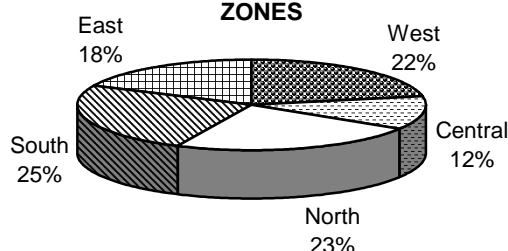
- Distance between various stations.
- Total idle time as a proportion of total travel time.
- Average speed between stations as well as over the entire journey.
- Minimum and maximum speeds of the between two stations.

### PIE-CHARTS

This is probably the simplest of all pictorial forms of data presentation. Here, total quantity to be shown is distributed over one complete circle or 360 degrees. In pie-charts, data is essentially presented with respect to only one parameter (unlike in two and 3-dimensional graphs described later). This form essentially presents shares of various elements as proportion or percentage of the total quantity. Each element or group in the pie-chart is represented in terms of quantity (or value, as the case may be) or as the angle made by the sector representing the elements or as a proportion of the total or as a percentage of the total.

Chart 1 gives distribution of the population in different geographical zones.

**CHART – 1**  
**DISTRIBUTION OF POPULATION IN GEOGRAPHICAL ZONES**



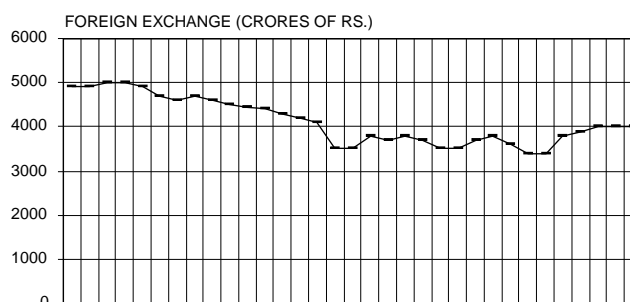
From the above pie chart, we can calculate the following:

- Population in any zone given the total population
- Population of any zone as a percentage of that of another zone
- Percentage increase in the total population given the percentage increase in the population of one or more zones

Pie Charts are also very frequently used in combination with other forms of data or along with other Pie-Charts.

### TWO-DIMENSIONAL GRAPHS

**CHART – 2**  
**FOREIGN EXCHANGE RESERVES OF INDIA**



This is essentially used for continuous data but can also be used for depicting discrete data provided we understand the limitation. Also known as Cartesian Graphs, they represent variation of one parameter with respect to another parameter each shown on a different axis. These types of graphs are useful in studying the rate of change or understanding the trends through extrapolations.

These graphs can be of various types and a few of them are shown below (Charts 2 to 4):

The graph in Chart 2 shows the changes in the foreign exchange reserves of our country during a period of time. One can find out trends and the growth rates of foreign exchange reserves.

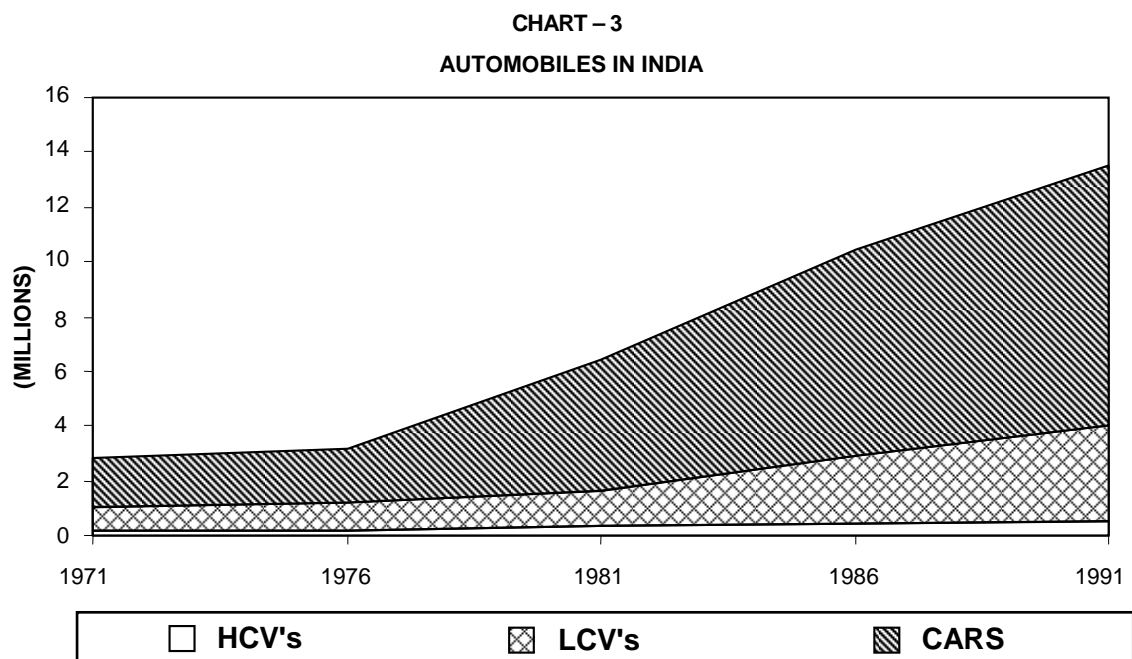


Chart 3 shows a cumulative type of graph (stacked graph). It gives more information than the previous graph that you studied in Chart 2.

From the graph given in Chart 3, the relative proportion of different varieties of vehicles which constitute the total can be obtained along with the trends and growth rates, percentage variation, actual variations and trends for any period of time can be ascertained.

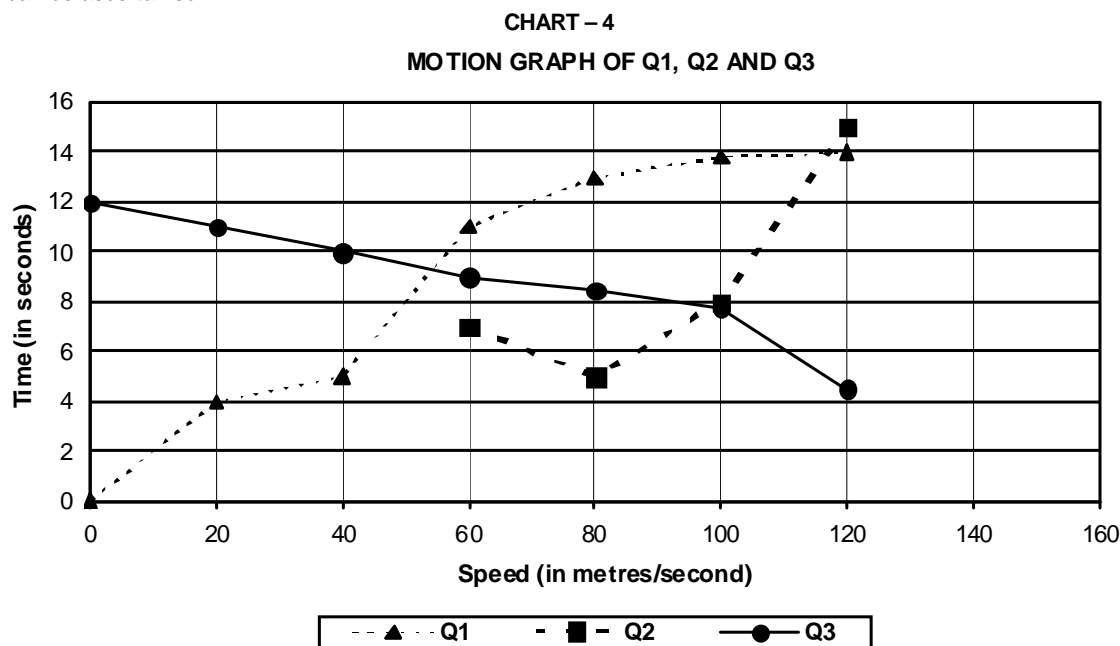


Chart 4 presents another type of two-dimensional graph which is mostly used to depict scientific data like speed, velocity, vectors etc., In the graph speed trends of three bodies Q1, Q2, Q3 is given.

Triumphant Institute of Management Education Pvt. Ltd. (T.I.M.E.) HO: 95B, 2<sup>nd</sup> Floor, Siddamsetty Complex, Secunderabad – 500 003.

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## BAR CHARTS

This is a type of graph used mostly to depict data in a discrete way. They are accurate and comparison of variables is very convenient.

CHART – 5

### REFRIGERATOR SALES OF COMPANY ABC (000's OF UNITS)

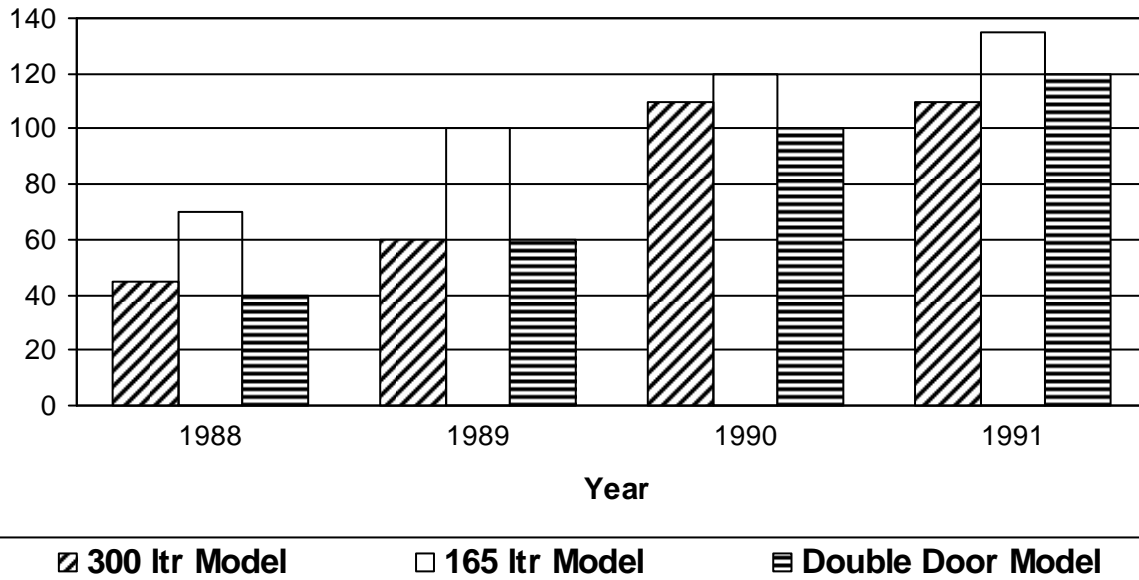


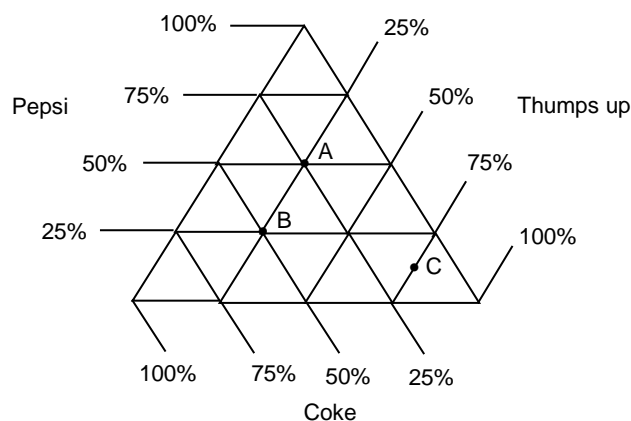
Chart 5 shows model wise sales of refrigerators during four years. From this graph we can obtain the following:

- Percentage contribution of each model to the company's total sales for four years.
- Relative increase or decrease in the share of each model.
- Sales trend of various models.

Using this bar chart one can carry out a detailed performance evaluation of the company with respect to the sales of the four year period 1988 to 1991 for any given model. These bar charts can also be depicted horizontally. Another variation could be showing each product at one place (rather than each year at one place).

## THREE-DIMENSIONAL GRAPH

CHART – 6



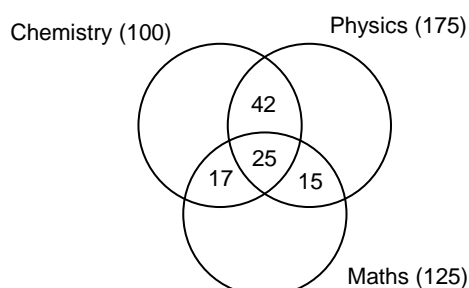
The data (parameters) in a triangular graph are given on each side of the triangle. Each point represents a particular parameter in terms of the percentage, the same represents.

This graph represents the percentage of students who like the three Colas – Pepsi, Thumps up and Coke in three colleges A, B and C.

## VENN-DIAGRAMS

You must be familiar with the concept of sets. Data is represented in the form of Venn-Diagrams when operations have to be carried out on different distinct sets of elements each following a different functional rule. All the elements in a set follow the same functional rule. By Set Union and Intersection operations, you can establish new sets from the existing sets. For example (Chart 7) consider three of the courses Physics, Chemistry, Maths offered to B.Sc students of various groups.

**CHART – 7**



From the chart, you can arrive at the number of students who are studying only one out of the above three subjects.

## PERT CHARTS

The word PERT stands for "Project Evaluation and Review Techniques". The progress of any project is monitored and the execution of various activities is scheduled keeping in mind resource constraints (like labour) and time constraints. For the purpose of data interpretation questions, the data may be given in the form of a table or a chart.

We will here take a table and draw a PERT chart from the table.

**TABLE – 3**

### Interior Decoration of an Office Room

The interior decoration work of an office is taken up and the activities involved along with the time taken by each activity is given below.

| Activity                      | Duration (in weeks) | Other activities to be completed before this activity can be taken up. |
|-------------------------------|---------------------|--|
| False roofing                 | 2                   | -  |
| Making Furniture              | 1                   | -  |
| Fixing Furniture              | 1                   | False roofing, Partition systems.                                      |
| Fixing Venetian Blinds        | 1                   | Painting of Doors and Windows.   |
| Fixing Air-Conditioner        | 1                   | -  |
| Painting Walls                | 1                   | False roofing.   |
| Partition Systems             | 2                   | False roofing, Laying the carpet.                                      |
| Laying of the carpet          | 1                   | False roofing, Painting of Doors and Windows, Painting of walls.       |
| Painting of Doors and Windows | 1                   | False roofing.   |

From the table, you can arrive at the minimum time after which a particular activity can be taken up or the whole task can be completed.