CHAPTER 17

Introduction to Data Interpretation

LEARNING OBJECTIVES

- What do we understand with data?
- What is data interpretation?

- Different ways of representing the data
- Problem solving techniques

WHAT IS DATA INTERPRETATION?

Data Interpretation is the act of transforming data with the objective of extracting useful information and facilitating conclusions on the basis of the given data. Depending upon the type of data and the questions, we might be required to apply certain statistical tools with various methods to represent the given data.

Before we move ahead to see and learn the various methods of representing data, let us understand some basics.

WHAT IS DATA?

Data is a means to represent facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing by humans or other automatic modes.

In other words, propositions like measurements or observations of a variable, which may comprise numbers, words or images can be quantified with the help of data.

Data can be a numerical or non-numerical fact and figure related to a particular social, economic or political event etc.

Let us see some examples of data:

Yesterday the Sensex closed at 14,004 points.

25% of the total population of India is below The poverty line.

In the last general elections in India, 40% of the total seats were won by regional parties. Data can be further understood to be an agent to cause the sentiments and even sometimes it can be effect also.

If the data given is distinct and separate, i.e., It can be counted (1, 2, 3...), then it is known as Discrete Data. For example, population of a country, production of cars in a manufacturing plant.

However, if the data takes any value within a finite or infinite interval, then it is known as a Continuous Variable. For example, the percentage of sugar in mangoes or weight/ height etc., are continuous variables.

Significance of Organized Data

It is said, "Trust only two—God and data." Since God cannnot be everywhere to prove a point, we have to resort to data to validate points or make inferences. The significance of data can be further illustrated by the fact that data is the basis of an argument. In fact, data is the starting point for most arguments.

However, data if not properly managed is not of much use. People at the higher echelons of any organization will have no time to go through the details of all the reports. The need for organized data becomes more pertinent because data can be used to describe a current situation with respect to its future possibility. Data can establish a relationship between different phenomenon like expenditure government in the various sectors of its annual budget vis-a-vis the priority sectors; The per capita income of different countries in relation to the number of deaths due to a particular disease.

For maximum utilization of data, it should be formatted properly for easy interpretation and deduction. However, in CAT and other B-School entrance examinations, we should not expect easy-to-comprehend data. Rather, the students should be prepared to find data which is difficult to interrelate or comprehend.

Different Ways of Representing Data

Data representation in the DI section is primarily of two types:

Narration Based

Also known as caselets, these questions often involve stories that define a situation and give details of various parameters involved; including their inter-relationships.

Example Mittal has recently acquired four companies, viz. Bank of Bozoland (BOB), My Own Bank (MOB), Zany

Obliterated Bank (ZOB) and Dogmatically Obscure Bank (DOB). He noticed that the sales of DOB are half than that of BOB, whereas, the profits of DOB are double than that of BOB. The expenses of ZOB are ₹3 crores less than that of DOB, whereas, the profits of MOB is ₹1 crore less than that of ZOB. The expenses of BOB are three times than that of DOB. It is also known that the sales of ZOB are ₹15 crore or one-fourth of MOB's sales. All the figures are for 1992–93. An insider further informs Mittal that the sales of DOB are ₹10 crores more than that of ZOB and the expenses of BOB are 90% of its own sales. Sales – Expenses = Profit

1. The total sales of all the four companies is $(\mathbf{\overline{c}} crores)$:

(a)	200	(b) 150
(c)	125	(d) 160

Pictorial

This is the most common form of data representation. In such problems, data is presented in various pictorial forms such as line graphs, bar diagrams, line charts etc. The important point to remember pertaining to all these questions is the fact that each and every question asked in the CAT is based on some logic and reasoning meant to check your aptitude. Few questions that involve numbers may also require a basic level of calculation skills.

Let us see the various pictorial representation of data:

Table

Tabular method is the most fundamental way of representing data. In fact, most of the different kinds of data presentation formats like the bar charts, line charts etc. originate from the table. In other words, presenting the data in a tabular format is the first step in forming other types of data presentation formats.

Example The table given below shows the break-up of the percentage of people of different age groups frequenting bars in 4 different metro cities viz., Delhi, Hyderabad, Bangalore and Patna in the year 2002.

Cities	Percentage break-up for age groups (Years) in 2006						
	Up to 15	15–20	20–25	25–30	30–35	35–40	Above 40
Delhi	8	13	24	21	11	17	6
Hyderabad	3	8	35	23	10	16	5
Bangalore	4	21	27	11	8	14	15
Patna	1	7	43	32	9	5	3

The tabular format is considered to be the most versatile data presentation method. All data which can be expressed in any other format can also be expressed in the format of a table. On the other hand, it is quite possible that data that can be presented in a tabular format, cannot be presented in any other format like the pie chart etc.

Pie Chart

Pie charts are a typical type of data representation where data is represented as a part of a circle. The circle represents the total value (or 100%), and the different parts represent certain proportions (or percentage) of the total. In a pie chart, the arc length of each sector (and in turn its central angle and area), is proportional to the part it represents. The origin of the pie chart is traced back to Florence Nightingale in 1858. This was the year when she presented a paper on the causes of deaths in her army in the eastern part of the world.

Following is the pie chart originally developed by Florence Nightingale in the year 1858. (Actually called by her as the 'Polar Area Diagram'.)

The below graphic gives the number of deaths that occured from diseases that could have been prevented (in light grey), those that were the results of wounds (in dark grey) and those due to other causes (in black).

There are two approaches to constructing a pie chart from any given data:



(A) Degree Approach:

The central angle in a circle represents 360°, so any part or segment in a pie chart is calculated as a proportion of 360°.

(B) Percentage Approach:

In this case, any part or segment in a pie chart is calculated as a part of 100%.

If we convert the same pie chart into the degree format, we will be required to do the following conversions:

Total	=	100%	=	360°
Hence		1%	=	3.6°
Central	=	10%	=	36°
North	=	20%	=	72°
South	=	25%	=	90°
East	=	15%	=	54°
West	=	30%	=	108°

Limitations of Pie Charts

Despite the pie chart being one of the most important ways to represent data, it is marred by limitations of its own:

- Pie charts can be used only when the sum of all categories is given, for example if the categories represent proportions or percentage of a total.
- A single pie chart can represent only one continuous variable.

Significance of Pie Charts

The pie chart has gained prominence due to the following reasons:

- In a pie chart, we get a clear picture of the contribution of different sectors to the build up of the total. E.g., presentation of budgets.
- Comparing two pie charts is easier than comparing two bar charts or any other format of data representation.









Question What is the percentage increase in the sales value of the East zone?

Solution There are two percentage increases (A) The total sales value of company XYZ is increasing. (B) The percentage contribution of the East zone is increasing.

Percentage increase in The total sales value of the company XYZ = 30%

Percentage increase in the percentage contribution of the East zone = 20%

Hence, the net percentage increase = 56%(Successive increase of 20% and 30%)

Types of Pie Charts

There are two types of pie charts:

(A) Normal Pie Chart

This displays the contribution of each component of the pie.



(B) Exploded Pie Chart

This pie chart has all the characteristics of a normal pie chart, the only addition is that the contribution of individual segments is highlighted.



Bar Chart/Bar Graph

The bar chart, in comparison to the pie chart is more versatile in representing data. It has been proven that representation using lengths as in the case of bar charts is a better indicator of data vis-a-vis pie charts wherein data is categorized in terms of areas.



In the above diagram, the same data has been represented length-wise in the bar chart and area-wise in the pie chart. Obviously, it is easier to see the contribution of the various segments in the bar chart than in the pie chart.

A therefore, is a chart with rectangular bars of lengths proportional to the values which they represent. Usually, the terms 'bar chart' and 'bar graph' are used interchangeably. It should also be noted that in a bar chart, what matters is the length of the bar and not the width of the bar. **Example** The following bar chart represents the number of seats won by different parties in the last general election.



Significance of Bar Charts

Following are the major specialities of bar charts: Unlike the pie chart, a single bar chart can be used to compare two, or more than two continuous variables.

Example The following bar chart represents the number of seats won by different parties in two general elections:



Since the length parameter is easier to study than the area parameter, a bar chart gives a quick understanding of the various ranks. Hence the time taken to understand the data becomes condiserably lower in a bar chart as compared to other formats of data presentation.

Types of Bar Charts

There are three types of bar charts:

(A) Normal Bar Chart

This is a simple bar chart with the values of different segments represented in the form of bars, which could be either horizontal, vertical or both.

Example The following bar chart represents the crime cases reported in Delhi in 2007:

Bar Chart with Vertical Bars



Bar Chart with Horizontal Bars



Bar Charts with 3-D Effects



(B) Stacked Bar Chart Value-wise

When the same variable is to be represented on more than one parameters like; year etc., then we can have a stacked bar chart.

(C) Stacked Bar Chart Percentage-wise

The only difference between value-wise and percentage-wise bar charts is that in the former we apply values to stack the bars and in the latter we apply percentages.

Stacked Bar Charts are also known as Cumulative Bar Charts.

Example Here, we will see the same data in a normal bar chart, value-wise stacked bar chart and stacked bar chart percentage-wise

Normal Bar Chart



Following things can be observed in the above bar chart: Bars representing different crimes in different years are proportional to the crimes reported.

The above bar chart takes the minimum value as 100, however the same bar chart could take the minimum value as

0 or 50 or anything else as well. The question here is, what will happen if we take the minimum value as 150?

Since some of the values are less than 150, what will happen to those? Find out yourself without using a computer.

Stacked Bar Chart Value-wise



Following things can be observed in the above stacked bar chart:

- The total number of murders have been added up in one bar and the different years are shown as a part of that total.
- The same data could also have been represented by taking the sum of all the crimes reported in a particular year as a total, and the individual crimes as a part of that total.

Stacked Bar Chart Percentage-wise



Following things can be observed in the above stacked bar chart:

• The total number of murders have been added up and they equal to 100%; and the murders reported in dif-

ferent years have been taken as a percentage of that total.

• The same data could have been represented by taking the sum of all the crimes reported in a particular year as a total, and the individual crimes as a part of that total.

Line Chart/X–Y Chart

Line charts are seen as simplified forms of the normal bar chart.

Example The bar chart given below represents the highest values of the sensex in the given years.



If we convert the same data into a line chart, it will look like this:



Sometimes in case of line charts, the lines are not given and only the dots are indicated in the graph. Let us see an example with the same data:



Significance of Line charts

- Generally Line charts are used in case time is one of the variables in the data. The 'time' variable can be in the form of hour, day, months years or anything that represents chronological order of events.
- It is easier to calculate the percentage changes in a line chart and thereby understand the trends of the data in a better way.
- A line chart becomes very handy in case of data with two different scales.

Example The line chart given below represents the production of soaps by a company over a period of five years and the inflation for the same period.



• Two or more than two variables can be represented on a line chart very easily. Besides, we can see the movement of data very easily in case of a line chart.

Example Below given line chart represents the movements of the highest value of two indices over a given period:



The same data can be represented using dots only also:



Types of Line Charts

Broadly, line charts are of three types:

Normal Line Chart

This is a simple line chart representing two or more than two variables.

In the chart given below, The total number of enrolments for four different years of for four coaching institutes are represented:



Stacked Line Chart

In a stacked line chart, the values keep on getting added to obtain the next value.

Example Here, the bottom line (of LC) gets added with the values of SMI to represent the value of SMI. Now this represented value of SMI is added to the actual value of EMIT to give the value of EMIT on the chart. And finally, the same is done with the value of FC.



Hence, in a stacked line chart, to obtain the values of different constituents/segments, either start with the top line or the bottom line and then keep on subtracting the values to obtain the next value.

Time-Speed-Distance Line Chart

This line chart is used in tables of data collected from experiments on physical processes.



Radar Diagram

This diagram every value is represented with respect to a central point. All the changes in the values are expressed in the form of distance from this center point.



Example The radar diagram given below represents the highest value of two indices over a given period.

It can be seen that the centre value = 8000. With every passing circle the value increases by 2000. Since here are seven years, the diagram takes the shape of a heptagon.

Had there been only six years, it would have taken the shape of a hexagon, as shown below:



Similarly, had there been only four years, the diagram would have been in the shape of a square.

Area Diagram

In case of an area diagram, the values are represented in terms of areas.

Example	Data	set	given	is:
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	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
East	20	27	90	20
West	30	38	34	30
North	45	46	45	42

The stacked area diagram corresponding to the table given above will be like this:



Floating Diagram

A floating diagram is used to represent the difference in any given variable between two different periods.

Example We will convert the following table into a floating diagram:

	1st Quarter	2nd Quarter	3rd Quar- ter	4th Quarter
2000	20	28	90	22
2001	22	31	95	24



Exercise 1

Bar Chart

Directions for questions 1 to 7: Refer to the following bar graph and solve the questions based on it.

The following bar chart shows the monthly expenditure of a family comprising of five persons over a period of seven months during three different years.



- Q.1 In any of the given years, which month sees the maximum percentage increase in expenses with respect to the previous month?
 - (a) Feburary (b) March
 - (c) April (d) June
- Q.2 What is the average monthly expenditure of the whole family in the year 2000?
 - (a) ₹314000
 - (b) ₹315000
 - (c) ₹316000
 - (d) Cannot be determined
- Q.3 In April 2000, what was the percentage increase in expenditure over April 1999?

(a)	1.2%	(b)	2%
(c)	6%	(d)	9.4%

- Q.4 Which period has shown the same change in trend across all the given three years?(a) February-March (b) May-June
 - (c) March-April (d) January-February

- **Q.5** Which of the following statements is correct?
 - (a) In 1998, May-June were the two consecutive months during which the expenditure was the maximum.
 - (b) During May-June 1999, the expenditure was the maximum for the year.
 - (c) Expenditure during January-Februrary was the same in 1998 as well as in 1999.
 - (d) None of these
- Q.6 For how many months of the given years the expenditure has been consistently increasing or decreasing?(a) 0 (b) 1
 - (c) 2 (d) 3
- **Q.7.** Out of the following months in the options, Which month accounts for the maximum combined expenditure for three years?
 - (a) March (b) May
 - (c) June (d) Feburary

Directions for questions 8 to 14: *Refer to the following bar graph and solve the based on it.*

The bar chart given below represents top 10 exporters and their export value (in billion \$) in 2008.



- **Q.8.** If India also joins the top ten exporters list by becoming the 11th largest exporter, then what will be the effect on the average exports of these 11 countries; provided the export value of India is \$ 10 billion?
 - (a) The average will increase by 1 billion dollars
 - (b) The average will decrease by 1 billion dollars
 - (c) The average will increase by 1.1 billion dollars
 - (d) None of these
- Q.9 The ratio of exports between Spain and Japan is (approximately) (a) 3 · 4 (b) 19 · 15

(a) 5.4	(0) 19.1
(c) 15 : 19	(d) 4 : 5

- Q.10 What is the average export of all the countries in billion dollars for the year 2008?
 - (a) 77.66
 - (b) 76.76
 - (c) 76.67
 - (d) Cannot be determined
- Q.11 If the exchange rate per dollar is ₹43 then find the difference between the values of exports by Hong Kong and UK in Rupee.

(a)	$28.179 \times$	109	(b)	28.179	\times	10^{10}
(c)	$28.079 \times$	1010	(d)	28.079	×	10^{11}

- **Q.12** If the average export of the top ten exporters is calculated how many of the top ten exporting countries have higher export than this average?
 - (a) 3
 - (b) 4
 - (c) 5
 - (d) Cannot be determined
- **Q.13** If the average export of the top ten exporters is calculated, how many countries have higher export than this average?
 - (a) 3
 - (b) 4

- (c) 5
- (d) Cannot be determined
- Q.14 To fight the US hegemony, the countries have decided to merge their operations by adding their exports value. What is the minimum number of countries needed to merge their operation so that their combined exports is more than the exports value of the US? (None of these ten countries export to each other.)
 - (a) 3 (b) 4 (c) 5 (
 - (c) 5 (d) None of these

Directions for questions 15 to 20: *Refer to the following bar graph and solve the questions based on it.*

Amount of production and sales by a company over the years (in lacs tonnes)



Q.15 What is the difference between the sales of 1993 and 1995 (in thousand tonnes)?

(a) 1000	(b) 50
(c) 100	(d) 500

- Q.16 Total sales of 1991 and 1992 together are approx-imately what percentage of the sales in 1994?
 (a) 120%
 (b) 100%
 - (c) 50% (d) 200%
- **Q.17** What is the approximate percentage increase in production from 1993 to 1994?
 - (a) 20% (b) 33%
 - (c) 70% (d) 100%
- **Q.18** The percentage of sales to production is maximum in which of the following years?
 - (a) 1992 (b) 1994
 - (c) 1996 (d) 1991
- Q.19 What is the percentage drop in sales from 1992 to 1993?

(a) 5% (b) 40%

(c) 10% (d) 60%

Q.20 In which year is the difference between the production and sales the maximum?

(a)	1992	(b) 1993
(c)	1995	(d) 1996

Directions for questions 21 to 25: *Refer to the following bar graph and solve the questions based on it.*

The following bar chart gives the cumulative percentage of five different types of bikes produced by Kajaj during the given two years:

Total Bikes produced in 2006 is 4,50,000.



Total bikes produced in 2007 is 520,000.

- Q.21 What is the difference in the production of the C type bikes between 2006 and 2007?(a) 5,000 (b) 7,500
 - (c) 10,000 (d) None of these
- **Q.22** If 85% of the E type bikes produced during 2006 and 2007 are being sold by the company, then how many E type bikes are left unsold?

(a) 1,42,800	(b) 21,825
(c) 29,100	(d) 21,300

- Q.23 What is the approximate percentage share of the A type bikes in the total production of (2007 + 2006)?
 (a) 11
 (b) 13
 (c) 15
 (d) 9
- Q.24 In the case of which of the following types of bikes is the percentage increase from 2006 to 2007 the maximum?(a) A (b) E

	(-)
(c) D	(d) B

Q.25 Assuming that the data points are in the multiples of 5, production of B type bikes in 2007 is what percentage of total bikes produced in 2007?
(a) 30%
(b) 40%
(c) 35%
(d) 25%

Directions for questions 26 to 30: *Refer to the following bar graph and solve the based on it.*

The bar graph given below shows the five districts of the state of Himachal Pradesh and the number of tourists visiting them. For the given bar chart, total number of Indian tourists is more that the total number of foreign tourists. None of the tourists can be Indian as well as foreigner.



Q.26 By what percentage are the Indian tourists visiting Chamba less than those visiting Shimla?(a) 30%(b) 50%

(c)) 60%	(d) 75%
(C) 00%	(a) / 3 70

- Q.27 Approximately what percentage of the total tourists visiting Himachal Pradesh are foreigners?
 (a) 2%
 (b) 8%
 (c) 4%
 (d) 5%
- Q.28 What is the ratio between the Indian tourists and the foreign tourists visiting Kullu?
 - (a) 105 : 3 (b) 70 : 3 (c) 107 : 3 (d) 35 : 1
- **Q.29** Which of the following districts has the maximum ratio of Indian and foreign tourists?
 - (a) Shimla (b) Solon
 - (c) Chamba (d) Kangra
- **Q.30** Which of the following districts has the minimum ratio of Indian and foreign tourists?
 - (a) Shimla (b) Solon
 - (c) Chamba (d) Kangra

Directions for questions 31 to 35: *Refer to the following bar graph and solve the questions based on it.*

The following bar charts represents the value of exports and imports (in ₹crores) of a country for the given period:



(All the values in the above bar chart are the multiples of 10).

Q.31 The value of exports in 2006 was what percentage of the average value of imports in the years 2004, 2005 and 2007?

EXERCISE 2

Pie Chart

Directions for questions 1 to 5: *Refer to the following pie chart and solve the questions based on it.*

Following is the cost analysis of a book "Pearson's Guide to *Quantitative Aptitude* for CAT".



Q.1	What is the central	angle showing the cost of paper?
	(a) 42.8°	(b) 32.6°
	(c) 36.8°	(d) 57.6°

	(a) 200%(c) 150%	(b) 100%(d) None of these
Q.32	The value of exports in 2 centage of the value of in (a) 200% (c) 150%	004 was exactly what per- ports in the same year? (b) 100% (d) None of these
Q.33	What is the approximate tween the average export for the given years? (a) 65 (c) 105	difference (in ₹crores) be- s and the average imports (b) 85 (d) 135
Q.34	In which year is the differ and the imports closest to (a) 2005 (c) 2007	rence between the exports 0₹100 crores? (b) 2006 (d) 2008

- **Q.35** What is the percentage increase in the value of exports in 2006 over 2005?
 - (a) 30% (b) 50%
 - (c) 90% (d) 120%
- **Q.2** If the cost of printing is ₹23,400 what would the cost of royalty be?
 - (a) ₹6500(b) ₹2340(c) ₹4680(d) ₹7840
- **Q.3** If the miscellaneous expenditure amounts to ₹18,000 then what is the expenditure on editing?
 - (a) ₹8000 (b) ₹14400
 - (c) ₹46800 (d) None of these
- Q.4 The royalty on the book is less than the editing expenditure by
 - (a) 8% (b) 80% (c) 44.44% (d) None of these
- Q.5 If 5500 copies of the book are published and the miscellaneous expenditure amounts to ₹36,960 and the marked price is 40% above the cost price, then the marked price of each copy is
 (a) ₹122.50 (b) ₹117.60
 - (c) ₹126.40 (d) ₹92.40

Directions for questions 6 to 10: *Refer to the following pie* charts and solve the questions based on it.

The pie charts given below represent the market share of different players in the electronics market in the year 1995 and 2000. A new player F has entered the market in the given period.



Market size = \$ 3.7 billion

Q.6 What is the percentage increase in the sales of A in the year 2000 over 1995?

(a)	90%	(b) 60%
(c)	80%	(d) 50%

Q.7 Find the CAGR with which the market has grown for the period 1995–2000?

(a) 18%	(b) 10%
(c) 5%	(d) 12%

- **Q.8** If the new entrant F has grown at the expense of B, C, and E, what would be the change in the net value of sales of E in the year 2000, had F not entered the market?
 - (a) \$ 111 million
 - (b) \$ 340 million
 - (c) \$ 247 million
 - (d) Cannot be determined
- **Q.9** What is the increase in sales (in \$ million) of A, B and C put together, over the 5 years period?

(a) 103	(b) 1202
(c) 668	(d) 854

- **0.10** If the market grows at 10% p.a. over the next 2 years
 - and D captures 1/3rd of the new market, what would be its market share in 2002?

(b) 27%

(c) 25% (d) 32%

Directions for questions 11 to 17: *Refer to the following pie charts and solve the questions based on it.*



- **Q.11** By what percentage has the consumption of electricity by agriculture increased in 1993–1994 over 1980–1981?
 - (a) 66%
 - (b) 33%
 - (c) 133%
 - (d) Cannot be determined
- Q.12 The electricity consumption of how many sectors has definitely increased over the given period?
 - (a) 2
 - (b) 3 (c) 4
 - (d) Cannot be determined
- Q.13 If the total electricity consumption in 1993–94 is 1.2 times of the total electricity consumption in 1980–1981, then how many sectors have definitely increased by more than 50% during the same period?
 (a) 1
 (b) 2
 - (c) 3 (d) 4
- **Q.14** If the total electricity consumption in 1993–1994 is 1.5 times of the total electricity consumption in 1980–1981, then what is the percentage increase in the electricity consumption of the agricultural sector in the given period?
 - (a) 50% (b) 100%
 - (c) 150% (d) None of these
- **Q.15** What is the minimum number of sectors required to be added up in order to be more than 50% of the consumption for the period in 1993–1994?

(a) 1	(b) 2
(c) 3	(d) 4

- Q.16 The agricultural consumption of electricity doubled from 1980–81 to 1993–94. By how much percentage has the total electricity consumption grown from 1980–81 to 1993–94?
 - (a) 20%
 - (b) 25%
 - (c) 50%
 - (d) Cannot be determined
- **Q.17.** If the electricity consumption of the 'others' category has remained constant over the period, then what is the percentage increase in the electricity consumption of the domestic category?
 - (a) 63%
 - (b) 38%
 - (c) 58%
 - (d) Cannot be determined

Directions for questions 18 to 23: *Refer to the following pie charts and solve the questions based on it.*

The two pie charts given below provide the expenses of two families:



Total expenses = ₹48, 000



Total expenses = ₹72,000.

- Q.18 Both the families decide to double the total expenditure keeping the pattern of spending the same as given above. What will be the new ratio of expenditure on food between family A and family B?
 (a) 27:31
 (b) 31:27
 (c) 2:3
 (d) 3:2
- Q.19 If the total expenses of family B increase three-fold, keeping the expenses on education the same as given above, what will be the expense on education?
 (a) 6.33%
 (b) 57%
 (c) 19%
 (d) None of these
- Q.20 What will be the expenses on light by family A, as a percentage of expense on light by family B?
 (a) 120%
 (b) 83.33%
 (c) 62.5%
 (d) 66.66%
- **Q.21** If family A and family B decide to combine their expenses, then which one of the following heads will be responsible for the highest expenses?
 - (a) Rent (b) Miscellous
 - (c) Food (d) Education
- **Q.22** In the above question, how many heads will have a lower percentage share in the combined total expenses of both the families than the percentage share of family B under the same head?
 - (a) 1 (b) 2 (c) 3 (d) 4
- **Q.23** Under how many heads are the expenses of family B more than the expenses of family A?
 - (a) Less than 3
 - (b) More than 3
 - (c) Equal to 3
 - (d) Cannot be determined

Directions for questions 24 to 30: *Refer to the following pie charts and solve the questions based on it.*

The following pie charts represent the budget expenditure of certain countries on various sectors for the year in 2007:









Q.24 A country is said to be progressive if its education, health and infrastructure expenditures are in the

top four expenditure sectors. How many of the four countries are progressive?

- (a) 0 (b) 1
- (c) 2 (d) 3
- Q.25 A country is said to be developing if its combined expenditure on education, health and infrastructure is at least 50% of the total expenditure. How many of the four countries are developing nations?
 (a) 0 (b) 1
 - (c) 2 (d) 3
- **Q.26** If a country is under military rule, it will spend maximum on defence and minimum on either health or education. How many of the above countries are under military rule?
 - (a) 0
 - (b) 1
 - (c) 2
 - (d) Cannot be determined
- **Q.27** Which of the following sectors will have same ranking in the countries budget expenditures?
 - (a) Nonplanned(b) Education(c) Health(d) None
- **Q.28** If the budgetary expenditures of all the four coun-
- tries are combined, which sector will account for the maximum expenditure?
 - (a) Non-planned
 - (b) Interest
 - (c) Defence
 - (d) Cannot be determined
- **Q.29** The total budgetary expenditure of USA is four times the total budgetary expenditure of India; and the population of India is twice the population of USA. Then the per capita budgetary expenditure of USA is how many times per capita expenditure of India.

(a) 8	(b) 4
(c) 1/8	(d) 1/4

Q.30 The total budgetary expenditure of Sri Lanka is twice the total budgetary expenditure of Uganda. Under how many sectors is the budgetary expenditure in Uganda more than the budgetary expenditure in Sri Lanka?

(a) 0	(b) 1
(c) 2	(d) 3

Exercise 3

Line Chart

Directions for questions 1 to 7: *Refer to the following line chart and solve the questions based on it.*

The line chart given below represents the salary and expenditure (in $\overline{\mathbf{x}}$) of Guru Gulab Khatri for the given period.



It is given that the salary is greater than the expenditure at least for four years. All the values are multiples of 5.

Q.1 By what percentage has the salary of Guru Gulab Khatri increased in 2004 over 2002? (a) 210% (b) 150%

J	u)	21070	(0)	15070
(c)	100%	(d)	250%

- Q.2 By what percentage has the expenditure of Guru Gulab Khatri increased in 2004 over 2003?
 (a) 66.66%
 (b) 133.33%
 (c) 150%
 (d) None of these
- Q.3 For how many years the salary is more than expenditure?
 - (a) 4
 - (b) 5
 - (c) 6
 - (d) Cannot be determined
- Q.4 Which year is the percentage increase in the salary of Guru Gulab Khatri maximum?(a) 2003 (b) 2004
 - (c) 2006 (d) 2003 or 2006
- Q.5 A year is said to be comfortable, if Guru Gulab Khatri is able to save at least 30% of his salary. How many years are comfortable during the given period?
 (a) 2 (b) 3
 (c) 4 (d) 5
- Q.6 What is the maximum difference (in ₹) between the salary and the expenditure for any year?
 - (a) 70 (b) 75
 - (c) 125 (d) 100

- Q.7 For how many years is the difference between the salary and the expenditure more than ₹80?
 - (a) 2 (b) 3 (c) 4 (d) 5

Directions for questions 8 to 12: *Refer to the following line chart and solve the questions based on it.*

Percentage profit earned by the two companies A and B over the years



- **Q.8** If the income for company A in the year 2004 was ₹35 lacs what was the expenditure for company B in the same year?
 - (a) ₹123.5 lacs
 - (b) ₹128 lacs
 - (c) ₹132 lacs
 - (d) Cannot be determined
- **Q.9** If the income of company A in 2006 and the income of company B in 2007 are equal, what will be the ratio of expenditure of company A in 2006 to the expenditure of company B in 2007?
 - (a) 26 : 7 (b) 17 : 16 (c) 15 : 170 (4) None of these
- Q.10 During which of the following years is the ratio of percentage profit earned by company A to that of company B, the maximum?(a) 2003 and 2006 (b) 2005 and 2007
 - (c) 2003 only (d) 2008 only
- Q.11 If the expenditure of company B increases by 20% from 2005 to 2006, the income in 2006 will be how many times the income in 2005?
 (a) 2.16 times
 (b) 1.2 times
 - (a) 2.10 times (b) 1.2 times (d) Name of the
 - (c) 1.8 times (d) None of these
- Q.12 If the income of company A in 2006 was ₹36 lacs, what was the expenditure of company A in 2006?
 (a) ₹12.5 lacs
 - (b) ₹18.8 lacs
 - (c) ₹20 lacs
 - (d) None of these

Directions for questions 13 to 17: Refer to the following line chart and solve the questions based on it.

The following line chart represents the ratio of exports (in ₹) to imports (in ₹) of two countries A and B over the given period:

Left Axis = Country A; Right Axis = Country B



All the values are multiples of 0.25.

- Q.13 For how many years do both the countries have their respective exports more than their imports? (a) 1 (b) 2
 - (c) 4
 - (d) None of these
- Q.14 Due to some compulsions, one year during the period given these two countries have to do business between themselves only and they are not allowed to export to or import from any other countries. Which out of the following years is possibly that year?
 - (a) 1997 (b) 1998
 - (c) 1999 (d) None of these
- Q.15 What can be said regarding the imports/exports of the two countries?
 - (a) The value of exports of country A is constantly on the decline from 1997 to 2001.
 - (b) The value of imports of the country B is constantly on the rise from 1997 to 2000.
 - (c) The value of imports of country A is equal to the value of import in 2002 (ratio = 1 for both the years)
 - (d) none of these
- **Q.16** For how many years is the value of exports of country B is constantly on the rise over the previous year for country B?
 - (a) 2
 - (b) 3
 - (c) 4
 - (d) Cannot be determined
- Q.17 For how many years is the value of imports of country A is constantly on the rise over the previous year?
 - (a) 2
 - (b) 3

- (c) 4
- (d) Cannot be determined

Directions for questions 18 to 20: Refer to the following line chart and solve the questions based on it.

The line chart given below represents the projections of seats for the coming Punjab assembly elections according to surveys done by four different agencies.



The following observations have also been made regarding the projected seats:

- (i) The others have won less than 20 seats according to the projections made by each of the agencies.
- (ii) According to NDTV, the Congress' projected seats are more than the projected seats for the SAD.
- (iii) The total number of seats have been won by only three parties-Congress, SAD and the others.
- According to CNBC, the difference between pro-(iv) jected seast of SAD and Congress is 20.
- Q.18 If we add the projected seats of each of the parties individually, then which of the following will have the maximum number of projected seats?
 - (a) Congress (b) SAD (c) Congress or SAD (d) Others
- Q.19 According to how many agencies' projections is the Congress getting more seats than the SAD?
 - (a) 0 (b) 1 (c) 2 (d) 3
- **Q.20** For how many agencies' projection about seats has the sum of the two bottom ranked parties been more than the top ranking party?
 - (a) 0 (b) 1 (c) 2 (d) 4

Directions for questions 21 to 25: Refer to the following line chart and solve the questions based on it.

The following line charts give the FDI (in \$ billion) in 2006 and 2007 for the different sectors in India:



Q.21 For how many sectors, is there an increase in the FDI in 2007 over 2006? (a) 2 (b) 3 (c) 4 (d) 5

Q.22 Which of the following sectors has seen the maximum percentage increase in its value in 2007 over

EXERCISE 4

Directions for questions 1 to 4: *Refer to the following table and solve the questions based on it.*

The following table gives the exports of top six industries (in value terms) from India in 2007:

	Exports (₹crore)	Growth (in %)
Glass industry	1093	11.7
Coal Industry	1080	7
Ruby Industry	913	-8.7
Nickel Industry	663	7.1
Software Industry	605	-12.3
Diamond Industry	505	-1.5

The overall exports from India increased by 20% to ₹19,500 crore in 2007.

Q.1 What is the share of the Glass industry in the total exports for 2007?

(a)	2.5%	(b) 4%
(c)	5.6%	(d) 7%

Q.2 For how many of the given six industries has the share in exports increased in 2007?

(a) 0	(b) I
(c) 2	(d) 3

- Q.3 Which of the following has the maximum share among the given industries in 2006?
 (a) Glass Industry
 (b) Ruby Industry
 (c) Software Industry
 (d) Coal Industry
- Q.4 What is the percentage increase in the exports of the given six industries?

2006 (only for those sectors which have their presence in both the years)?

- (a) Fuel (b) Others
- (c) Chemical (d) None of these
- **Q.23** Which of the following sectors has seen the maximum percentage decrease in its value in 2007 over 2006 (only for those sectors which have their presence in both the years)?
 - (a) Fuel (b) Others
 - (c) Chemical (d) None of these
- **Q.24** Which of the following sectors will have the maximum FDI added in both the years?
 - (a) Fuel (b) Others
 - (c) Chemical (d) None of these
- **Q.25** Which of the following sectors will have the minimum FDI added in both the years?
 - (a) Fuel (b) Others
 - (c) Chemical (d) Textile

(a) 0.1%	(b) 0.5%
(c) 1.05%	(d) 1.75%

Directions for questions 5 to 9: *Refer to the following table and solve the questions based on it.*

The following table gives the number of vehicles (in '000s) of different models and colours sold in two cities—Patna and Lucknow-in a given year.

Туре		Patna				Lucknow				
		Colour					Colour			
	Black	Red	Blue	White	Silver	Black	Red	Blue	White	Silver
A	40	25	55	75	15	45	32	40	60	20
В	20	35	60	80	20	30	37	39	81	35
С	35	30	50	90	35	40	42	41	6	37
D	45	40	45	85	40	35	39	37	90	42
E	50	35	35	60	30	50	44	43	77	22
F	55	42	40	65	52	47	34	45	87	17

Q.5 For which of the following models, difference between white—coloured vehicles sold in the two cities is minimum?

(a) A	(0) C
(c) D	(d) None of these

Q.6 The total number of blue—coloured vehicles of model E and D sold in Lucknow is exactly equal to the number of white-coloured vehicles of which model in Patna?

(a) B	(b) F
(c) C	(d) A

Q.7 What is the difference between the number of blue-coloured vehicles of model C sold in Patna and the number of red coloured vehicles of model F sold in Lucknow? (1.) 10.000 $(a) \ 0 \ 0 \ 0 \ 0$

(a)	8,000	(b) 10,000	
(c)	12,000	(d) None of these	

Q.8 The total number of silver-coloured vehicles sold in lucknow is approximately what percentage of that in Patna?

(a)	130%	(b)	140%

- (c) 90% (d) 100%
- Q.9 In Patna the number of vehicles sold was the maximum for which of the colour-model combinations? (a) white-C (b) blue-B
 - (c) silver-B (d) white-D

Directions for questions 10 to 14: Refer to the following table and solve the questions based on it.

The table given below gives the marks obtained by six students in six subjects:

Student	History (150)	Science (200)	Geography (150)	English (200)	Hindi (100)	Math (200)
Α	75	110	90	140	75	170
В	105	130	75	130	80	140
С	95	105	80	150	90	160
D	85	115	95	125	65	135
Е	115	135	110	145	70	125
F	120	160	96	110	55	145

Marks in bracket are Total Marks.

Q.10 What is the difference between the percentage marks obtained by student B in History and the percentage marks obtained by student C in Hindi? (a) 25 (b) 20 (c) 35(d) 30

	(c) 35	(u) 50	
Q.11	The marks obtained by	student A in Mat	h are how
	many times the percenta	ge marks obtained	by student
	F in Science?		

(a) 2.5	(b) 4.125
(c) 1.125	(d) 2.125

- Q.12 What is the difference between the percentage marks obtained by student C in English and the average percentage marks of all the six subjects? (a) 82 (b) 38 (d) 14 (c) 7
- Q.13 In how many of the given subjects has student D got more than seventy percent marks? (a) none (b) one ee

(c) two ((d)	thre
-----------	-----	------

- **Q.14** Approximately, what is the average percentage marks obtained by the six students in English?
 - (a) 67% (b) 72% (c) 80% (d) Data inadequate

Directions for questions 15 to 18: Refer the following table and solve the questions based on it.

The following table gives the number of students from different locations who appeared and passed in the Xth standard examination conducted by CBSE over the years:

Year	Ru	ral	Sem bi	ni-ur- an	Sta Cap	State Capitals		-poli- ns
	Appeared	Passed	Appeared	Passed	Appeared	Passed	Appeared	Passed
1990	1651	209	7897	2511	5057	1464	9537	3212
1991	1832	314	8561	2932	7163	3242	10152	4015
1992	2154	935	8133	2466	8251	3151	9697	3033
1993	5035	1792	9436	3525	8526	3627	11245	5157
1994	4911	1656	9782	4012	9013	4315	12512	6323
1995	5626	2391	9965	4266	1729	4523	13625	6411

- **Q.15** For the students from which of the following locations was there a continuous increase in both the appeared and passed member of candidates?
 - (a) semi-urban (b) state capital
 - (c) state capital and rural
 - (d) None of these
- **Q.16** In which of the following years was the percentage passed to appeared candidates from the semi-urban area the least?
 - (a) 1991 (b) 1993 (c) 1990 (d) 1992
- Q.17 What is the approximate percentage drop in the number of semi-urban candidates who appeared from 1991 to 1992?

(a) 5	(b) 10
(c) 15	(d) 8
() <	

(e) 12 0.18 The total number of candidate who passed from the rural locations in 1993 and the semi-urban locations in 1990 was exactly equal to the total number of candidates who passed from the state capitals in which of the following years?

which of the follow	ing yours.
(a) 1990	(b) 1993
(c) 1994	(d) None of these

Directions for questions 19 to 21: Refer to the following table and solve the questions based on it.

The following table gives the average marks obtained by 20 boys and 20 girls in five subjects from five different schools P, Q, R, S and T:

	c	F	2	(2	F	र	ç	5	٦	Г
Subject	Maximun Marks	В	G	В	G	В	G	В	G	В	G
English	200	85	90	80	75	100	110	65	60	105	110
History	100	40	55	45	50	50	55	40	45	65	60
Geography	100	50	40	40	45	60	55	50	55	60	65
Math	200	120	110	95	85	135	130	75	80	130	135
Science	200	105	125	110	120	125	115	85	90	140	135

In the above table, B = Boys and G = Girls

Q.19 What were the total marks obtained by the boys in History from school Q?

(a) 900	(b) 1000
(c) 800	(d) 1300

Q.20 In which of the following subjects did the girls have the highest average percentage marks in all the schools?(a) Saignee (b) Casegrephy

(a) Science	(b) Geography
(c) English	(d) History

- Q.21 What is the average mark obtained by all the students of school P taking all the subjects into account?
 - (a) 82
 - (b) 84
 - (c) 80
 - (d) Cannot be determined

Directions for questions 22 to 28: *Refer to the following table and solve the questions based on it.*

The following table shows the domestic sales of cars of five manufacturers from 1995 to 2000. (All the figures are in thousands)

Manufacturer	1995	1996	1997	1998	1999	2000
А	440	480	470	500	520	510
В	400	410	415	415	420	430
С	380	390	390	400	420	495
D	360	380	400	415	440	500
Е	480	440	440	420	425	435

- Q.22 Considering the period given, the domestic sales of which manufacturer are the highest?(a) A (b) B
 - (c) C (d) D

- Q.23 During 1996, what is the approximate share of domestic sales of cars of the manufacturer B?
 - (a) 10.5% (b) 25.5% (c) 15.5% (d) 19.5%
- Q.24 During 2000, the sales of which manufacturer has shown the maximum percentage increase over the previous year?
 - (a) A (b) B (c) C (d) D
- Q.25 With respect to which of the following combinations, is the sales of cars the highest over the given period?
 (a) D, 2000
 (b) A, 1998
 (c) A, 1998
 - (c) A, 2000 (d) A, 1999
- Q.26 Which of the following manufacturers, has a consistent increase across the years given?(a) A (b) B
 - (a) A (b) B (c) C (d) D
- Q.27 How many of the manufacturers have never shown a decline in the number of cars sold in any particular year over the previous year?
 - (a) 1 (b) 2
 - (c) 3 (d) 4
- Q.28 How many times have the number of cars sold been more than 450 for any manufacturer in any year more than once? (A manufacturer can achieve this feat)
 (a) 6 (b) 7
 (c) 8 (d) 9

Directions for questions 29 and 30: *Refer to the following table*.

The following table captures the comparative performance of LIC and HDFC in the housing sector in the last four years. (All figures are in ₹crores).

Attribute	1994–1995		1993–1994		1992–1993		1991–1992	
	LIC	HDFC	LIC	HDFC	LIC	HDFC	LIC	HDFC
Loan Sanctions	618.0	1495.0	564.0	1025	607	859	511	758
Dues	24.2	29.6	20.0	27.8	16.1	25.17	5.32	19.57
Total Loans	1672.0	3747.0	1283.0	3071	852	2561	401	2125
Default Percentage	1.45	0.79	1.56	0.91	1.89	.98	1.32	0.93

Т	otal Revenue	251.0	780.0	175.0	608	109	473	44.4	371
Ν	et Profit	41.4	146.1	21.53	105	13.5	55.55	6.71	45.6
29.	For how many or more of HI (a) 0 (c) 2	years are the DFC's loan sa	LIC loan san nctions? (b) 1 (d) 3	ctions 70%	30.	The ratio of to least for LIC (a) 1992–199 (c) 1994–199	otal revenue in which of 93 95	to the loan sa the following (b) 1993–1 (d) 1991–1	nctions is years? 994 992
				ANSW	ER KEYS				
Ēxei	RCISE 1								
1. (c) 2. (d)	3. (a)	4. (c)	5. (d)	6. (b)	7. (b)	8. (d)	9. (d)	10. (c
1. (d) 12. (a)	13. (a)	14. (a)	15. (c)	16. (a)	17. (b)	18. (c)	19. (c)	20. (c
21. (d) 22. (d)	23. (b)	24. (c)	25. (a)	26. (d)	27. (a)	28. (c)	29. (c)	30. (c
1. (d) 32. (c)	33. (b)	34. (b)	35. (b)					
XEI	RCISE 2								
1. (d) 2. (a)	3. (d)	4. (c)	5. (b)	6. (a)	7. (b)	8. (d)	9. (c)	10. (a
1 1. (d) 12. (d)	13. (b)	14. (c)	15. (b)	16. (a)	17. (a)	18. (a)	19. (a)	20. (t
21. (c) 22. (b)	23. (b)	24. (a)	25. (a)	26. (d)	27. (d)	28. (d)	29. (a)	30. (a
EXEI	RCISE 3								
1. (b) 2. (a)	3. (c)	4. (b)	5. (b)	6. (c)	7. (a)	8. (d)	9. (b)	10. (0
1. (b) 12. (d)	13. (d)	14. (d)	15. (d)	16. (d)	17. (d)	18. (c)	19. (c)	20. (
1. (c) 22. (b)	23. (d)	24. (b)	25. (d)					
XEI	RCISE 4								
1. (c) 2. (a)	3. (d)	4. (c)	5. (d)	6. (a)	7. (d)	8. (c)	9. (a)	10. (1
1 1. (d) 12. (c)	13. (a)	14. (a)	15. (d)	16. (d)	17. (a)	18. (d)	19. (a)	20. (a
21. (d) 22. (a)	23. (d)	24. (c)	25. (d)	26. (d)	27. (c)	28. (c)	29. (b)	30. (d

Exercise 1

Solutions to Q.1 to 5:

1. Among the given options March sees the maximum percentage increase in expenses from year 1999 to 2000. If we check for all the 7 months, answer would be May from year 1998 to 1999.

Hence, option (c) is the correct answer.

2. To find the average monthly expenditure during the year 2000, the total income for the year has to be known. In the chart, the income of only seven months is known. Therefore it cannot be determined.

Hence, option (d) is the correct answer.

3. Value (April 2000) = 316

Value (April 1999) = 312

Approximate % age increase = 1.2%

Hence, option (a) is the correct answer.

4. The same increasing trend is seen every year during the period March-April.

Hence, option (c) is the correct answer.

5. In 1998, the period during which the expenditure was maximum was June-July.

In 1999, the period of maximum expenditure was April-May.

So, option (a) and (b) are incorrect. Option (c) is obviously incorrect.

Hence, option (d) is the correct answer.

6. Only April satisfies these conditions.

Hence, option (b) is the correct answer.

7. Visual inspection we can see that option (b) is correct. It should also be noted that we have to answer out of the options given.

Hence, option (b) is the correct answer.

Solutions to Q.8 to 14:

- The average will decrease by 6.11 billion dollars.
 Hence, option (d) is the correct answer.
- 9. Required ratio = 4:5

Exports of Spain : Exports of Japan = 48 : 60.8 = 0.79 (approx.)

Hence, option (d) is the correct answer.

10. Cannot be determined because the data is given only for the top ten exporters.

Hence, option (d) is the correct answer.

11. Required difference = $(99.5 - 34.2) \times 43 \times 10^9$ =₹28.079 × 10¹¹ (1 billion = 10⁹)

Hence, option (d) is the correct answer.

12. The average is 77.6. Now it can be seen that only three countries have more than this.

Hence, option (a) is the correct answer.

13. There is no difference between this and the last question. Understand that the average is calculated for the top ten countries only, and the only countries which can have exports higher than the average exports can be the countries which are in the list of the top ten exporter countries.

Hence, option (a) is the correct answer.

Solutions to Q.15 to 20:

15. The difference between sales of 1993 and 1995 = 1 lacs or 100,000

Hence, option (c) is the correct answer.

16. Sum of sales of 1991 and 1992 = 6 + 10 = 16 lacs Required Answer = $\frac{16}{13} \times 100 = 123\%$

Hence, option (a) is the correct answer.

17. Percentage increase is production from 1993 to 1994

$$\frac{16-12}{12} \times 100 = 33.33\%$$

Hence, option (b) is the correct answer.

18. Percentage of sales to production is maximum in the year when the difference between them is minimum.

Hence, option (c) is the correct answer.

19. Percentage drop in sales from 1992 to 1993

 $=\frac{1}{10} \times 100 = 10\%$

Hence, option (c) is the correct answer.

20. By visual inspection we can see that the correct answer is option (c).

Hence, option (c) is the correct answer.

Solutions to Q.21 to 25:

21.

	2006	2007
C type Bikes (in %)	30	30
C type Bikes (in numbers)	135,000	156,000

Difference = 21,000

Hence, option (d) is the correct answer.

22 Production of E type bikes in 2006

=(100-80)% of 4,50,000

= 20% of 4,50,000 = 90,000

And in 2007 = 10% of 5,20,000 = 52,000 Total production = 90,000 + 52,000 = 1,42,000 So, the number of bikes = 15 % of 1,42,000 = 21,300

Hence, option (d) is the correct answer.

23. Production of A type bikes in 2006 = 67,500Production of A type bikes in 2007 = 52,000

Required % = $\frac{67,500+52,200}{9,70,000} \times 100 = 12.3\%$ \approx Closest to option (b)

Hence, option (b) is the correct answer.

24. By visual inspection we can say that option (c) is correct answer

Hence, option (c) is the correct answer.

25. The bar chart presents the cumulative chart for the five types of bikes produced. Out of which, B type bike = 40% - 10% = 30% of the total bikes.

Hence, option (a) is the correct answer.

Solutions to Q.26 to 30:

26. Required % = $\frac{540 - 130}{540} \times 100 = 75\%$

Hence, option (d) is the correct answer.

27. Percentage share of foreign tourists visiting HP

 $\frac{34.5}{1600} \times 100 = 2\%$

Hence, option (a) is the correct answer.

EXERCISE 2

Solutions to Q.1 to 5:

1. Required Angle = $(16/100 \times 360) = 57.6^{\circ}$

Hence, option (d) is the correct answer.

4. If the editing charges are ₹18, royalty is ₹10. On ₹18, it is less by 8. On ₹100, it is less by (8/18 × 100)% = 44.44%

Hence, option (c) is the correct answer.

5. Let the total expenditure be ₹x. Then, 8 : 100 = 36960 : x. So x = ₹462000. Therefore Cost Price of 5500 copies of the book = ₹4,62,000. Cost Price of each copy = ₹(4,62,000/500) = ₹84. So, marked price = 140% of ₹84 = ₹117.60.

Hence, option (b) is the correct answer.

Solutions to Q.6 to 10:

6. There are two successive increases—First is the total increase of 60% approx. (\$ 3.7 bn in 2000 from \$ 2.3 billion in 1995) and second is the percentage share of

28. Ratio = 535 : 15 = 107 : 3

Hence, option (c) is the correct answer.

29. Maximum ratio of Indian and foreign tourists is for Chamba = 130: 0.5 = 260

Hence, option (c) is the correct answer.

30. Minimum ratio of Indian and foreign tourists is for Kangra = 140 : 10 = 14

Hence, option (d) is the correct answer.

Solutions to Q.31 to 35:

31. Required % age $=\frac{450}{250} \times 100 = 180\%$

Hence, option (d) is the correct answer.

32.

	2004
Exports	370
Imports	250

Value of exports as percentage of value of imports = $\frac{370}{250} \times 100 = \sim 150\%$

Hence, option (c) is the correct answer.

2	5	
3	5	•

	2005	2006
Exports	300	450
Percentage in	ncrease =	$\frac{450-300}{300}\times 1$

Hence, option (b) is the correct answer.

A by 20% approx. Hence total percentage increase = 92%.

Hence, option (a) is the correct answer.

 Market size in 2000 = \$ 3.7 billion Market size in 1995 = \$ 2.3 billion Therefore, growth rate

 $= [(3.7/2.3)^{1/5} - 1] \times 100 = 10\%$

Hence, option (b) is the correct answer.

[3.7/2.3 = 1.6, now to find $(1.6)^{1/5}$, $1.1^3 = 1.331$ and $1.1^2 = 1.21$ and $1.3 \times 1.2 = 1.6$

Thus, $1.6^{1/5} = 1.1$]

Hence, option (b) is the correct answer.

8. Since we do not know what part of market share of B. C and E has been eaten up by F, so cannot be determined.

Hence, option (d) is the correct answer.

9. Sales value for A + B + C in 2000 = (13 + 14 + 19)%of 3.7 billion = 46 % × 3.7 = 1.702 billion

Sales value for A + B + C in 1995 = (16 + 17 + 12) % of 2.3 billion = 1.035 billion.

Hence increase in sales value = 1703 - 1035 =\$ 668 million.

Hence, option (c) is the correct answer.

Solutions to Q.11 to 17:

11. Since the total consumption for the given years is not known, we cannot determine it.

Hence, option (d) is the correct answer.

12. Since the total consumption for the given years is not known, we cannot determine it.

Hence, option (d) is the correct answer.

13. Total consumption has increased by 20%. So, any sector that shows an increase of even 25% will give us a net increase of 50%. There are only two sectors–agriculture and domestic.

Hence, option (b) is the correct answer.

14. There are two increases—one is the increase in the share of agriculture (66.66%) and the other is an increase of 50% in total. Net increase = 150%

Hence, option (c) is the correct answer.

15. By visual inspection. We can see that the correctansever is option (b)

Hence, option (b) is the correct answer.

16. There is an increase in the share of agriculture (66.66%), to make the agricultural consumption double, total consumption is to be increased by 20%.

Hence, option (a) is the correct answer.

17. The electricity consumption of the 'others' category has remained constant over the period. It means that the total consumption of 1980-1981 = Total consumption of 1993-1994. So, the only increase = [(18-11)/11] × 100 = 63.64%

Hence, option (a) is the correct answer.

Solutions to Q.18 to 23:

18. If the percentage increase in the expenditure of both the families, is the same then the ratio will be the same.

Hence, option (a) is the correct answer.

19. The total consumption has become 3 times more keeping the expenses on education the same. Hence the percentage consumption on education will become 1/3rd of the present.

Hence, option (a) is the correct answer.

21. By visual inspection we can see that option (c) is the correct answer.

Hence, option (c) is the correct answer.

22. It should be understood that the final percentage of expenditure will always be in between the percentage of family A and family B (It is true of any mixture that the percentage composition of the mixture will be always in between the percentage compositions of the components).

Hence, option (b) is the correct answer.

23. By visual inspection we can see that the correct answer is option (b).

Hence, option (b) is the correct answer.

Solutions to Q.24 to 30

24. By visual inspection we can see that option (a) is the correct answer.

Hence, option (a) is the correct answer.

25. By visual inspection we can see that option (a) is the correct answer.

Hence, option (a) is the correct answer.

26. Understand the logic that "If a country is under military rule, it will spend maximum on defence and minimum on either health or education" does not mean that if a country is spending maximum on defence and minimum on either health or education, then it will under military rule.

[For more–See Logical Links in Part 1 of this book]

Hence, option (d) is the correct answer.

27. By visual inspection. we can see that option (d) is the correct answer.

Hence, option (d) is the correct answer.

28. Since individual expenditures of the countries are not given, we cannot determine it.

Hence, option (d) is the correct answer.

Solutions to Q.1 to 7:

For the sake of convenience, use the following chart (with the same data) to find out the solution:



Now all the questions can be done with ease.

Solutions to Q.8 to 12:

8. Income-expenditures of company A and B cannot be correlated. Hence cannot be determined.

Hence, option (d) is the correct answer.

9. Expenditure of company A in 2006 =

Income in 2006 of (A) × (100/160) = Income in 2006 of (A) × 5/8

Expenditure of Company B in 2007 =

Income in 2007 of (B) (100/170) = 10/17 of Income in 2007 of B

Now, [Expenditure in 2006 of (A)/Income in 2007 of (B)] = $(5/8) \div (10/17)$ [Since Income in 2006 of (A) = Income in 2007 of (B)]

 $=\frac{5}{8} \times \frac{17}{10} = \frac{17}{16}$

Hence, option (b) is the correct answer.

10. Ratio A : B is greater than 1 in only 2003 and 2007. It is 1.33 in 2003 and 1.1 in 2007.

Hence, option (c) is the correct answer.

11. Percentage profits are the same for two years, hence if expenditure increases by 20% the income should also increase by 20%. Hence, the required ratio = 120/100 = 1.2

Hence, option (b) is the correct answer.

Solutions to Q.13 to 17:

13. This never happens. Understand that if export is more than import, then the ratio will be more than 1. If export is equal to import, then the ratio will be equal to 1 and if export is less than import, then the ratio will be less than 1.

Hence, option (d) is the correct answer.

14. The ratio of one to the other should be reciprocal.

Hence, option (d) is the correct answer.

15. Despite the ratio being on a decline for country A, we cannot comment about the value of exports. it might be a possibility that imports have increased keeping exports constant. Similarly both the other options (b) and (c) can be refuted on the same grounds.

Hence, option (d) is the correct answer.

16. Since only the ratio is given, we cannot comment on the values.

Hence, option (d) is the correct answer.

17. Since only the ratio is given, we cannot command on the values.

Hence, option (d) is the correct answer.

Solutions to Q.18 to 20:

Following is the table pertaining to the data set given:

	CNN	NDTV	CNBC	Zee
SAD	44	52	58	52
Congress	55	55	48	48
Others	18	10	11	17

Solutions to Q.21 to 25:

Following is the table pertaining to the data given:



Exercise 4

Solutions to Q.1 to 4:

	Export (₹Crore)	
	2006	2007
Glass Industry	978	1093
Coal Industry	1009	1080
Ruby Industry	1000	913
Nickel Industry	619	663
Softwares Industry	690	605
Diamond Industry	513	505
Total	16250	19500

1. The share of Glass in the total exports for $2007 = 1093/19500 \times 100 = 5.6\%$.

Hence, option (c) is the correct answer.

2. Overall exports have increased by 20% while none of the given six industries have grown by 20%. So, we can conclude that the market shares for all the six industries will decrease in 2003.

Hence, option (a) is the correct answer.

3. Coal has the maximum exports in 2006. Hence, its market share is the maximum.

Hence, option (d) is the correct answer.

4. Exports for the given six industries in 2006 = 4809 crore

Exports for the given six industries in 2007 = 4859 crore

Therefore, percentage increase in the exports = $[(4859 - 4809)/4809] \times 100 = 5000/4809 = 1.05\%$.

Hence, option (c) is the correct answer.

Solutions to Q.5 to 9:

5. The difference between the white-coloured cars sold is the minimum in the B type model.

Hence, option (d) is the correct answer.

- 6. Blue (E + D) = 43 + 37 = 80 = White (B)
- Hence, option (a) is the correct answer.
 7. Required difference = (50 34) × 1000 = 16,000 Hence, option (d) is the correct answer.
- 8. Required Percentage = $173/192 \times 100 = 90\%$ Hence, option (c) is the correct answer.
- 9. White-c = 90,000

Hence, option (a) is the correct answer.

Solutions to Q.10 to 14:

10. The difference in percentage marks of B (History) and C (Hindi) = 90 - 70 = 20

Hence, option (b) is the correct answer.

11. The percentage of marks obtained by F in Science = $160/200 \times 100 = 80\%$

Required Value = 170/80 = 2.125

Hence, option (d) is the correct answer.

12. Average percentage of marks of C = $680/1000 \times 100$ = 68%

Percentage of marks of C in English = $150/200 \times 100$ = 75%

Required difference = 75 - 68 = 7

Hence, option (c) is the correct answer.

14. Average percentage of marks in English

$$= \left(\frac{140 + 130 + 150 + 125 + 145 + 110}{6}\right) \times \frac{100}{200}$$
$$= 67\%$$

Hence, option (a) is the correct answer.

Solutions to Q.15 to 18:

15. By visual inspection.

Hence, option (d) is the correct answer.

16. Least percentage of passed to appeared,

 $\Rightarrow \frac{\text{Passed}}{\text{Appeared}} \times 100 \text{ , to make this least, we must make}$ passed minimum and appeared maximum.

In 1992, $\frac{2466}{8133} \times 100 = ~30\%$ which is least among given four options.

Hence, option (d) is the correct answer.

17.

	1991	1992
No. of semi-urban candi- dates appeared	8561	8133
unes appeared		

Drop = 8561 - 8133 = 428

Drop percentage = $(428/8561) \times 100 = \sim 5\%$

Hence, option (a) is the correct answer.

18.

Total	4303
No. of candidates passed from semi-urban location in 1990	2511
No. of candidates passed from rural location in 1993	1792

177	• • • • • •	177-
No. of candidates passed 146 from state capitals in 1993	4 3627	4315

None of the options is equal to 4303.

Hence, option (d) is the correct answer.

Solutions to Q.19 to 21:

19. Average marks obtained by 20 boys in History from school Q = 45

Therefore, Total marks = $20 \times 45 = 900$

Hence, option (a) is the correct answer.

20. From visual inspection it is clear that Science is the desired subject.

Hence, option (a) is the correct answer.

21. The table gives the data pertaining to only 40 students of the school and it is not given if this is the total number of students in the school. Therefore it cannot be determined.

Hence, option (d) is the correct answer.

Solutions to Q.22 to 28:

22. It is a simple calculation. Alternatively, it can be observed that A has always been more than the others except but for one year.

Hence, option (a) is the correct answer.

23. Required share

 $= (410/480 + 410 + 390 + 380 + 440) \times 100 = 19.5\%$

Hence, option (d) is the correct answer.

24. It can be observed that the difference is the highest in case of manufacturer C. We can further observe that the largest percentage growth would be for C, as the base is the smallest.

Hence, option (c) is the correct answer.

26. By visual inspection we can say that option (d) is the correct answer.

Hence, option (d) is the correct answer.

27. By visual inspection we can say that option (c) is the correct answer. Manufacturers are B, C, D.

Hence, option (c) is the correct answer.

28. By visual inspection we can say that option (d) is the correct answer.

Hence, option (c) is the correct answer.

Solutions to Q.29 to 30:

29. It happens only in 1992–1993

Hence, option (b) is the correct answer.

30. Least ratio of total revenue to the loan sanctions, which means numerator should be minimum and denominator should be maximum.

This least ratio can be found in year 1991-1992 = 44.4/511 = 0.08.

Hence, option (d) is the correct answer.