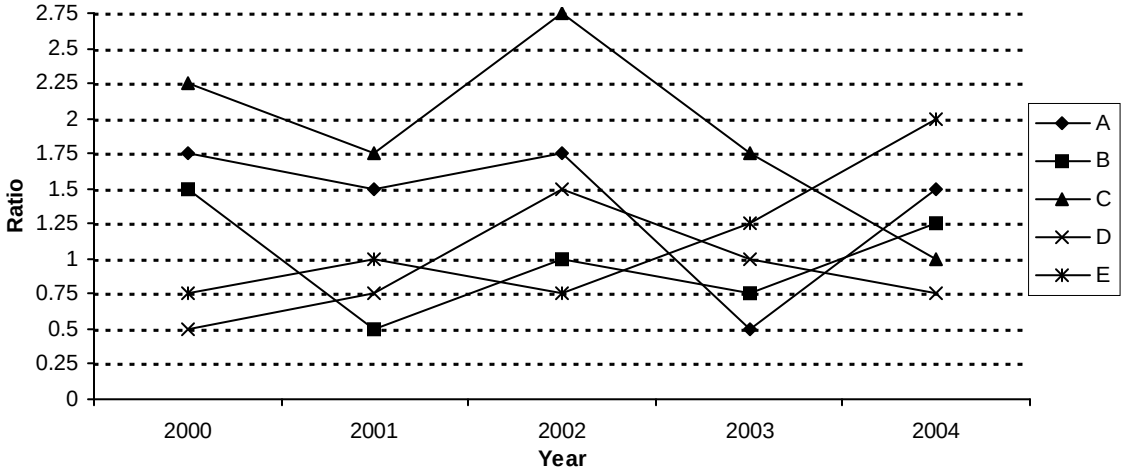
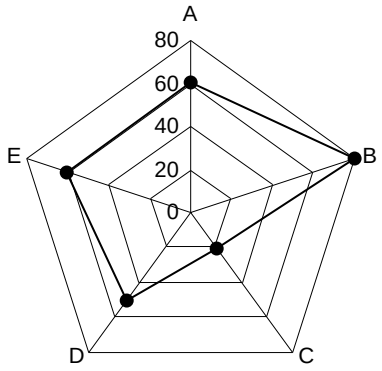
Practice Exercise 1

Directions (Q. 1-14): The following line chart shows the ratio of export to import of five companies A, B, C, D and E in years 2000 to 2004.



The following Radar graph shows the projected % increase in export in year 2005 with respect to 2004. (It is assumed that the import in year 2005 is equal to the import in year 2004.)



1. In which year was export of company E the maximum?
   1) 2000 2) 2002 3) 2003 4) Can't say
2. The difference between export and import of company D is the maximum in the year
   1) 2000 2) 2001 3) 2002 4) Can't say
3. In year 2003 the difference between export and import is minimum of company
   1) A 2) D 3) C 4) Can't say
4. The export of company A in year 2001 is what percentage more/less than that in year 2000?
   1) 24% less 2) 17% more 3) 11% less 4) Can't be determined
5. The export of company C is twice that of company D in year 2001. The import of company D in year 2001 is 70 million more than the export. The import of company C in year 2001 is
   1) 280 million 2) 220 million 3) 240 million 4) 180 million
6. The trade deficit of company B in year 2003 is 75% more than the trade deficit of company A. The ratio of import of company B to that of company A in year 2003 is
   1) 13 : 5 2) 4 : 9 3) 6 : 3 4) 7 : 2
7. If the ratio of export of company E in 2003 to that in 2004 is 4 : 5, the combined ratio of export to

import of company E in year 2003 and 2004 together is
1) 30 : 19 2) 17 : 9 3) 34 : 13 4) 29 : 16

8. The total transactions (export + import) of companies A, B and C in year 2004 are in the ratio 3 : 4 : 2. The export and import of companies A, B and C in year 2004 together are in the ratio of
1) 334 : 213 2) 226 : 179 3) 174 : 97 4) None of these

9. The ratio of export to import of company C in year 2005 as per the projection is
1) 6 : 7 2) 6 : 5 3) 4 : 3 4) 4 : 5

10. Total transaction (ie export + import) of company E in year 2003 is $33\frac{1}{3}\%$ lower than the total transaction of company E in year 2004. Then the ratio of export to import of company E in the year 2003 and 2004 together is
1) 28 : 17 2) 17 : 28 3) 27 : 17 4) 3 : 2

11. If the projected growth in export of company C and company D together in year 2005 is 40% with respect to the previous year, the ratio of export to import of company C and D together in year 2004 is
1) 9 : 15 2) 7 : 10 3) 9 : 11 4) 5 : 6

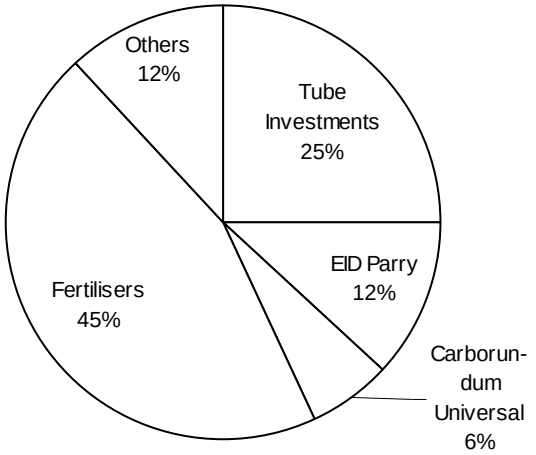
12. As per the projection, how many companies have the import more than the export in 2005?
1) 2 2) 1 3) 3 4) None

13. If the exports of companies C, D and E in year 2004 are in the ratio 1 : 3 : 2, the overall % increase in the export of company C, D and E as per the projected percentage increase in 2005 is
1) 48.3% 2) 54.6% 3) 57.8% 4) 64.8%

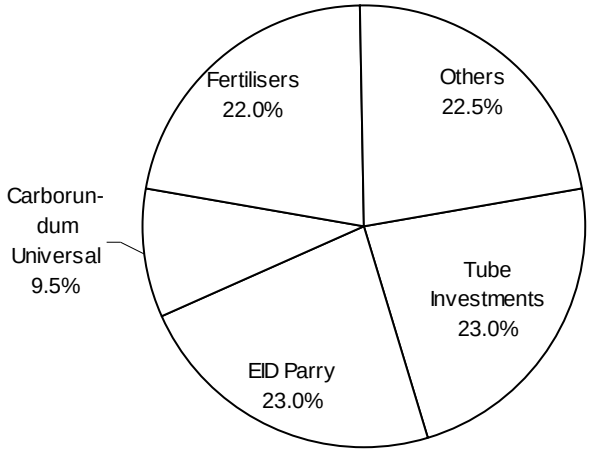
14. If the difference between export and import of company A is 60% more than that between export and import of company B in year 2004, the difference between export and import of company B is what % more/less than that of company A in year 2005?
1) 7.5% less 2) 11.6% more 3) 15% less 4) 17.4% more

Directions (Q. 15-18): The following pie-charts show the revenue (income) and profit of MG Finance for the financial year 2004-05.

Share of Revenue (income)



Share of Profit



15. The profit from Tube Investments is what % more than the profit from Fertilisers?
1) 4.5% 2) 5.5% 3) 6.6% 4) Can't be determined

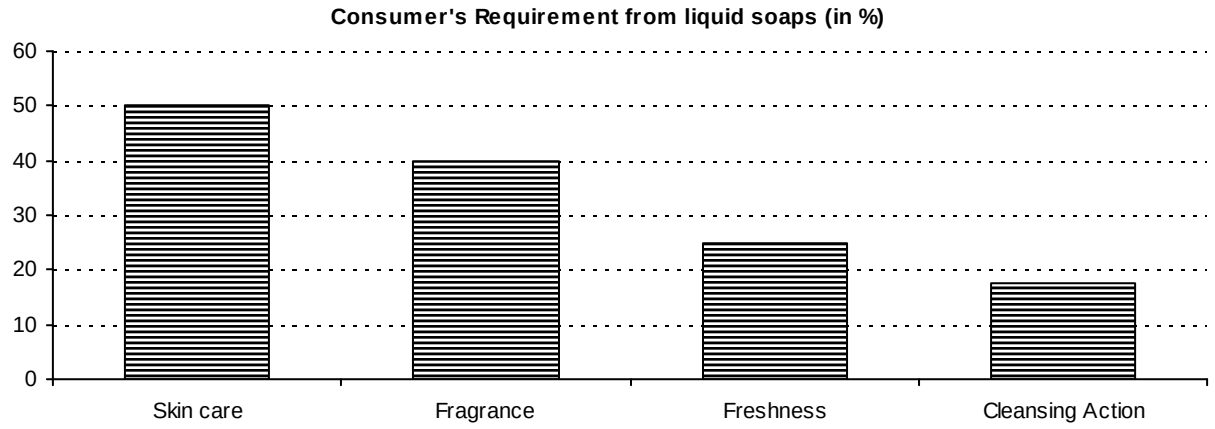
16. The expenditure of Fertilisers is what % more than the expenditure of Tube Investments?
1) 24% 2) 36% 3) 48% 4) Can't be determined

17. The minimum expenditure of MG Finance is in
1) Fertilizers 2) Others
3) Carborundum Universal 4) Can't be determined

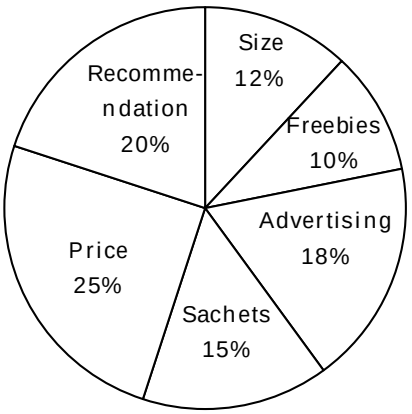
18. If the total revenue of the company in the financial year 2004-05 is Rs 6250 crores and the total profit of the company is Rs 600 crores, the profit of which type of investment has the maximum for per rupee revenue?

1) Fertilizers
2) Carborundum Universal
3) EID Parry
4) Tube Investments

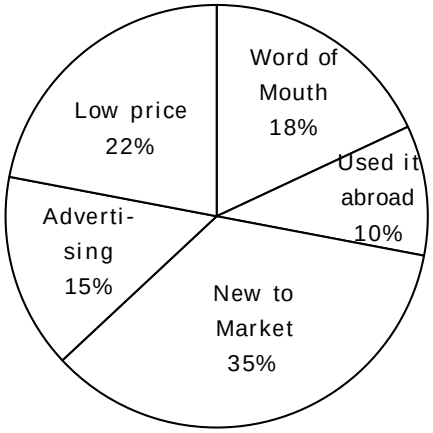
Directions (Q. 19-22): The following graphs show the result of a survey. Refer to the graphs to answer the questions that follow.



Reasons For Trial



Reasons for Use



19. If 5000 users were questioned for the survey, in which 8% required fragrance and freshness, 3% required skin care and fragrance, 7% required skin care and cleansing action, 3% required cleansing action and freshness, and 5% required all the qualities from the liquid soap, how many people required only skin care from liquid soaps? (There are no consumers who required exactly three qualities from liquid soaps.)

1) 1800
2) 1750
3) 1600
4) 1900

20. If 4200 people were covered under the survey, what is the ratio of the people who tried the soap because of recommendation and those who did so because of size?

1) 5 : 3
2) 3 : 5
3) 8 : 5
4) 5 : 8

21. What per cent of the people who tried the soap because of recommendation continued using it for

a similar-mentioned purpose?

1) 80% 2) 95% 3) 85% 4) 90%

22. If 7800 people were covered under the survey, what is the difference between the number of people who use the liquid soaps because it is new to market and the number of people who use it because of its advertisement?

1) 1750 2) 1560 3) 1800 4) 1500

Answers and explanations

1. 4; Only the ratio of export to import of each of the companies is given. Therefore it can't be determined.
2. 4; Only the ratio of export to import of each of the company is given. Therefore we can't find in which year the difference between export and import of company D is maximum. It depends upon the constant involved in each of the ratios.
3. 2; This question is similar to the above problem but we have to find the minimum difference. The minimum difference between export and import will be when Export = Import, ie ratio = 1. Hence company D.
4. 4; Different constants are involved in the ratios of export and import of company A in year 2001 and 2000. Therefore we can't determine.
5. 3; Let K_1 and K_2 be present in the ratio of export to import of company C and company D in year 2001.

$$\frac{\text{Export of company}}{\text{Import of company}} = 1.75 = \frac{7}{4}$$

$\Rightarrow$ Export of company C = $7K_1$

Import of company C = $4K_1$

Similarly, export of company D = $3K_2$

Import of company D = $4K_2$

According to the question,

$$\frac{7K_1}{3K_2} = 2$$

$$\Rightarrow 7K_1 = 6K_2 \Rightarrow \frac{K_1}{K_2} = \frac{6}{7} \quad \ldots. (1)$$

Also, $4K_2 - 3K_2 = 70 \Rightarrow K_2 = 70$

As per (1) $\Rightarrow$ $K_1 = \frac{6}{7}K_2 = \frac{6}{7} \times 70 = 60$

$\therefore$ Import of company C = $4K_1 = 4 \times 60 = 240$ million.

6. 4; Let K_1 and K_2 be present in the ratio of export to import of company A and company B respectively in year 2003.

Export of company A = K_1

Import of company A = $2K_1$

Export of company B = $3K_2$

Import of company B = $4K_2$

Trade deficit (Import – Export) of company A = K_1

Trade deficit of company B = K_2

According to the question,

$$K_2 = K_1\left(1+\frac{75}{100}\right)$$

$$\Rightarrow K_2 = K_1 \times \frac{7}{4}$$

$$\frac{\text{Import of company B}}{\text{Import of company A}} = \frac{4K_2}{2K_1} = \frac{4\times\frac{7K_1}{4}}{2K_1} = \frac{7}{2}$$

$\therefore$ Required ratio = 7 : 2

7. 1; Let K_1 and K_2 be present in the ratio of export to import of company E in 2003 and 2004 respectively.

Export of company E in 2003 = $5K_1$

Import of company E in 2003 = $4K_1$

Export of company E in 2004 = $2K_2$

Import of company E in 2004 = K_2

According to the question,

$$\frac{5K_1}{2K_2} = \frac{4}{5} \Rightarrow 25K_1 = 8K_2$$

$$\Rightarrow \frac{K_1}{K_2} = \frac{8}{25} \Rightarrow K_1 = \frac{K_2.8}{25}$$

$$\Rightarrow \text{Required ratio} = \frac{5\left(\frac{8K_2}{25}\right)+2K_2}{4\left(\frac{8K_2}{25}\right)+K_2} = \frac{90}{57} = \frac{30}{19} = 30:19$$

8. 2; Let K_1, K_2 and K_3 be present in the ratio of export to import of companies A, B and C respectively in year 2004.

Total transaction (export + import) of company A = $3K_1 + 2K_1 = 5K_1$

Total transaction (export + import) of company B = $5K_2 + 4K_2 = 9K_2$

Total transaction (export + import) of company C = $K_3 + K_3 = 2K_3$

According to the question,

$$\frac{5K_1}{9K_2} = \frac{3}{4} \qquad \text{and} \qquad \frac{9K_2}{2K_3} = \frac{4}{2}$$

$$\Rightarrow 20K_1 = 27K_2 \qquad \Rightarrow 18K_2 = 8K_3$$

$$\Rightarrow K_1 : K_2 = 27 : 20 \qquad \Rightarrow K_2 : K_3 = 8 : 18 \equiv 4 : 9$$

$K_1 : K_2 : K_3$

$\Rightarrow$ 27 : 20 :

4 : 9

$\Rightarrow K_1 : K_2 : K_3 \equiv 108 : 80 : 180 \equiv 54 : 40 : 90$

$$\frac{\text{Total export of companies A, B and C}}{\text{Total import of companies A, B and C}} = \frac{3K_1 + 5K_2 + K_3}{2K_1 + 4K_2 + K_3}$$

$$= \frac{3 \times 54 + 5 \times 40 + 90}{2 \times 54 + 4 \times 40 + 90} = \frac{452}{358} = \frac{226}{179}$$

$\therefore$ Required ratio = 226 : 179

9. 2; Let K_1 be present in the ratio of export to import of company C in year 2004.

Export of company C in year 2004 = K_1

Import of company C in year 2004 = K_1

From the radar graph,

% increase in export of company C = 20%

$\therefore$ Export of company C in 2005 = $K_1\left(1 + \frac{20}{100}\right) = \frac{6K_1}{5}$.

Import of company C in 2005 = K_1 (same as that of 2004)

$\therefore$ Required ratio = $\frac{\frac{6K_1}{5}}{K_1} = \frac{6}{5} \equiv 6 : 5$

10. 1; Let K_1 and K_2 be present in the ratio of export to import of company E in years 2003 and 2004 respectively.

Total transaction of company E in year 2003 = $5K_1 + 4K_1 = 9K_1$

Total transaction of company E in year 2004 = $2K_2 + K_2 = 3K_2$

According to the question,

$$9K_1 = 3K_2\left(1 - \frac{1}{3}\right) = 2K_2$$

$$\Rightarrow \frac{K_1}{K_2} = \frac{2}{9}$$

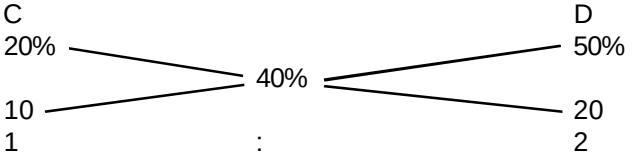
$$\therefore \frac{\text{Total export of E}}{\text{Total import of E}} = \frac{5K_1 + 2K_2}{4K_1 + K_2} = \frac{5\left(\frac{2}{9}\right) + 2}{4\left(\frac{2}{9}\right) + 1} = \frac{28}{17}$$

$\therefore$ Required ratio = 373 : 212

11. 3; % growth in export of company C in year 2005 w.r.t. 2004 = 20%

and, % growth in export of company D = 50%

But companies C and D together have increased by 40%. Obviously, 40% is the weighted mean of 20% and 50%.



$\Rightarrow$ Ratio of export of company C to company D in year 2004 = 1 : 2

Let K_1 and K_2 be present in the ratio of export to import of companies C and D in year 2004.

Export of company C = K_1; and import of company C = K_1

Export of company D = $3K_2$; and import of company D = $4K_2$

and, $\frac{K_1}{3K_2} = \frac{1}{2} \Rightarrow 2K_1 = 3K_2$

$\Rightarrow \frac{K_1}{K_2} = \frac{3}{2}$

Required ratio = $\frac{\text{Export of company C and D}}{\text{Import of company C and D}} = \frac{K_1 + 3K_2}{K_1 + 4K_2}$

$= \frac{\frac{3}{2}K_2 + 3K_2}{\frac{3}{2}K_2 + 4K_2} = \frac{9}{11} = 9:11$

12. 4; In year 2004, only company D has import less than export. From year 2004 to 2005 export of the company D increase by 50%.
Therefore, no company has import more than export as per the projection.

13. 1; As per the projected percentage increase, the overall % increase

$= \frac{1}{6} \times 20 + \frac{3}{6} \times 50 + \frac{2}{6} \times 60 = \frac{290}{6} = 48.33\%$

14. 2; Let K_1 and K_2 be present in the ratio of export to import of companies A and B respectively in year 2004.

Difference between export and import of company A in year 2004 = $3K_1 - 2K_1 = K_1$

Difference between export and import of company B in year 2004 = 5 : 4 = $5K_1 - 4K_2 = K_2$

According to the question,

$K_1 = K_2\left(1 + \frac{60}{100}\right) \Rightarrow K_1 = K_2\left(\frac{8}{5}\right)$

Export of company A in 2005 = $3K_1\left(\frac{160}{100}\right) = \frac{24K_1}{5}$

Export of company B in 2005 = $5K_2\left(\frac{180}{100}\right) = 9K_2$

Difference between export and import of company B = $9K_2 - 4K_2 = 5K_2$

Difference between export and import of company A = $\frac{24}{5}K_1 - 2K_1$

$= \frac{14K_1}{5} = \frac{14}{5}\left(\frac{8K_2}{5}\right) = \frac{112K_2}{25}$

Required % = $\frac{5K_2 - \frac{112K_2}{25}}{\frac{112K_2}{25}} \times 100 = \frac{1300}{112} = 11.6\%$

11.6% more than that of A.

Practice Exercise 2

Directions (Q. 1-5): Refer to the bar graph below and answer the questions that follow.

The following bar graph gives age-wise as well as offence-wise distribution of male offenders in England and Wales in the year 2003. Value written on the top of each bar gives the total number of offences in thousands occurring in that particular category of offence.

1. The second highest number of crimes is committed by the boys in the age group
   1) 10-12 2) 12-14
   3) 14-16 4) Over 16
2. Which of the following conclusions is true?
   1) Boys in age group 14-16 commit more burglaries than theft.
   2) Boys in age group 12-14 are the most violent.
   3) In the boys' over-16 age group the number of burglaries committed is more than that of violent acts.
   4) Burglary is the second most common offence amongst the juvenile delinquent below the age of 12.
3. If the total offences were shown by a pie-chart what sector angle would approximately represent robberies?
   1) 10 2) 3
   3) 24 4) 65
4. The total number of offences committed by those over 16 is greater than the total number of offences committed by those in the age group of 12 to 16 by
   1) 10% 2) 5%
   3) 26% 4) 1%
5. If no child committed more than one offence, given that the total number of boys in the age group 10-12 was 1457682, what was the approximate percentage of children who were away from crime in that age group?
   1) 5 2) 82
   3) 87 4) 96

Directions (Q. 6-11): Refer to the table below and answer the questions that follow.

Statewise area and production of tobacco

(A = Area in '000 hectares; P = Production in '000 tonnes)

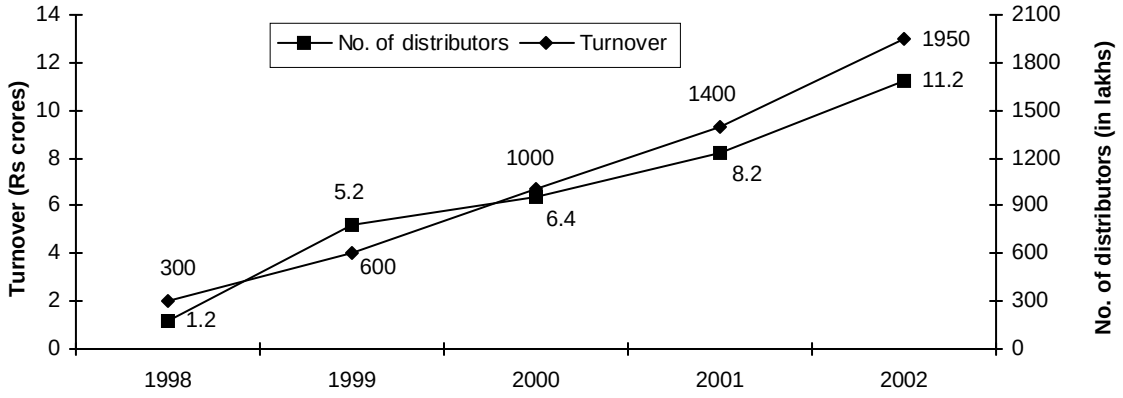
Note: Figures in brackets show the percentage share of Virginia Tobacco.

	Year									
State	1997-1998		1998-1999		1999-2000		2000-2001		2001-2002	
	A	P	A	P	A	P	A	P	A	P
Andhra Pradesh	209.7	262.8	198.7	190.6	171.6	154.9	169.4	164	182.8	192.5
	(66)	(60)	(78)	(71)	(74)	(61)	(7.5)	(67)	(75)	(67)
Gujarat	81.5	125.3	74.6	153.6	114.7	174.9	121.5	185.2	113	209.5
Karnataka	42.1	30.5	43.5	29.6	44.5	26.6	51.6	33.9	50.8	30.5
	(24)	(24)	(23)	(23)	(29)	(25)	(30)	(21)	(31)	(30)
Tamil Nadu (TN)	11.3	16.7	12.7	19	12.9	19.1	14.5	22.4	17.2	26.1
West Bengal	14.9	14.5	13.2	12.7	12.7	11.5	18.9	17.4	14.1	13.3
	(3)	(2)	(4)	(2)	(2)	(2)	(1)	(1)	(1)	(1)
Others	63.9	43.8	66.6	48.3	69	51.5	75.6	57.9	70.4	53.4
All India Total	504.4	493.6	409.3	453.8	425.4	438.5	451.5	480.8	448.3	525.3

6. In which of the following years was the productivity (tonnes per hectare) of tobacco in Andhra Pradesh greater than one?
   1) 1998-99 2) 1999-2000
   3) 2000-2001 4) 2001-2002
7. The all-India percentage share of Virginia Tobacco in the total tobacco production in 1997-1998 was approximately
   1) 50 2) 86 3) 33 4) 27
8. If in 2002-2003 the area under cultivation of tobacco was increased to 18,000 hectares in Tamil Nadu, the tobacco production would then approximately be (in '000 tonnes, assuming productivity in 2002-2003 remains the same as in 2001-2002):
   1) 32.6 2) 16.3
   3) 25 4) 27.3
9. Tobacco production in which of the following States increased consistently over the five-year period?
   1) Karnataka & TN
   2) Gujarat & TN
   3) Karnataka & Gujarat
   4) W Bengal & TN
10. Total production of Virginia Tobacco was higher in which year?
   1) 1997-1998
   2) 1998-1999
   3) 2000-2001
   4) 2001-2002
11. Which of the following is true?
   1) Production of Virginia Tobacco is increasing every year in Andhra Pradesh.
   2) Production of Virginia Tobacco is second highest in year 1999-2000.
   3) Production of Virginia Tobacco in West Bengal is decreasing.
   4) All-India productivity of Tobacco is minimum in year 2000-01.

Directins (Q. 12-16): Refer to the line graph below and answer the questions that follow.

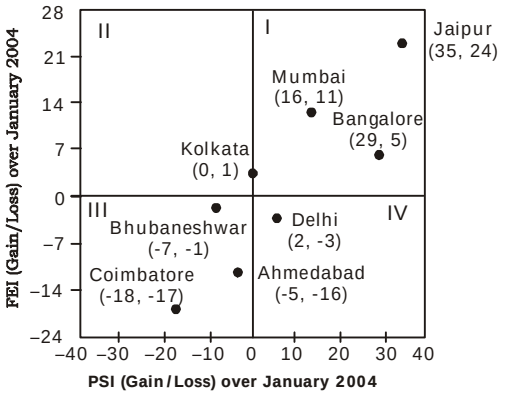
DIRECT SELLING BUSINESS

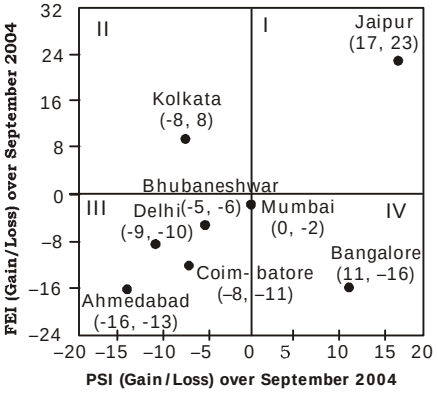


Rank	Company	Turnover in 2002 (in Rs Crores)	No. of distributors in 2002 (in lakhs)
1.	Wamay	472	3.65
2.	Codimare	165	4.95
3.	Nova	110	0.68
4.	Balife	78	0.2

12. What is the average simple annual growth rate of turnover of direct selling business in India during the given period?
    1) 42% 2) 60%
    3) 78% 4) 137.5%
13. If Wamay and Nova were the only companies in the direct selling business in India till 1998 with the Wamay market share three times that of Nova, then what is the percentage growth in Nova's turnover during the given period?
    1) 10% 2) 15.6%
    3) 35% 4) 46.7%
14. Balife was launched in 2000. Since then, the number of its distributors is increasing by 25% every year and its turnover by 20%. Then what was the turnover-to-number of distributors ratio of Balife during its launching year?
    1) 36120 2) 39820
    3) 42320 4) 45720
15. Which of the following is definitely false?
    1) The ratio of turnover to number of distributors is maximum for Balife during 2002.
    2) Top four companies together have more than 80% of total number of distributors in the direct selling business in India during 2002.
    3) There are not more than 18 companies in direct selling business in India during 2002.
    4) None of these
16. During which year, has the ratio of turnover-to-number of distributors shown maximum percentage increase over the previous year?
    1) 1999 2) 2000
    3) 2001 4) 2002

Directions (Q. 17-20): Refer to the diagrams below and answer the questions that follow.
Given below is the data of a consumer confidence survey.





FEI → Future Expenditure Index
PSI → Present Situation Index

CCI → Consumer Confidence Index → $\left|\frac{FEI}{PSI}\right|$

17. For how many cities has PSI changed from a positive value to negative value?
1) 0 2) 1 3) 2 4) 3

18. How many cities have shown greater than or equal to 100% change in FEI?
1) 2 2) 3 3) 4 4) 5

19. Which of the following cities have CCI more than 1 during September 2004?
1) Ahmedabad 2) Kolkata 3) Delhi 4) Bangalore

20. For how many cities, FEI as well as PSI decreased over the period?
1) 3 2) 4 3) 5 4) 6

Answers and explanations

1-5: Please note that the bar chart gives the % distribution of each age group in various kinds of offences.

1. 3; For all kinds of offences, the percentage of crimes committed is the highest in the age group over 16 and second highest in age group 14-16. Thus, number of crimes is second highest in the age group 14-16. Hence, (3).

2. 4; **Statement 1:**
Not true, as the percentage of boys committing burglaries and thefts is almost the same, but the number of thefts is much more than burglaries. Thus, thefts would be more than burglaries in the age group 14-16.
Statement 2:
Note true, as the boys in the age group over 16 are the most violent.
Statement 3:
For age group over 16:
Number of burglaries = 35% × 82 ≈ 28.7 thousand
Number of violent acts = 55% of 53 ≈ 29.2 thousand
Hence, this is not true.
Statement 4:
Below the age of 12, the most common offence is theft, followed by burglary. Hence, this statement is true.

3. 2; Total offences = 82 + 238 + 4 + 53 + 74 = 451 thousand.

$\therefore$ In a pie-chart the angle of the sector representing robberies = $\frac{4 \times 360}{451} \approx 3^{\circ}$.

4. 4; Total number of offences in '000 in the age group over 16

$$= \frac{35}{100} \times 82 + \frac{40}{100} \times 238 + \frac{50}{100} \times 4 + \frac{55}{100} \times 53 + \frac{60}{100} \times 74$$
$$\approx 29 + 95 + 2 + 29 + 44 = 199$$

In age group 12 to 16 = $\frac{50}{100} \times 82 + \frac{45}{100} \times 238 + \frac{40}{100} \times 4 + \frac{40}{100} \times 53 + \frac{35}{100} \times 74$

$$\approx 41 + 107 + 2 + 21 + 26 = 197$$

5. 4; Number of crimes in age group 10 to 12

$$= \left(\frac{15}{100} \times 82 + \frac{15}{100} \times 238 + \frac{10}{100} \times 4 + \frac{5}{100} \times 53 + \frac{5}{100} \times 74\right)$$

$= (12 + 36 + 0.4 + 3 + 4) \times 1000 \approx 55 \times 1000 \approx 55000$

$\therefore$ Percentage of children committing crimes = $\frac{55000}{1457682} \times 100 \approx 4\%$

$\therefore$ Percentage of children away from crimes = 100 - 4 = 96%.

6. 4; In the row of Andhra Pradesh choose the year in which P > A.

7. 3; $\frac{262.8 \times 0.6 + 30.5 \times 0.24 + 14.5 \times 0.02}{493.6} \times 100 \approx 33\%$

8. 4; $\frac{18}{17.2} \times 26.1 = 27.3$ (Assuming same productivity).

9. 2; Gujarat and Tamil Nadu both show increasing trends of production.

10. 1; As Andhra Pradesh is the sole biggest contributor, it is sufficient to note that in 1997-1998 the production of Virginia Tobacco in AP was greater than in any other year by a significant margin.

11. 3; The production of Virginia Tobacco is decreasing every year in West Bengal.

12. 4; Average annual growth rate = $\frac{1950 - 300}{300 \times 4} \times 100 = \frac{1650}{12} = 137.5\%$.

13. 4; Nova's turnover in 1998 = $\frac{1}{4} \times 300$ = Rs 75 crores

Nova's turnover in 2002 = Rs 110 crores

$\therefore$ Percentage growth = $\frac{110 - 75}{75} \times 100 = \frac{35 \times 100}{75} = 46.7\%$

14. 3 At 25% per annum, the number of distributors increases by 56.25% in two years. At 20% per annum, the turnover increases by 44% in two years.

$\therefore$ Turnover-to-number of distributors for Balife in 2000

$$= \frac{\frac{78 \times 100 \text{ lakh}}{1.44}}{\frac{0.2 \text{ lakh}}{1.5625}} = \frac{7800}{1.44} \times \frac{1.5625}{0.2} = 42318$$

15. 3; Nothing can be inferred about statement 1 as data is given for only top 4 companies.

Statement 2 is definitely true as top 4 companies have approximately 85% of total number of distributors.

Total turnover of top 3 companies = 472 + 165 + 110 = Rs 747 crores

Turnover of all other companies = 1950 - 747 = Rs 1203 crores
Number of companies in the direct selling business will be minimum if all companies other than top 3 companies have turnover almost equal to the turnover of fourth company, ie Balife

$\therefore$ Minimum number of companies (excluding top 3) = $\frac{1203}{78} = 15.4 \approx 16$

$\therefore$ Minimum number of companies = 16 + 3 = 19
$\therefore$ Statement 3 is definitely false.

16. 2;

Year	Ratio (approx)	Percentage increase
1998	25000	-
1999	11500	-ve
2000	15600	4100/115 > 30%
2001	17100	1500/156 < 10%
2002	17400	300/17100 < 10%

17. 2; Only for Delhi, PSI has changed from 2 to –9, ie positive value to negative.
18. 4; **City** **% Change in FEI**

Jaipur $\left|\frac{1}{24}\times 100\right| < 100\%$

Bangalore $\left|\frac{5-(-16)}{5}\times 100\right| = \frac{2100}{5} > 100\%$

Mumbai $\left|\frac{11-(-2)}{11}\times 100\right| = \frac{1300}{11} > 100\%$

Kolkata $\left|\frac{1-8}{1}\times 100\right| = 700\% > 100\%$

Bhubaneshwar $\left|\frac{-1+6}{-1}\times 100\right| = 500\% > 100\%$

Coimbatore $\left|\frac{-17-(-11)}{-17}\times 100\right| = \frac{600}{17} < 100\%$

Ahmedabad $\left|\frac{-16-(-13)}{-16}\times 100\right| = \frac{300}{16} < 100\%$

Delhi $\left|\frac{-3-(-6)}{-3}\times 100\right| = \frac{300}{3} = 100\%$

Only Jaipur, Ahmedabad and Coimbatore have less than 100% change in FEI.
$\therefore$ Required number of cities = 8 – 3 = 5

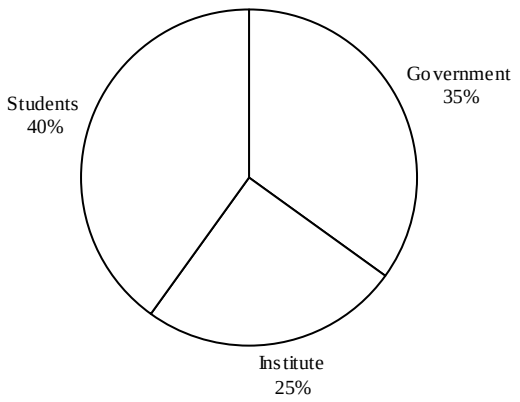
19. 3; To have CCI more than 1, |FEI| must be greater than |PSI| during the given period. Only Delhi has [FEI] more than |PSI|.
20. 2; FEI and PSI of Jaipur have decreased from (35, 24) to (17, 23) over the period.
Similarly, FEI and PSI of Mumbai, Bangalore and Delhi have decreased over the period.
$\therefore$ Total no. of cities = 4.

Practice Exercise 3

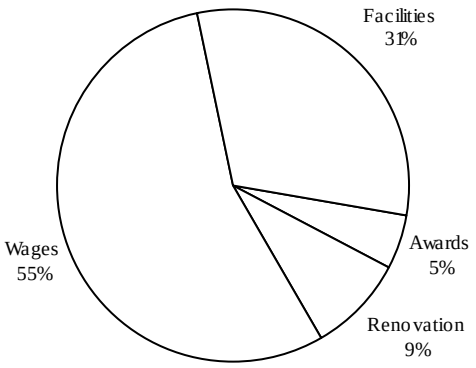
Directions (Q. 1-5): Refer to the pie-charts below and answer the questions that follow.

Monthly income and expenditure for a semi-government institute

INCOME



EXPENDITURE



There are some constraints:

i) Income from students can be used for awards and facilities; otherwise it has to be kept aside.

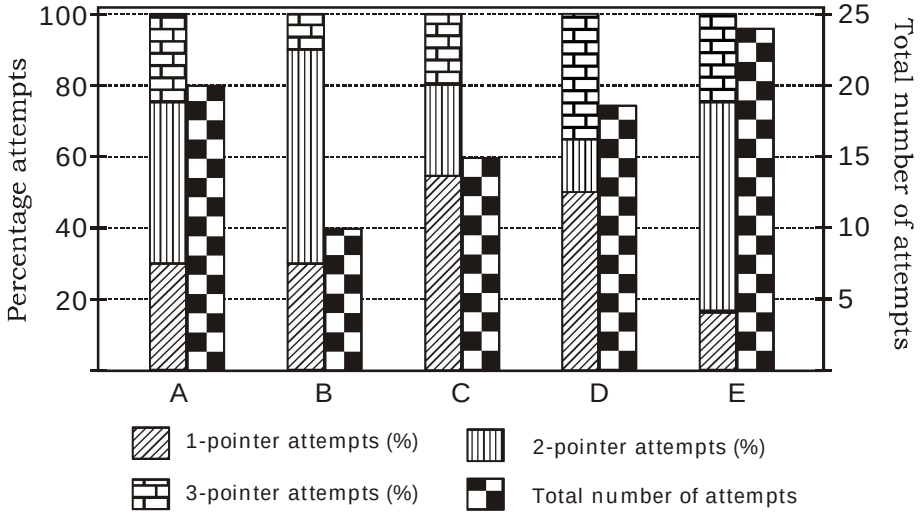
ii) Renovation can be done only with donation from institute.

iii) Government and institute's contributions do not increase even if any new course is introduced for/till first 2 years.

1. If government's contribution was Rs 10 lakh and the management could save Rs 60000, then what would be the expenditure on wages? (approximately)
   1) Rs 1504000 2) Rs 1538000 3) Rs 1602000 4) Rs 1571000
2. The total income is Rs 35×10^6. The percentage utilization of the income from the students is 100%. If expenditure on awards and facilities is met only with income from students, then what is the total expenditure? (approximately)
   1) Rs 31.5×10^6 2) Rs 35×10^6
   3) Rs 39×10^6 4) Rs 40×10^6
3. Approximately what is the ratio of the expenditure on facilities to that on wages?
   1) 5 : 11 2) 11 : 6
   3) 6 : 11 4) Cannot be determined
4. If no money is spent on renovation then the income and the expenditure are the same, otherwise there is a shortage of Rs 650000. Then what is the total income?
   1) Rs 72×10^5 2) Rs 65.7×10^5 3) Rs 59.5×10^5 4) Rs 54.5×10^5
5. Students' contribution is totally used in awards and facilities but Rs 2×10^6 is still left. Find the total expenditure (in Rs).
   1) 5×10^6 2) 7.5×10^6 3) 4×10^6 4) Data inadequate

Directions (Q. 6-10): Refer to the bar graph below and answer the questions that follow.

In the game of basketball, points for the correct throws are 1, 2 or 3. In a match the number of attempts to basket the ball and accuracy are given for all players of the team below. Indian Railways' players are A, B, C, D and E.



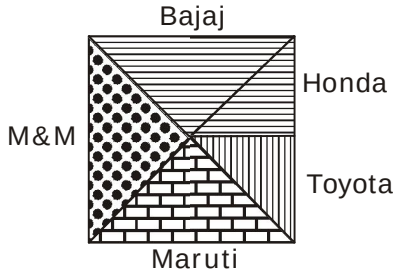
Player	Accuracy		
	1-pointer	2-pointer	3-pointer
A	66.66	33.33	20
B	100	66.66	100
C	75	75	100
D	88.88	100	50
E	100	71.42	83.33

6. How many points were scored by player A?
   1) 13 2) 19 3) 21 4) 39
7. What was the accuracy of the most accurate player? (Accuracy means no. of baskets per attempt.)
   1) 78% 2) 80%
   3) 83% 4) 87%
8. What percentage of total points was scored by player D?
   1) 13% 2) 21% 3) 30% 4) 37%
9. What percentage of total points was scored through 2-pointers?
   1) 22% 2) 32% 3) 42% 4) 52%
10. Point scored by all players from 3-pointers is what percentage (approx.) more / less than those from 2-pointers?
    1) 15% more 2) 10% less
    3) 15% less 4) 10% more

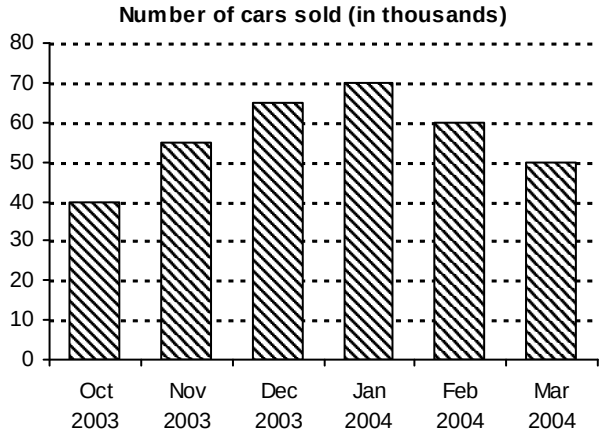
Directions (Q. 11-15): Refer to the graphs below and answer the questions that follow.

Graph (i) shows volumewise share of various companies in car market in India, for March 2004.
Graph (ii) shows total number of cars sold since October 2003 to March 2004.
Graph (iii) shows ratios of market prices of cars of the companies which are written next to each other, ie $\left(\frac{\text{price of Bajaj car}}{\text{price of Toyota car}}\right) = 0.66$

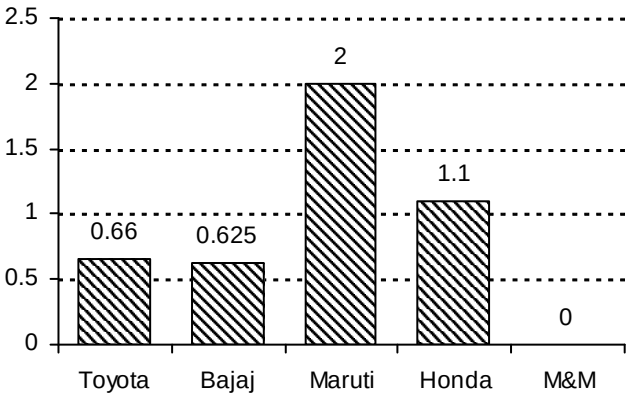
Graph (i)



Graph (ii)



Graph (iii)



11. What is the share of M&M in total sale (in Rs) of cars in March 2004?
    1) 32% 2) 48% 3) 60% 4) Cannot be determined
12. If Toyota had 20% share in volume in November 2003, then what is the ratio of its sales (units) in November 2003 to that in March 2004?
    1) 11 : 10 2) 8 : 5 3) 44 : 25 4) None of these
13. If a Honda car costs Rs 2.5 lakhs, then what were the sales of Bajaj cars in March 2004?
    1) Rs 125 crores 2) Rs 160 crores 3) Rs 250 crores 4) Rs 300 crores
14. How many cars cost more than the average price of cars in March 2004 among the given group of cars?
    1) 1 2) 2 3) 3 4) Cannot be determined
15. If the cost of Bajaj car is Rs 108000 less than that of M&M, then the income from the selling of a car by Maruti is what % more/less than that by Honda in March 2004?
    1) 60% less 2) 50% less 3) 40% more 4) 25% less

Directions (Q. 16-20): The following table shows the percentage population above poverty line and ratio of male to female above and below poverty line for states A, B, C, D and E in year 2003.

Name of State	% population above poverty line	Ratio of male to female	
		Below poverty line	Above poverty line
A	72	4 : 3	4 : 5
B	64	8 : 10	9 : 7
C	56	6 : 5	13 : 15
D	84	7 : 9	11 : 10
E	76	5 : 7	9 : 10

16. In which state is the maximum male population below poverty line?
    1) C 2) B
    3) A 4) Can't be determined
17. If the female population below poverty line in state D is 6.3 million, find the female population above poverty line.
    1) 38 million
    2) 28 million
    3) 40 million
    4) 42 million
18. If the female population above poverty line in state A is 3.6 million more than the female population above poverty line in state D, find the difference between total population of State A and state D.
    1) 9 million
    2) 8 million
    3) 10 million
    4) Can't say
19. If the percentage of male population below poverty line in state C and state E together is 15%, find the % male population above poverty line in states C and E together.
    1) 45.2% 2) 32.4% 3) 37.8% 4) Can't say
20. If the female population above poverty line in state C is greater than the female population above poverty line in state B, which of the following is definitely true?
    1) Population of state C < population of state B
    2) Population of state C > population at state B
    3) Population of state C = population of state B
    4) Can't say

Answers and explanations

1. 2; Government's contribution = 35% of the total income

$\therefore$ Total income = $\frac{10^6 \times 100}{35} \approx 2857143$

Savings = Rs 60000 $\Rightarrow$ Total expenditure = Total income - savings = 2857143 - 60000 = 2797143.
Expenditure on wages = 55% of total expenditure $\approx$ 1538429.

2. 3; From condition (i), 100% income from students is utilized.
$\Rightarrow$ income from students = expenditure on awards and facilities.
$\Rightarrow$ 40% of income = 36% of expenditure.

$\therefore$ Expenditure = $\frac{100}{36} \times \frac{40}{100} \times 35 \times 10^6 = 388889 \approx 3900000 = 39 \times 10^6$

3. 3; Facilities-to-wages ratio = $\frac{31}{55} \approx \frac{6}{11}$

4. 2; From the given information, total income = total expenditure - 9% of total expenditure
= total expenditure - 650000

$= \frac{100}{9} \times 650000 - 650000 \approx 6572222 \approx 6570000$

5. 4; Let the total income be Rs x and total expenditure be Rs y.
According to the question,

40% of x – 36% of y = 2×10^5
But we can't find the value of y.
Hence, data inadequate.

6-9:

Player	No. of attempts for		
	1-pointer	2-pointer	3-pointer
A	6	9	5
B	3	6	1
C	8	4	3
D	9	3	6
E	4	14	6
Total	30	36	21

Player	Number of baskets		
	1-pointer	2-pointer	3-pointer
A	4	3	1
B	3	4	1
C	6	3	3
D	8	3	3
E	4	10	5
Total	25	23	13

6. 1; Points scored by player A = $4 \times 1 + 3 \times 2 + 1 \times 3 = 4 + 6 + 3 = 13$

Alternatively:

Player A has overall accuracy of around 40% with quite a low accuracy of 3 pointers.
With total 20 attempts, assuming average score of 2 per attempt, approximate score would be $0.4 \times 2 \times 20 = 16$.

7. 2;

Player	A	B	C	D	E
Accuracy	8/20 = 0.4	8/10 = 0.8	12/15 = 0.8	14/18 < 0.8	19/24 < 0.8

Players B and C have the maximum accuracy of 80%.

8. 2; Total points = $25 \times 1 + 23 \times 2 + 13 \times 3 = 25 + 46 + 39 = 110$
Points scored by player D = $8 \times 1 + 3 \times 2 + 3 \times 3 = 23$

$\therefore$ Percentage of points scored by player D = $\frac{23}{110} \times 100 \approx 21\%$

Alternatively:

Approximately 20% of total attempts were made by player D with the same accuracy (approximately) as the other players except A, whose accuracy is quite low. Hence, player D must have scored approximately 20% of total points.

9. 3; Number of points scored through 2-pointers = $2 \times 23 = 46$

$\therefore$ Percentage of points through 2-pointers = $\frac{46}{110} \times 100 \approx 42\%$.

10. 3; Total points scored from 3-pointers = $13 \times 3 = 39$
Total points scored from 2-pointers = $23 \times 2 = 46$

Required percentage = $\frac{46 - 39}{46} \times 100 \approx 15.2\%$

11. 1; From graph (iii)

$\frac{\text{Price of Bajaj}}{\text{Price of Toyota}} = \frac{2}{3}; \frac{\text{Price of Maruti}}{\text{Price of Bajaj}} = \frac{5}{8}; \frac{\text{Price of Honda}}{\text{Price of Maruti}} = 2; \frac{\text{Price of M \& M}}{\text{Price of Honda}} = 1.1$

$\Rightarrow$ If price of Bajaj car is 8x, then prices of Toyota, Maruti, Honda and M&M cars are 12x, 5x, 10x and 11x respectively.
From graph (i),

Percentage shares of Honda and Toyota are 12.5% each while those of Bajaj, M&M and Maruti are 25% each.

Sales of M&M cars (in value) in 2004 = $11x \times \frac{25}{100} \times 50000$

Total sales (in value) = $(8x + 11x + 5x) \times \frac{25}{100} \times 50000 + (12x + 10x) \times \frac{12.5}{100} \times 50000$

$$= (24x + 11x) \times \frac{25}{100} \times 50000 = 35x \times \frac{25}{100} \times 50000$$

Percentage share of sales of M&M cars = $\frac{11}{35} \times 100 \approx 32\%$

12. 3; $\frac{\text{Sales of Toyota in November 2003}}{\text{Sales of Toyota in March 2004}} = \frac{\frac{20}{100} \times 55}{\frac{12.5}{100} \times 50} = \frac{220}{125} = \frac{44}{25}$

13. 3; If a Honda car costs Rs 2.5 lakhs, then a Bajaj car will cost $\frac{2.5}{2} \div 0.625 =$ Rs 2 lakhs.

Sales of Bajaj cars in March 2004 = $\frac{25}{100} \times 50000 \times 2$ = 25000 lakhs.

14. 3; Ratio of price of all the given companies is

Toyoto : Bajaj : Maruti : Honda : M & M

3 : 2

8 : 5

1 : 2

10 : 11

$\equiv (3 \times 8 \times 1 \times 10) : (2 \times 8 \times 1 \times 10) : (2 \times 5 \times 1 \times 10) : (2 \times 5 \times 2 \times 10) : (2 \times 5 \times 2 \times 11)$

$\equiv 240 : 160 : 100 : 200 : 220 \equiv 12 : 8 : 5 : 10 : 11$

Volumes of production of Toyota, Bajaj, Maruti, Honda and M&M in March 2004 are in the ratio 1 : 2 : 2 : 1 : 2

Let x be present in the ratio of the price of each of the cars.

Average price in March 2004 = $\frac{12x \times 1 + 8x \times 2 + 5x \times 2 + 10x \times 1 + 11x \times 2}{1 + 2 + 2 + 1 + 2} = \frac{70x}{8} = 8.75x$

Therefore the prices of Toyota, Honda and M&M are greater than the average price of all cars in March 2004.

15. 2; From solution (11) : Ratio of market prices is Bajaj : M&M = $8x : 11x$

$\therefore 11x - 8x = 3x = 1,08,000$

$\therefore x = 36,000$

Now market price of Maruti = $5x$ = 180,000

Market price of Honda = $10x$ = 3,60,000

$\therefore$ required answer = 50%.

Quicker Approach:

Ratio of price of Honda to Maruti = 2 : 1

$\therefore$ Required ratio = $\frac{2-1}{2} \times 100 = 50\%$

Note: There is no need of the cost of Bajaj car in March 2004.

16. 4; Total population of each of the states is not given. Hence data inadequate.

17. 2; $\frac{9}{16}$ part of 16% $\equiv$ 6.3 million

$\Rightarrow$ 9% $\equiv$ 6.3 milion

$\Rightarrow$ $\frac{10}{21}$ part of 84% ie 40% $\equiv$ $\frac{6.3}{9} \times 40 \equiv 28$ million.

18. 1; At first glance, data seems inadequate for the question.
Let total population of state A and state D be x and y respectively.

Female population above poverty line in state A = $\frac{5}{9}$ part of 72% of x = 40% of x.

Female population above poverty line in state D = $\frac{10}{21}$ part of 84% of y = 40% of y.

According to the question,
40% of x – 40% of y = 3.6

$\Rightarrow$ 40% of $(x - y) = 3.6$

$\Rightarrow$ $x - y$ = 9 million

Note: If percentages are different then we can't solve the problem.

19. 2; Percentage male population below poverty line in state C = $\frac{6}{11}$ part of 44% = 24%

and that in state E = $\frac{5}{12}$ part of 24% = 10%

Combining both states, we have 15% male population below poverty line.
It means that 15% is the weighted mean of 10% and 24%.

C		**E**
24%		10%
	15%	
5		9

Therefore, total populations of C and E are in the ratio 5 : 9.

Now, % male population above poverty line in state C = $\frac{13}{28}$ part of 56% = 26%

and that in state E = $\frac{9}{19}$ part of 76% = 36%.

Required % = $\frac{26 \times 5 + 36 \times 9}{5 + 9} = \frac{130 + 324}{14} = \frac{454}{14} = 32.4\%$

20. 4; Let the total population of state C and state B be x and y respectively.
According to the question,

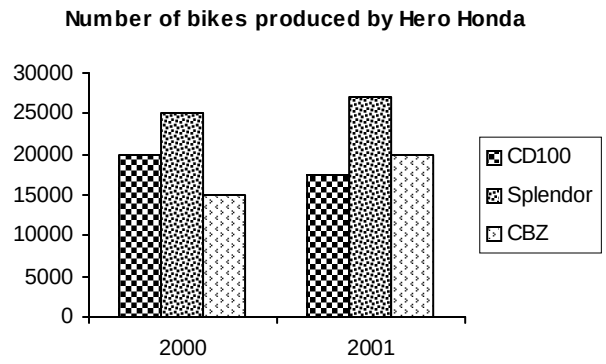
$\frac{15}{28}$ part of 56% of $x > \frac{7}{16}$ part of 64% of y

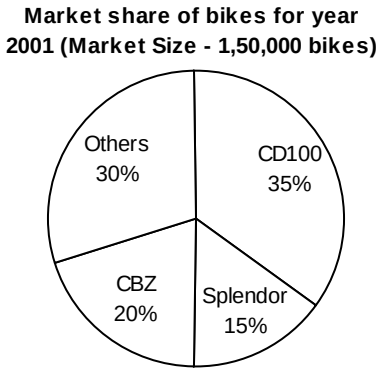
$\Rightarrow$ 30% of x > 28% of y

$\Rightarrow$ $x > y$ or $x < y$ or $x = y$.

Practice Exercise 4

Directions (Q. 1-5): Read the information to solve the questions.

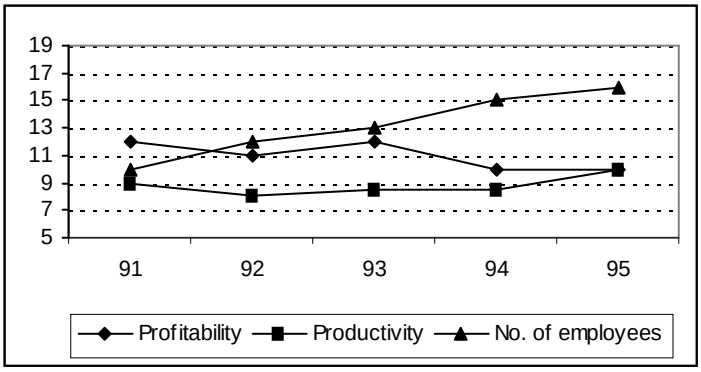




1. If Hero Honda company wants all its CBZ which are produced in 2000 and 2001 to be sold then what should have been the number of CBZ produced in 2001?
   1) 15,000 2) 18,000
   3) 17,000 4) Indeterminable
2. If in 2001 Yamaha accounts for 8% of market share, what per cent of Others category does it account for?
   1) 24% 2) 25%
   3) $26\frac{2}{3}\%$ 4) 28%
3. If Hero Honda plans to launch a new model Crazy in 2002 and if the market increases by 20% and the market share of Hero Honda increases by 10%, then what is the minimum number of Splendor that needs to be produced to meet the demand?
   1) 27,000 2) 25,000
   3) 25,500 4) Indeterminable
4. If in 2002 LML enters the market and is able to capure 30% of the 50,000 market then what is the percentage difference between market share of LML and Splendor? (assuming percentage market share of Hero Honda models and Others is the same as in the previous year)
   1) 24.5%
   2) 19.5%
   3) 12%
   4) None of these
5. If the market share of Others remains the same, what is the total number of Bajaj bikes sold in 2001, if Bajaj enters as a new player in market in 2001 and has the same market share as Hero Honda?
   1) 52,500 2) 53,500
   3) 52,000 4) 54,000

Directions (Q. 6-11): Following graph gives details about the fortunes of the company Multiple Investment. Productivity is given here as the produced value per employee in '00000 $. Profitability is defined here as the profit as a percentage of produced value. The number of em-

ployees is given in '00s.



6. What was the percentage change in the production in the given period for Multiple Investment?
   1) 78% 2) 86% 3) 68% 4) 92%
7. Which year showed the sharpest change in production?
   1) 92 2) 93 3) 94 4) 95
8. Which year showed the sharpest increase in profits?
   1) 92 2) 93 3) 94 4) 95
9. In which year were the profits per employee the highest?
   1) 91 2) 93 3) 94 4) 95
10. In how many years has the profitability shown an inverse trend to that of the number of employees?
    1) 0 2) 1 3) 2 4) 3
11. Which of the following years has the lowest profits per employee?
    1) 92 2) 93 3) 94 4) 95

Directions (Q. 12-16): The tabular data given below gives the information about the adult population (in lacs) in the four different regions of a city in 1996 along with the death and birth rates in the respective regions.

	Region I	Region II	Region III	Region IV
Male	12	8	14	22
Female	10	11	9	12
Birth Rate	5%	8%	12%	3%
Death Rate	0.5%	2%	1%	3%

12. What was the total adult population of all the four regions combined?
    1) 81 2) 83 3) 85 4) 98
13. What was the number of deaths in the given year for regions I and II? (in thousands)
    1) 35 2) 43 3) 49 4) 54
14. Which region had the highest population growth rate in the given year?
    1) Region I 2) Region II
    3) Region III 4) Region IV
15. Which region had the highest number of births?
    1) Region I 2) Region II
    3) Region III 4) Region IV
16. Which region had the lowest number of deaths?
    1) Region I 2) Region II 3) Region III 4) Region IV

Directions (Q. 17-20): Refer to table below and answer the questions that follow.
BSNL announced a cut in STD rates on 27.12.2001. The new rates and slabs are given in the table below and are to be implemented from 14.01.2002. Assume you are given this question on 01.01.2002.

Distance (in km)	Rates (Rs/min)			
	Peak Rates		Off Peak	
	Old	New	Old	New
50-200	4.8	2.4	1.2	1.2
200-500	11.6	4.8	3.00	2.4
500-1000	17.56	9.00	4.5	4.5
>1000	17.56	9.00	6.00	4.5

17. The maximum percentage reduction in costs will be experienced for calls over which of the following distance (in km)?
    1) 50-200 2) 200-500 3) 500-1000 4) >1000
18. The percentage difference in the cost of a set of telephone calls made on the 13th and 14th January having durations of 4 minutes over a distance of 350 km, 3 minutes for a distance of 700 km, and 3 minutes for a distance of 1050 km is (if all the three calls are made in peak times)
    1) 51.2% 2) 51.75% 3) 59.8% 4) Can't be determined
19. If one of the three calls in Q. 18 were made in an off peak time on both days, then the percentage reduction in the total cost of the calls between 13th and 14th January will
    1) Definitely reduce
    2) Definitely increase
    3) Depend on which particular call was made in off peak time
    4) Can't be determined
20. A person talks for a certain no. of minutes at peak rates and off peak rates on 13.01.2002 for 50-200 km distance such that his averge cost of talking per minute is Rs 3.7/minute. Find the least time that he talked (assuming he talks only in multiples of a minute).
    1) 27 minutes 2) 43 minutes 3) 36 minutes 4) Can't say

Answers and explanations

1. 4; We don't know the market share of 2000. We can't find the number of CBZ sold in year 2000.
2. 3; x% of 30% of total = 8% of total

$$\Rightarrow x = \frac{8 \times 100}{30} = 26\frac{2}{3}\%$$

3. 4; We don't know the percentage distribution of Hero Honda models in 2002.
4. 2; % market share of LML = 30% and percentage share of Splendor = $\frac{15}{100} \times 70 = 10.5\%$

   Required percentage difference = 30 – 10.5 = 19.5%
5. 1; Others have 30% share.
   Bajaj has 35% share.
   Hero Honda has 35% share (as percentage shares of Bajaj and Hero Honda are the same).
   and 35% of 150000 = 52500.
6. 1; Production = Productivity × No. of employee

   The increase was from 9 × 10 = 90 to 16 × 10 = 160. So $\frac{70}{90} \times 100 \approx 78\%$.
7. 4; In 1995 both the productivity and the number of employees showed the sharpest increases.

Since the production is given as the product of these two, '95 had the sharpest incease in production.

8. 2; Profit in 1991 = 12% of $\left(9\times10^5\times10\times10^2\right)=1080\times10^5$

Profit in 1992 = 11% of $\left(8\times10^5\times12\times10^2\right)=1056\times10^5$

Profit in 1993 = 12% of $\left(8.5\times10^5\times13\times10^2\right)=1326\times10^5$

Profit in 1994 = 10% of $\left(8.5\times10^5\times15\times10^2\right)=1275\times10^5$

Profit in 1995 = 10% of $\left(10\times10^5\times16\times10^2\right)=1600\times10^5$

% change in profit for 1992-93 = $\frac{1326-1056}{1056}\times100\approx25.56\%$.

% change in profit for 1994-95 = $\frac{1600-1275}{1275}\times100\approx25.50\%$.

9. 1; See the previous soln.
Profit per employee in year 1991 is maximum.

10. 3; In '92 and '94 the trends shown by productivity and number of employees were inverse.

11. 3; In '92 the profit per employee was 1056/12, and in '94 the value was 1275/15. The value of '94 is the smaller one.

12. 4; Simply add up all the figures of the male and female populations of the four regions and the answer comes to 98 lacs. Otherwise the numbers are all odd except 98, and from the figures, there are two odd numbers; therefore the sum has to be even.

13. 3; To find the number of deaths of region I and II, just find 0.5% of 22 and 2% of 19. The sum comes to 49 thousand.

14. 3; The highest growth rate is of region III, which is 12 - 1 = 11%.

15. 3; Region III, which has a population of 23 lacs and a birth rate of 12%, will have the highest number of births.

16. 1; The lowest number of deaths is of region I, which is 0.5% of 22 lacs.

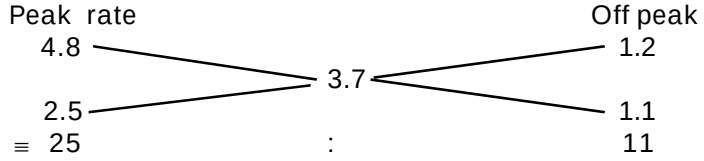
17. 2; Clearly, for 200-500 km distance there is maximum percentage reduction.

18. 2; Required % = $\frac{(4\times11.6+3\times17.56+3\times17.56)-(4\times4.8+3\times9+3\times9)}{(4\times11.6+3\times17.56+3\times17.56)}\times100$

$=\frac{151.76-73.2}{151.76}\times100=\frac{78.56}{151.76}\times100\approx51.75\%$

19. 1; Definitely reduce.

20. 3; On 13.01.2002 old rate was applicable.
Rs 3.7/minute is the weighted mean of Rs 4.8/min and Rs 1.2/minute.



Since 25:11 can't be simplified further,
Therefore the least time that he talked = 25 + 11 = 36 minutes.

Practice Exercise 5

Directions (Q. 1-5): Refer to the charts below and answer the questions that follow.

Figure (i)

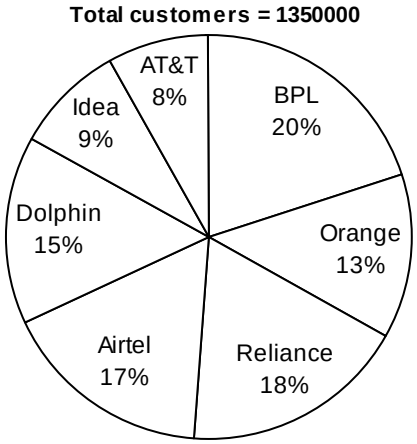


Figure (ii)

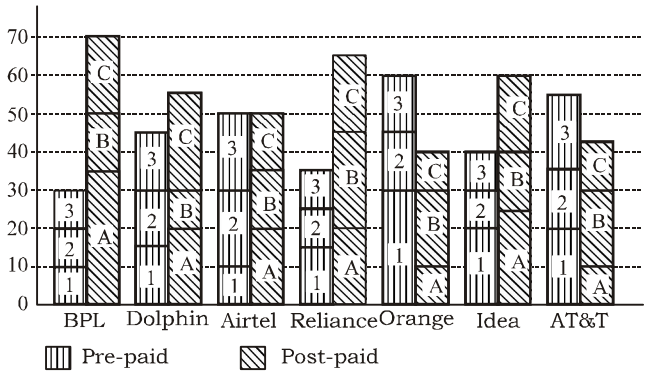


Figure (iii)

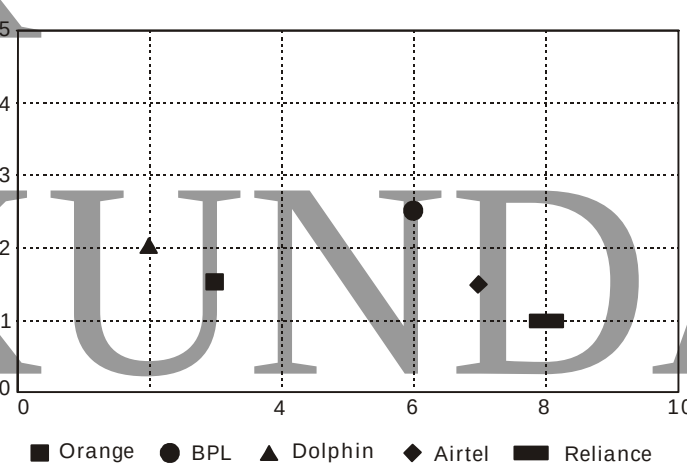


Figure (i) shows share of various telecom companies in Indian market.
Figure (ii) shows % of pre-paid and post-paid customers of various plans of various companies.
Figure (iii) shows average number of SMS sent in a day (*x*-axis) by customers and its cost in Rs (*y*-axis).

1. What is the ratio of the number of BPL pre-paid plan 2 customers to the number of Idea post-paid plan C customers?
   1) 9 : 10 2) 10 : 9 3) 40 : 9 4) 9 : 40
2. Which of the following is true?
   I. The total income of Airtel through SMS in a day is Rs 33 lakhs.
   II. The number of Dolphin pre-paid plan 1 customers is equal to that of AT&T post-paid plan C customers.
   III. The amount collected by Reliance through SMS is greater than that by Orange, in a week.
   IV. The number of Orange post-paid customers is equal to the number of Idea pre-paid customers.
   1) Only I 2) Only I and III 3) Only II and IV 4) Only I, III and IV
3. What is the difference between the number of BPL post-paid plan A customers and that of Idea pre-

paid plan 3 customers?

1) 0.79 lakh 2) 0.87 lakh 3) 0.95 lakh 4) 1.13 lakhs

4. Orange and BPL pre-paid customers send 4 SMS in a day. Then what is the approximate ratio of the incomes of Orange and BPL from SMS service given to post-paid customers?

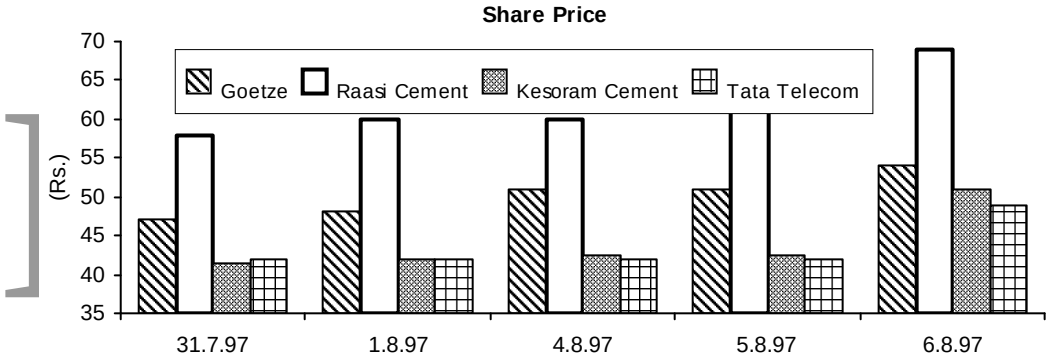
   1) 1 : 2 2) 2 : 3 3) 1 : 3 4) 2 : 5

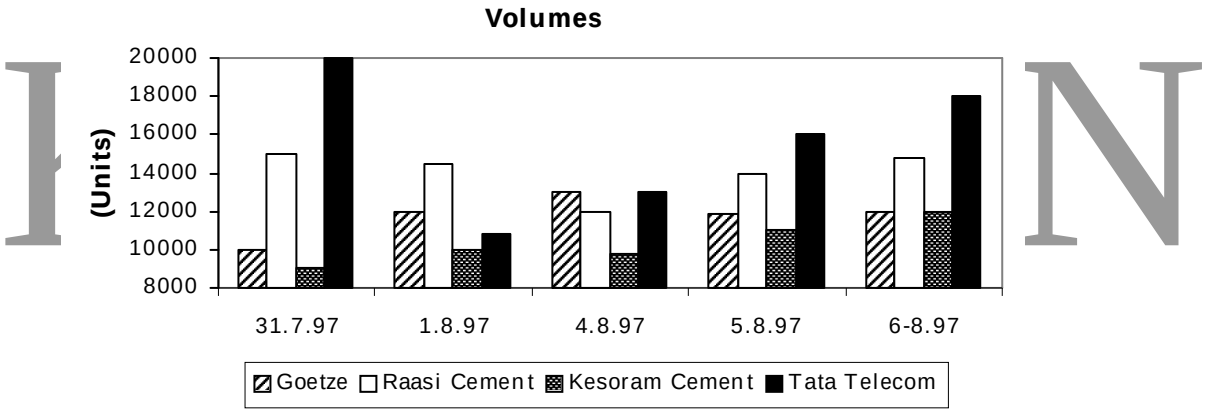
5. Reliance announced an attractive offer for pre-paid customers and 20% of BPL post-paid customers accepted this new offer. Then what would be the ratio of the numbers of pre-paid and post-paid customers for Reliance?

   1) 5 : 13 2) 5 : 7 3) 7 : 9 4) 7 : 13

Directions (Q. 6-10): Refer to the bar-graphs below and answer the questins that follow.

Movement of share prices of four companies in five trading sessions and the volumes on these sessions.





6. Which of the following scrips shows the highest increase in the share price between 31/7 and 6/8 and by how much?

   1) Goetze → 9.5 2) Raasi → 11

   3) Tata Telecom → 7 4) Kesoram → 10

7. Which of the following scrips clocks the highest turnover on 31/7?
   (Turnover = Volume × Share price)

   1) Goetze 2) Raasi 3) Kesoram 4) Tata Telecom

8. Which of the following sets of scrips has shown an increase in volumes from 31/7 to 6/8?

   1) Goetze, Raasi 2) Raasi, Kesoram

   3) Kesoram, Goetze 4) Raasi, Tata Telecom

9. What is the percentage change in the turnover of Tata Telecom from 31/7 to 6/8?

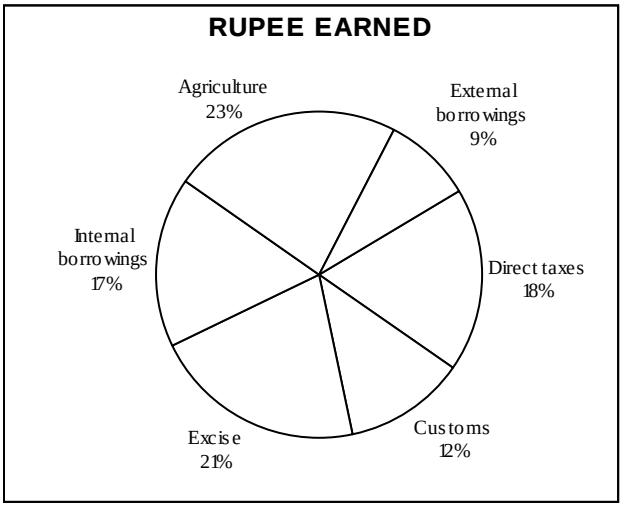
   1) -5% 2) -9% 3) 5% 4) 9%

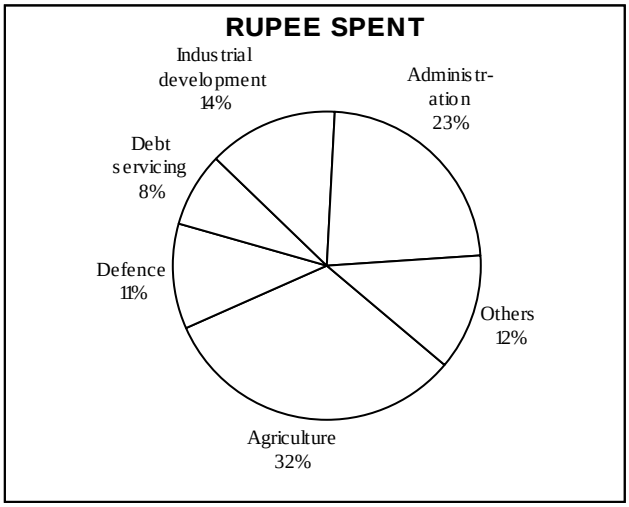
10. The price of which of the following scrips shows the highest percentage increase from 31/7 to 6/8?
    1) Goetze 2) Raasi 3) Kesoram 4) Tata Telecom

Directions (Q. 11-15): Refer to the pie-charts below and answer the questions that follow.

YEAR 1999-2000

BREAK-UP OF NATIONAL INCOME AND NATIONAL EXPENDITURE





11. If debt service ratio = $\frac{\text{debt servicing cost}}{\text{national income}}$, by what percentage should agricultural income rise (keeping all other incomes constant) so as to bring the debt-service ratio to 7.5%?
    1) 7% 2) 29% 3) 40% 4) 125%
12. If it is known that out of total external borrowings, 65% is spent on industrial development, 28% on defence, and the rest on debt servicing, then what is the component of foreign finance in industrial development? (Assume rupees earned = rupees spent)
    1) 74% 2) 53% 3) 42% 4) 27%
13. If the total collection by way of direct taxes in 1999-2000 was estimated at Rs 123,000 million, how much extra money was pumped into the agricultural sector during 1999-2000? (Assume rupees earned = rupees spent)
    1) Rs 20,000 million 2) Rs 47,000 million 3) Rs 61,500 million 4) Rs 72,000 million
14. If the internal borrowings are to be decreased by 50%, by what per cent should the rupee earned from other resources be increased if external borrowings cannot be increased?
    1) 14.5% 2) 20% 3) 30% 4) 17%
15. If the sectoral allocation is to change so that our country spends as much on industrial development as on agriculture (with total spending on industrial development and agriculture remaining the same), then the allocation of agricultural sector should reduce by approximately
    1) 28.13% 2) 17% 3) 36% 4) 28%

Answers and explanations

1. 2; $\frac{\text{Number of BPL prepaid plan 2 customers}}{\text{Number of Idea postpaid plan C customers}} = \frac{0.2 \times 0.1}{0.09 \times 0.2} = \frac{10}{9}$

2. 2; Number of Airtel customers = 0.17 × 1850000
   Total income of Airtel through SMS = 7 × 1.5 × 0.17 × 1850000 ≈ 33,00,000
   ∴ Statement I is true.

Percentage of Dolphin pre-paid plan 1 customers = 15 × 0.15 = 2.25%
Percentage of AT&T post-paid plan C customers = 8 × 0.15 = 1.2%
$\therefore$ Statement II is false.
Amount collected by Reliance through SMS in a week (A) = 0.18 × 1850000 × 1 × 8 × 7
Amount collected by Orange through SMS in a week (B) = 0.13 × 1850000 × 1.5 × 3 × 7
A > B $\Rightarrow$ Statement III is true.
Percentage of Orange post-paid customers = 0.13 × 40 = 5.2%.
Percentage of Idea pre-paid customers = 0.09 × 40 = 3.6%
$\therefore$ Statement IV is false.

3. 4; Number of BPL post-paid A customers = 0.2 × 0.35 × 1850000
Number of IDEA pre-paid plan 3 customers = 0.09 × 0.1 × 1850000
$\therefore$ Difference = (0.07 - 0.009) × 1850000 = 0.061 × 1850000 $\approx$ 1.13 lakhs.

4. 1; Orange and BPL pre-paid customers send 4 SMS in a day.

$\therefore$ Average number of SMS sent in a day by Orange post-paid customers = $\frac{3\times100-4\times60}{40}=1.5$

Averate number of SMS sent in a day by BPL post-paid customers = $\frac{6\times100-4\times30}{70}=\frac{48}{7}$

$\therefore \frac{\text{Income from Orange post - paid customers}}{\text{Income from BPL post - paid customers}} = \frac{1.5\times1.5\times13\times40}{\frac{48}{7}\times2.5\times20\times70}=\frac{13\times90}{2400}=\frac{39}{80}\approx\frac{1}{2}$

5. 3; In overall customer base, percentage of Reliance pre-paid customers = 18 × 0.35 = 6.3%
Percentage of Reliance post-paid customers = 18 × 0.65 = 11.7%
Increase in Reliance pre-paid customers in terms of percentage of overall customer base

$= 20\times\frac{70}{100}\times\frac{20}{100}=2.8\%$

$\therefore$ New percentage of Reliance prepaid customers = 6.3 + 2.8 = 9.1%

$\therefore$ Ratio = $\frac{9.1}{11.7}=\frac{7}{9}$.

6. 2; By observation, Raasi Cement shows the highest increase in the share price.

7. 2; By observation, it is either Tata or Raasi.
Tata's turnover = 20,000 × 42 = Rs 840,000
Raasi's turnover = 15,000 × 58 = Rs 870,000
Hence, Raasi's turnover is highest on 31/7.

8. 3; By observation, it is Goetze and Kesoram.

9. 3; Tata's turnover on 31/7 was Rs 840,000. On 6/8, it was 49 × 18,000 = Rs 882,000.

Percentage change = $\frac{882000-840000}{840000}=5\%$

10. 3; By observation, it is either Raasi or Kesoram.

For Raasi, % increase = $\frac{69-58}{58}\approx19\%$

For Kesoram, % increase = $\frac{50-41.5}{41.5}=20\%$

11. 2; Debt service ratio = $\frac{\text{Debt servicing cost}}{\text{National Income}}$

To bring down the ratio from 8% to 7.5%, national income must rise by $\frac{8}{7.5}$,

ie $\frac{16}{15}$ times, ie by $\frac{1}{15} \times 100 = 6.67\%$

All other income except Agriculture remains constant.

Agricultural income should rise by $\frac{6.67}{23} \times 100 = 29\%$

12. 3; External borrowing = 9% of resources available.

65% of external borrowings spent on industrial development

$$= \frac{65}{100} \times 9\% = 5.85\% \text{ of total resources.}$$

Assuming the budget to be a zero-deficit one, ie rupee earned - rupee spent = 0, we find the proportion of foreign finance (external borrowings) in industrial development

$$= \frac{5.85}{14} \times 100 = 42\%.$$

13. 3; Again, assuming a zero-deficit budget, 18% of rupee earned = 123,000 million.

Extra money pumped = 32% - 23% = 9%, which is $\frac{9}{18} \times 123{,}000$ = Rs 61,500 million..

14. 1; Internal borrowings are decreased by 50%.

$\therefore$ Internal borrowings = 0.5 × 17 = 8.5

External borrowings cannot be increased.

$\therefore$ Rupee earned by other resources should increase by $\frac{8.5}{74} \times 100 = 14.5\%$

15. 1; Total spend on agriculture and industry = 32 + 14 = 46%

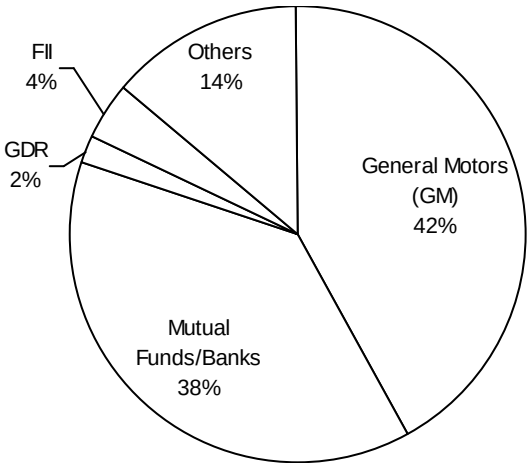
$\therefore$ If total spendings on industry and agriculture are the same then 23% will be spent on each.

$\therefore$ Required reduction = $\frac{9}{32} \times 100 = 28.13\%$

Practice Exercise 6

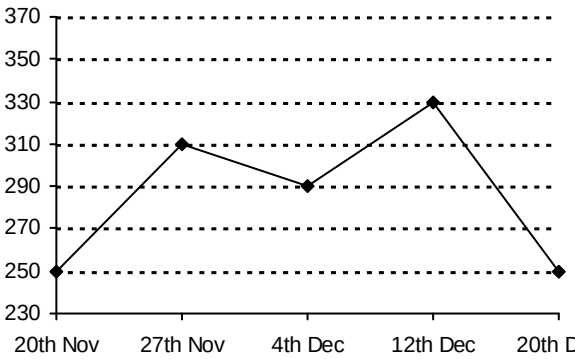
Directions (Q. 1-4): These questions are based on the graphs given below.

Percentagewise break-up of the shareholding pattern of United Lever (for the period 20th Nov to 20th Dec 2003)

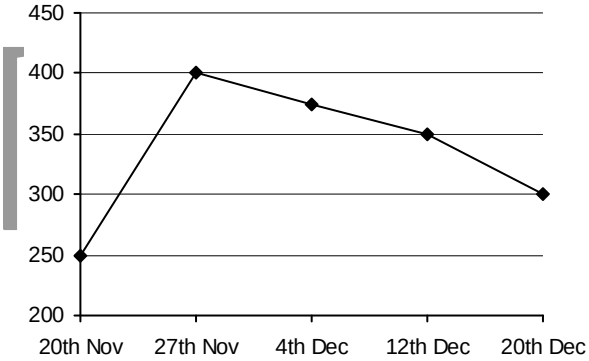


GDR = Global Depository Receipts
FII = Foreign Institutional Investors

Market value of a United Level share from 20th Nov to 20th Dec of 2003 (in $)



Market value of a General Motors share from 20th Nov to 20th Dec of 2003 (in $)



1. What is the percentage increase in the value of GM's holding in United Lever from 10th Dec 2002 to 10th Dec 2003, given that the value of GM's holding in United Lever as on 10th Dec 2002 was 124.88 million dollars and the difference in the value of the shares of United Lever held in the form of GDRs and that of those held by FIIs as on 15th Dec 2003 was 17.84 million dollars?
   1) 100% 2) 200% 3) 300% 4) Cannot be determined
2. What is the number of shares of United Lever held by 'Others' as on 20th Dec 2003, given that the difference in the value of the shares of United Lever held by GM and Mutual Funds/Banks as on 20th Dec 2003 was 250 million dollars?
   1) 2.75 million 2) 3 million 3) 3.5 million 4) Cannot be determined
3. Which of the following statements are true as per the graphs given?
   1) The market value of a United Lever share is directly proportional to the market value of a General Motors share.
   2) The peak value attained by the United Lever share is exactly 80% of the peak value of the

General Motors share during the period 20th Nov to 20th Dec 2003.

3) The percentage decrease in the value of the United Lever scrip from 12th Dec to 20th Dec 2003 is less than the percentage decrease in the value of the GM scrip from 27th Nov to 20th Dec 2003.

4) None of these

4. The number of shares held by Mutual Funds/Banks on 29th Dec is what % more/less than the number of shares held by Others on 12th Dec in United Lever?

1) 39% more 2) 17% less 3) 24% more 4) Can't be determined

Directions (Q. 5-9): These questions are based on the table given below.

Model	No. of cylin-ders	Engine displace-ment (cc)	Max. Power (bhp)	Fuel tank cap. (litres)	Front Suspe-nsion	Rear Suspe-nsion	Boot space (litres)	Tyre Size (in mm)	Price on Road (in Rs lakh in Delhi)	Fuel consu-mption (km/L)	Kerb Wt (with Fuel in kg)
M800	8	796	39	60	H	LS	120	90	1.8	20	740
Zen	16	997	55	50	LS	MS	150	90	3.4	15	900
Alto	8	997	45	50	LS	MS	90	80	3	10	850
Santro	8	1016	60	30	LS	H	140	100	3.3	25	950
Palio	8	1457	60	80	LS	ITA	160	100	3.7	10	1200
Matiz	8	796	58	100	LS	LS	100	80	3.4	10	1000
Indica	8	980	62	120	LS	MS	140	80	3	35	1400
Siena	16	1600	100	140	MS	ITA	250	90	4.5	10	1500
Corsa	16	1392	70	200	MS	ITA	230	110	4.8	10	1400
Astra	16	1810	80	300	H	MS	300	110	5.2	15	1500
Mondeo	16	2600	120	100	H	MS	600	120	9.6	6	1750
Sonata	16	2600	120	250	MS	ITA	750	120	13.5	8	2200
Ikon	16	2400	90	170	H	MS	750	100	6.2	12	1300
Baleno	8	1900	65	290	MS	MS	800	90	7.5	10	1750
Mercedes	16	3800	220	420	MS	LS	1100	140	35	5	3000
Bolero	16	3500	140	300	LS	LS	1600	150	5.3	8	3500
Armada	16	2500	90	250	ITA	ITA	1800	160	7	14	2200
Corolla	16	2200	130	200	LS	MS	800	120	18.6	15	1800
Octavia	8	2300	170	175	MS	ITA	900	110	12.1	12	2000

H = Hydraulic; LS = Leaf Spring; MS = Mcpherson Struts; ITA = Independent Trailing Arm

5. If Cylinder size (in cc) = $\frac{\text{Engine displacement (in cc)}}{\text{Number of Cylinders}}$, what is the maximum cylinder size among the vehicles having a maximum power of less than 100 BHP?

1) 124.6 2) 237.5 3) 182.1 4) 287.5

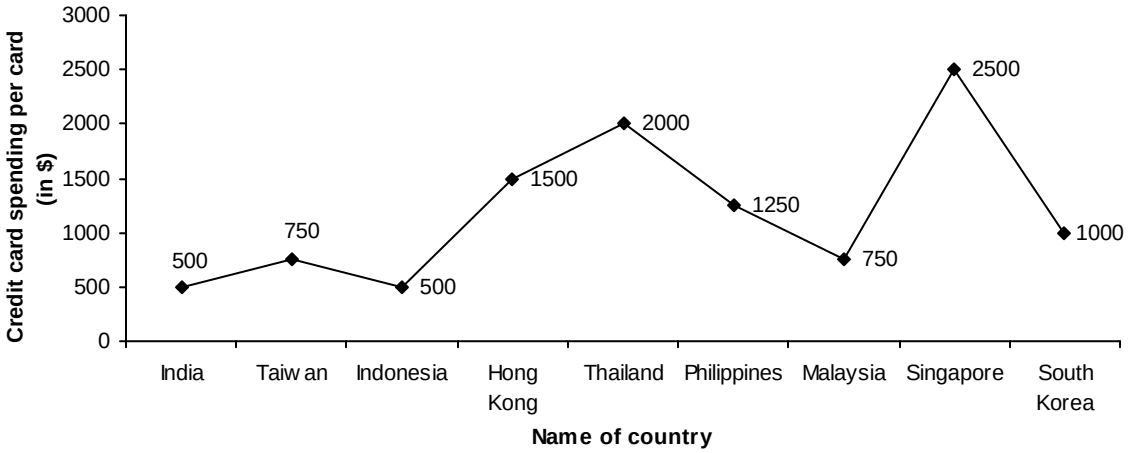
6. What percentage of the cars given in the table cannot finish a rally race which involves 2 legs each of length 900 km, given that each car is allowed to refuel only once during the rally after the start (all cars start the rally with a full tank of fuel)?
   1) 25% 2) 26% 3) 27% 4) 28%
7. How many cars here have a boot space-to-fuel tank capacity ratio of more than 2.9 and whose price is less than Rs 8 lacs?
   1) 9 2) 8 3) 7 4) 5
8. If all the cars are ranked on the basis of the number of revolutions of the tyre required to cover a distance of 1 km (top ranker makes the least number of revolutions), then find the average fuel consumption for the top six ranked cars?
   1) 11.66 km/litre 2) 9.33 km/litre 3) 10.20 km/litre 4) 6.54 km/litre
9. What is the ratio of the number of vehicles which have a kerb weight of less than 1200 kg and also use at least one leaf spring in their suspension to the number of vehicles whose engine displacement (in cc) is more than their kerb weight (in kg)?
   1) 5 : 14 2) 1 : 3 3) 2 : 5 4) 6 : 13

Directions (Q. 10-13): These questions are based on the table and the graph given below.

Statistics of Credit Card Expenditure (CCE) and Personal Consumption Expenditure (PCE) for various countries

Country	PCE (billion $)	CCE as % of PCE*
India	320	0.5
South Korea	214	36.0
Taiwan	195	12.0
Indonesia	100	1.8
Hong Kong	96	19.0
Thailand	64	4.0
Philippines	60	2.7
Malaysia	38	11.5
Singapore	12	40.0

Statistics regarding Credit Card usage in various countries



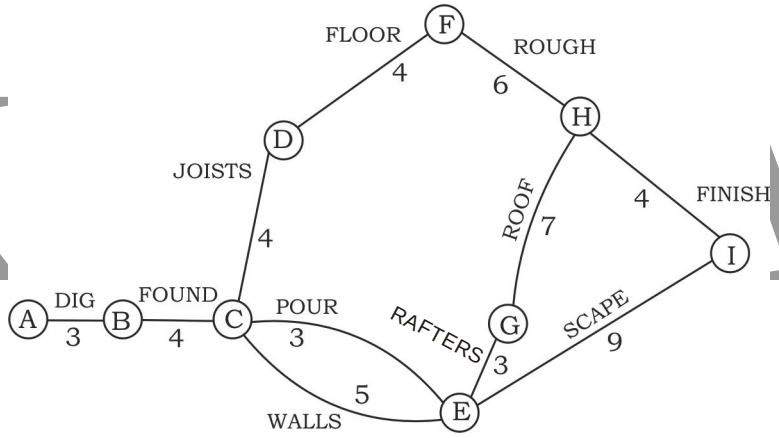
* All cards are used only for PCE.

Note: PCE is part of Gross Domestic Expenditure.

10. Assuming that every card holder has only one card, what is the total number of credit card holders in India?
    1) 3.2 lacs 2) 4 million 3) 7.5 lacs 4) None of these
11. If the Gross Domestic Expenditure (GDE) of the country whose CCE as a percentage of PCE is the highest, is Rs 2,400 billion dollars, then what percentage of the GDE of that country is spent through credit cards?
    1) 40% 2) 20% 3) 2% 4) 0.2%
12. What is the female population of Thailand given that the number of males and the number of females in Thailand are in the ratio of 3 : 1 and the number of credit cards in Thailand is 40% of the total population?
    1) 2.56 million 2) 3.2 million 3) 0.8 million 4) Cannot be determined
13. What is the value of the global gold market provided that India accounts for a sixth of it and 20% of the card spend in India is on purchase of gold, which in turn accounts for 5% of the total gold purchased in India?
    1) $ 22.6 billion 2) $ 60.5 billion 3) $ 38.4 billion 4) Cannot be determined

Directions (Q. 14-18): Refer to the chart below and answer the questions that follow.

The given diagram shows the number of hours taken to complete the various activities involved in constructing a house. Also, the sequence of the letters shows which activity is preceded strictly by which activity. For example, flooring takes 4 hours and can be done only after joisting.

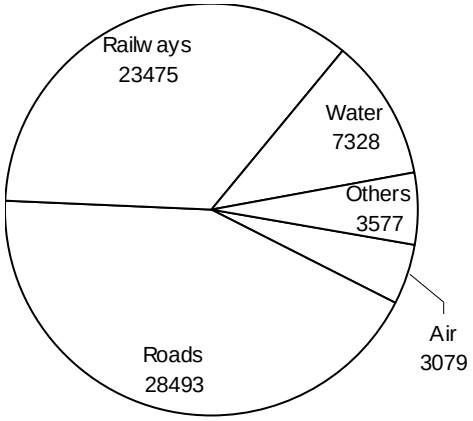


14. If a certain sequence of operations must take exactly one day, what operation must follow 'FOUND'?
    1) Walls 2) Joists 3) Pour 4) Scape
15. In the sequence which takes one day, the process of roofing is replaced with the process of flooring. What relation does the time taken now have with the time taken in the minimum time-taking sequence?
    1) Greater than the minimum time-taking sequence
    2) Less than the minimum time-taking sequence
    3) Both are equal
    4) No relation
16. If A and I are always to be included, which of these are essential operations?
    1) Dig 2) Found
    3) Scape 4) There is more than one essential operation.

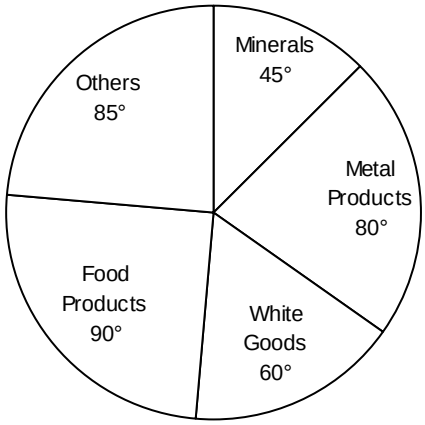
17. If all the operations are to be covered such that one always moves from node to node, and no operation is repeated, then which node will one end at, if the conditions given in the question are followed?
    1) H 2) F 3) I 4) Such a sequence is not possible.
18. What is the time taken by the sequence requiring the maximum time as a percentage of the time taken by all the operations together?
    1) 48% 2) 50% 3) 46% 4) 44%

Directions (Q. 19-23): Refer to the charts below and answer the questions that follow.

Transport of goods in India in 2001 (in Rs crores)



Commodities Transported



Zonal Distribution of Railways	
Northern Railway	17%
Western Railway	33%
Southern Railway	26%
Eastern Railway	15%
North-Eastern Railway	9%

19. What is the central angle corresponding to water in the pie-chart showing various modes of transport?
    1) 36° 2) 40° 3) 45° 4) 60°
20. What per cent of the total transport of goods in India is contributed by Northern Railway?
    1) 6% 2) 5% 3) 7.5% 4) Cannot be determined
21. If 40% of white goods are transported by roads, what per cent of goods transported by roads consist of white goods?
    1) 26% 2) 55.5% 3) 38.5% 4) 15.5%
22. If half of the minerals are transported by Eastern Railway, what per cent of goods carried by Eastern Railway consists of food products, white goods and metal products?
    1) 26% 2) 74% 3) 48% 4) Cannot be determined
23. In 2002, due to an increase in economic activity, total transporation of goods increases by 7% but the distribution of goods transported remains the same. Transport by Railways increases by 15% and the share of Western Railway increases to 38%. If 60% of goods transported by Western Railway consists of Food Products, what per cent of Food Products are transported by Western Railway?
    1) 50% 2) 22% 3) 35% 4) 38%

Answers and explanations

1. 2; Difference in GDR and FII in 2003 is 17.84 mn dollars, which represents 2% of United Lever's total share value.

$\Rightarrow$ 1% = \$ 8.92 mn

$\therefore$ 100% of United Lever in 2003 = \$ 892 mn

$\therefore$ GM's holding in 2003 = $\frac{892 \times 42}{100} = \$374.64$ mn

Increase in value of GM's holding from 2002 to 2003 = $\frac{374.64 - 124.88}{124.88} \times 100 = 200\%$

2. 3; Difference in the holding of GM and MF / Banks = 4%

4% of holding = \$ 250 mn

$\therefore$ 100% of holding = $\frac{250 \times 100}{4} = \$6250$ mn

Value of 1 United Lever share on 20th Dec 2003 = \$ 250

$\therefore$ Total no. of shares of United Lever on 20th Dec 2003 = $\frac{6250 \text{ mn}\$}{250\ \$} = 25$ mn

Number of shares held by others = $\frac{25 \times 14}{100} = 3.5$ million.

3. 3; Clearly, the market value of United Lever is not in tandem with GM market value. Hence choice (1) is false.

Peak value of United Lever is 330 as against peak value of GM, which is 400. The percentage is more than 80%.

Hence choice (2) is also false.

The percentage decrease in United Lever from 12th Dec to 20th Dec

$\Rightarrow \frac{80}{330} = \frac{8}{33} \times 100 < 25\%$

The percentage decrease of GM from 27th Nov to 20th Dec is $\frac{100}{400} \times 100 = 25\%$

United Lever scrip's decrease is less than GM's decrease.

4. 4; Since the total value of shares of United Lever on 20th Dec and 12th Dec is not given, hence data inadequate.

5. 2; For Torque to be maximum the value of Engine Capacity should be as high as possible and the number of cylinders as low as possible.

This is true in the case of Baleno.

Torque = $\frac{1900}{8} = 237.5$

6. 2; The total distance of 1800 km has to be covered using only one refuelling. For example for M800

Total distance travelled on Full Tank = 60 × 20 = 1200

$\Rightarrow$ M800 can cover a distance of 2400 km on one additional fuelling.

The number of cars that can complete the rally is 14.

The number of cars that cannot finish the rally is 5.

$\therefore$ % of cars that do not finish the rally = $\frac{5}{19} \times 100 = 26.31\%$

7. 4; By inspection, the number of cars satisfying the condition is 5.

8. 2; The car that requires the least number of revolutions has the largest tyre size. Hence cars with the maximum tyre size are ranked from 1-6. The cars that get this ranking are Armada (1),

Bolero (2), Mercedes E-320 (3). Corolla, Sonata and Mondeo have equal tyre size and hence complete the top six.

Average fuel consumption = $\frac{14+8+5+15+6+8}{6}$ = 9.33 km/litre

9. 2; The number of vehicles where weight is less than 1200 kg and which use a Leaf Spring in their suspension is 5. The number of vehicles whose engine displacement is more than their kerb weight is 15.

$\therefore$ The ratio is 5 : 15 = 1 : 3

10. 4; Total amount spent through cards = $\frac{320 \times 0.5}{100}$ = $ 1.6 bn

Average amount spent per card in India = $\frac{\$1.6 \text{ bn}}{\$500}$

Total number of cards = $\frac{16000 \times 100000}{500}$

Total number of cards = 3200000 = 3.2 mn

(1 bn = 1000 mn; 1 mn = 10 lacs)

11. 4; Country with highest card spend percentage is Singapore.

Total amount spent by cards = $\frac{12 \times 40}{100} = \$4.8$ bn

Amount spent by cards as a percentage of GDE = $\frac{4.8}{2400} \times 100 = 0.2\%$

12. 3; For Thailand, amount spent by credit cards = $\frac{64 \times 4}{100} = \$2.56$ bn

$\therefore$ Total number of credit cards = $\frac{\$2.56 \text{ bn}}{\$2000}$

$\therefore$ Total number of credit cards = $\frac{25600 \times 100000}{2000}$ = 1280000 = 12.8 lacs

Credit cards are 40% of total population

$\therefore$ Total population = $\frac{12.8 \times 100}{40} = 32$ lacs

$\therefore$ Number of females = $\frac{32 \times 1}{4} = 8$ lacs = 0.8 mn

13. 3; Total amount spent by card in India = $\frac{320 \times 0.5}{100} = \$1.6$ bn

Gold purchased through credit cards = $\frac{\$1600 \text{ mn} \times 20}{100} = \$320$ mn

$ 320 mn is 5% of the Indian gold market.

$\therefore$ Total value of gold purchased in India = $\frac{320 \times 100}{5} = \$6400$ mn

India is 1/6 of the Global Market.

$\therefore$ Global mrket = 6400 × 6 = $ 38400 mn = $ 38.4 bn

14. 3; The sequence which takes a total time of 24 hours is A – B – C – E – G – H – I.

In this path, the operation POUR follows FOUND.

15. 3; The given sequence takes 24 hours. If the process of roofing is replaced with that of flooring, it now takes 21 hours. The sequence which takes minimum time takes 21 hours (A - B - C - E - I). Thus, both are equal.
16. 4; If A and I are to be included, any sequence taken must always include 'DIG' and 'FOUND'. Thus there is more than one essential operation.
17. 4; A sequence which covers all operations in such a way that no operation is repeated is a sequence like A – B – C – E – C – D – F – H – G – E – I – H. However, the question specifies that E cannot precede C.
18. 2; Time taken by sequence requiring maximum time = 26 hours. (A-B-C-E-G-H-I)
    Total time for all operations = 52 hours.

    Required percentage = $\frac{26}{52} \times 100 = 50\%$
19. 2; Total goods transported by all modes = Rs 65952 crores
    Central angle corresponding to 'Water' in the pie chart showing various modes of transport

    $= \frac{7328}{65952} \times 360° = 40°.$
20. 1; Northern Railway forms 17% of total goods transported by railways in India.

    $\therefore$ Required percentage = $\frac{17}{100} \times \frac{23475 \times 100}{65952} = 6\%$
21. 4; White goods transported by roads $= \frac{60}{360} \times \frac{40}{100} \times 65952 = $ Rs 4396.8 crores

    White goods as percentage of goods transported by road = $\frac{4396.8}{28493} \times 100 \approx 15.5\%$.
22. 4; The composition of various goods transported by Eastern Railway is not given. Although the question includes Food Products, White Goods and Metal Products, the share of 'other' goods is not known.
23. 3; Total transport of goods = 65952 × 1.07 = 70568.64 crores

    Transport of food products = 70568.6 × $\frac{90}{360}$ = 17642.16 crores

    Transport of goods by Railways = 23475 × 1.15 = Rs 26996.25 crores

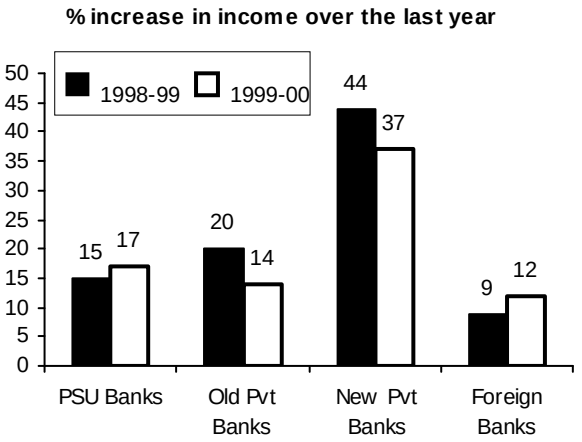
    Transport of goods by Western Railway = 26996.25 × $\frac{38}{100} = 10258.58$ crores.

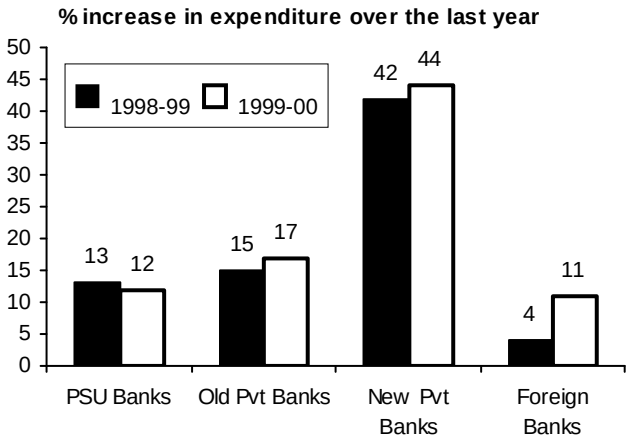
    Food Products transported by Western Railway = 60% of 10258.58 = 6155.15 crores

    $\therefore$ Percentage of Food Products transported by Western Railway = $\frac{6155.15}{17642.16} \times 100 \approx 35\%$.

Practice Exercise 7

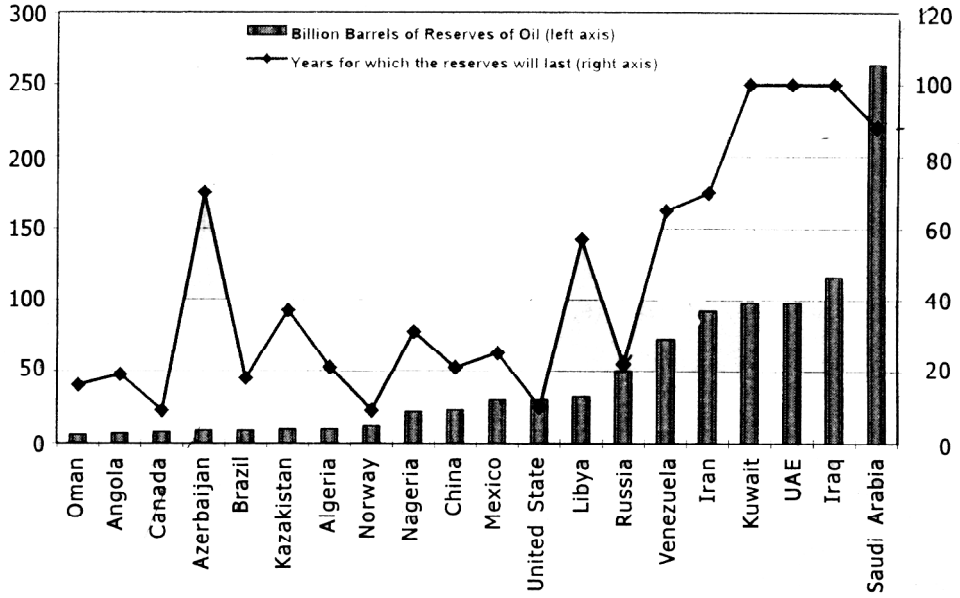
Direction (1-5): The bar graphs give the percentage increase in income and expenditure of various types of banks during a period of 2 years. Refer to the graphs to answer the questions that follow.

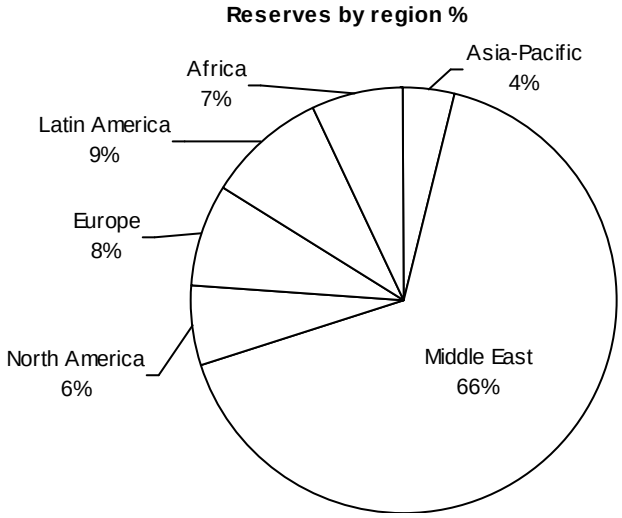




1. Let the income of the PSU Banks in 1997-98 be equal to Rs 500000 crores. If the expenditure of PSU Banks in 1999-00 is equal to the income of PSU Banks in 1997-98, then the income of PSU Banks in 1999-00 will be what per cent more than the expenditure of these Banks in 1998-99?
   1) 32% 2) 44%
   3) 56% 4) 64%
2. If the expenditure of Foreign Banks in 1997-98 is equal to their income in that year and is equal to Rs 30000 crores then, in 1999-00, what is the difference in income and expenditure for the foreign Banks?
   1) Rs 1500 crores 2) Rs 2000 crores
   3) Rs 15000 crores 4) Rs 20000 crores
3. Let the income of New Pvt. Banks in 1998-99 be Rs 4000 crores. If the expenditure of New Pvt. Banks in 1998-99 is the same as their income then the difference in incomes of New Pvt. Banks in 1998-99 and 1999-00 will be what per cent of the difference of expenditures of New Pvt. Banks in 1998-99 and 1999-00?
   1) 52% 2) 76%
   3) 84% 4) 118%
4. In 1998-99, if the income of PSU Banks is twice the expenditure of Foreign Banks then what will be the ratio of the income of PSU Banks to the expenditure of Foreign Banks in 1999-00?
   1) 1 : 2 2) 21 : 10
   3) 5 : 1 4) 1 : 5
5. In 1998-99, if the income of Foreign Banks is four times their expenditure, then what will be the ratio of the income to the expenditure of the Foreign Banks in 1999-00?
   1) 1 : 4 2) 4 : 1 3) 5 : 1 4) 1 : 5

Directions (Q. 6-9): The bar graph shows the oil reserves and the line graph shows the estimated number of years for which the reserves will last at the present oil extraction rates for various countries. The pie-chart shows the % distirbution of the oil reserves regionwise. Refer to the following graphs to answer the questions that follow.





6. What is the ratio of oil extracted by Saudi Arabia to that by Mexico per year (in billion barrels)?
   1) 0.4 2) 2.67
   3) 3.16 4) 15.23
7. If the oil reserves held by Saudi Arabia form 32% of the share of Middle East countries then what percentage share of global oil reserves is in Iraq?
   1) 20.92% 2) 16.82%
   3) 12.08% 4) 9.6%
8. What will be the difference between countries extracting maximum amount of oil to those extracting minimum amount of oil? (in billion barrels)
   1) 2.57 2) 2.85
   3) 2.14 4) 1.98
9. The ratio of the number of years for which the reserves will last to the total available reserves in billion barrels is maximum for
   1) USA 2) Saudi Arabia
   3) Azerbaizan 4) Iraq

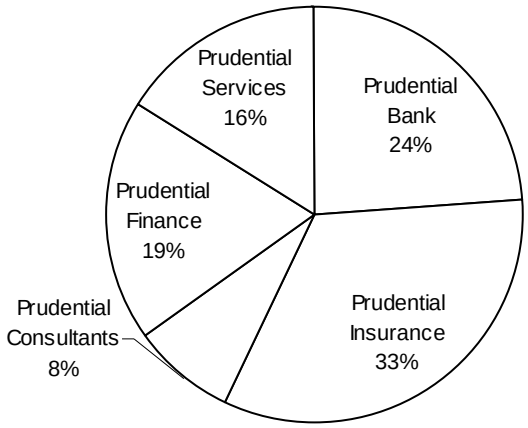
Directions (Q. 10-15): These questions are based on the following table.

Expected market of four brands of automobiles in the four metros
(In terms of percentage of number of units sold)

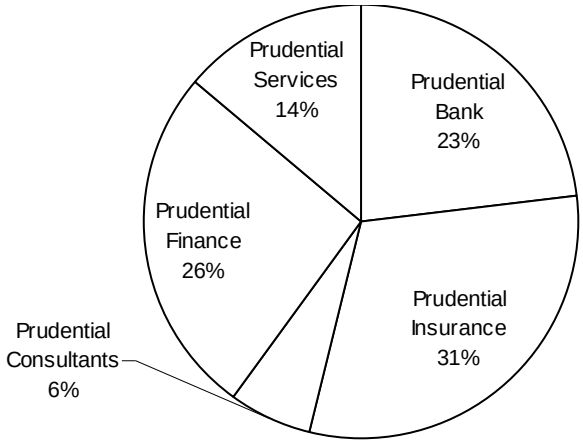
	Mumbai		Delhi		Calcutta		Madras	
	1996	1997	1996	1997	1996	1997	1996	1997
PAL-Peugeot	32	27	38	35	40	42	26	35
DCM-Daewoo	42	35	33	26	31	28	41	33
Opel Astra	19	27	24	32	23	23	29	26
Mercedes-Benz	7	11	5	7	6	7	4	6

10. What will be the average percentage increase in the market share of Opel Astra in the metros?
    1) 25%
    2) 9.5%
    3) 16%
    4) 5.5%
11. PAL-Peugeot's sales in the four metros have been
    I. always more than those of Opel Astra.
    II. always maximum in Calcutta.
    III. always increasing.
    1) I only
    2) I and II only
    3) I, II and III
    4) II only
12. If the combined sales of all four is expected to go from 11000 to 12500 in Mumbai between 1996 and 1997 the increase in Mercedes-Benz's revenues will show a _____ per cent growth, if the price were to go up by 12% in 1997.
    1) 10%
    2) 50%
    3) 75%
    4) 100%
13. Given that the cost of a PAL-Peugeot and a DCM-Daewoo is same, an Opel Astra costs twice as much as a PAL-Peugeot, and a Mercedes-Benz is twice as costly as a PAL-Peugeot, the net revenue from the four metros was maximum for
    1) PAL-Peugeot and DCM-Daewoo
    2) Opel Astra
    3) Mercedes-Benz
    4) Cannot be answered
14. If in 1996 sales were 11000, 10000, 9000 and 8000 respectively in the four metros, then the following are almost equal:
    1) PAL-Peugeot sales in Mumbai and Calcutta
    2) DCM-Daewoo sales in Delhi and Madras
    3) Opel-Astra sales in Mumbai and Madras
    4) Mercedes-Benz sales in Delhi and Calcutta
15. The combined share of Opel Astra in Mumbai and Madras is 22%. The sales volume of Opel Astra in Mumbai is how many times that in Madras?
    1) $\frac{7}{3}$
    2) $\frac{5}{4}$
    3) $\frac{8}{5}$
    4) None of these

Directions (Q. 16-20): These are based on the following pie-chart given below:
Contributions of different companies to the turnover of Prudential Group of companies



1990



1995

1990: Prudential Insurance turnover was Rs 27 bn.

16. If the turnover of Prudential Insurance remained almost unchanged, the group turnover in 1995 was almost Rs
    1) 87 bn 2) 93 bn 3) 90 bn 4) 89 bn

Answer the questions **17 to 20** with reference to the data in question 16.

17. The turnover of Prudential Finance increased by
    1) 20% 2) 30% 3) 45% 4) 60%
18. If 40% of Prudential Consultants' revenue came from project exports, its income from domestic activity was (in 1990)
    1) 1 bn 2) 2 bn 3) 3 bn 4) 4 bn
19. The number of companies whose turnover decreased in 1995 as compared with 1990 was
    1) 1 2) 2 3) 3 4) 4
20. The company which showed the biggest percentage drop in turnover is
    1) Prudential Consultants 2) Prudential Insurance
    3) Prudential Services 4) Prudential Bank

Answers and explanations

1. 4; Income of PSU Banks in 1997-98 = Rs 500000 crores
   $\therefore$ Income of PSU Banks in 1998-99 = 500000 × 1.15 = Rs 575000 crores.
   And income of PSU Banks in 1999-00 = 575000 × 1.17 = Rs 672750 crores.
   Now, expenditure of PSU Banks in 1999-00 = Rs 500000 crores.

   Expenditure of PSU Banks in 1998-99 = $\frac{500000}{1.22}$ = Rs 409836 crores.

   Income is more than expenditure by 672750 - 409836 = Rs 262914 crores.

   Required % = $\frac{(672750-409836)}{409836}\times 100 = \frac{262914}{409836}\times 100 = 64.15\%$
2. 2; Here, expenditure of Foreign Banks in 1997-98 = Rs 30000 crores.
   Expenditure of Foreign Banks in 1998-99 = 30000 × 1.04 = Rs 31200 crores.
   Expenditure of Foreign Banks in 1999-2000 = 31200 × 1.11 = Rs 34632 crores.
   And income of Foreign Banks in 1997-98 = Rs 30000 crores.
   Income of Foreign Banks in 1998-99 = 30000 × 1.09 = Rs 32700 crores.
   Incomes of Foreign Banks in 1999-2000 = 32700 × 1.12 = Rs 36624 crores.

$\therefore$ required difference = 36624 - 34632 = Rs 1992 crores

3. 3; $\because$ Income of New Pvt. Banks in 1998-99 = Rs 4000 crores

$\therefore$ Income of New Pvt. Banks in 1999-00 = 4000 × 1.37 = Rs 5480 crores

Difference = 5480 - 4000 = Rs 1480 crores

Again, expenditure of New Pvt. Banks in 1998-99 = Rs 4000 crores

$\therefore$ Expenditure of New Pvt. Banks in 1999-00 = 4000 × 1.44 = Rs 5760 crores

Difference = 5760 - 4000 = Rs 1760 crores

$\therefore$ Required percentage = $\frac{1480}{1760} \times 100 = 84$

4. 2; Let the expenditure of Foreign Banks in 1998-99 = Rs x crores

Then income of PSU Banks in 1998-99 = Rs 2x crores

Then income of PSU Banks in 1999-00 = 2x × 1.17 = Rs 2.34x crores

And expenditure of Foreign Banks in 1999-00 = x × 1.11 = Rs 1.11x crores

$\therefore$ Required ratio = $\frac{2.34x}{1.11x} = \frac{2.1}{1} = 21 : 10.$

5. 2; Let expenditure of Foreign Banks in 1998-99 = P

Then income of Foreign Banks in 1998-99 = 4 P

And income of Foreign Banks in 1999-00 = 4P × 1.12 = 4.48 P

Expenditure of Foreign Banks in 1999-00 = P × 1.11 = 1.11 P

$\therefore$ required ratio = $\frac{4.48P}{1.11P} = \frac{4}{1}$

6. 2; Reserves of oil held by Saudi Arabia is for 88 years.

It means Saudi Arabia extracts $\frac{264}{88} = 3$ billion barrels of oil per year.

Similarly, for Mexico $\frac{28}{25}$ = 1.12 billion barrels of oil per year; thus required ratio is $\frac{3}{1.12} = 2.67$.

7. 4; For Saudi Arabia percentage of global oil reserves is $\frac{32}{100} \times 66 = 21.12$

For Iraq it would be $\frac{21.12}{264} \times 120 = 9.6$.

8. 2; The oil extraction of Saudi Arabia is 3 billion barrels per year while that of Azerbaijan is 0.15 billion barrels per year. Hence the difference will be 2.85 billion barrels.

9. 3; The ratio of the number of years for which the reserves will last to the total available reserves in billion barrels is maximum for Azerbaijan, ie $\frac{170}{5} = 34$.

10. 3; Average increase in market share of Opel Astra:

Increase in Bombay = $\frac{27 - 19}{19} \times 100 = 42\%$

Similarly, Increase in Delhi = 33%

Increase in Calcutta = 0%

Increase in Madras = = -11%

Thus average increase = (42 + 33 + 0 – 11)/4 = 16%.

11. 4; Only statement II holds good as of all the metro sales of PAL, it is maximum in Calcutta.

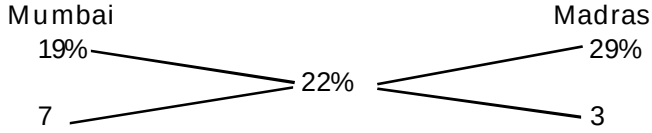
12. 4; Sales of Mercedes-Benz in 1996 = 7% of 11000 = 770 and in 1997 = 11% of 12500 = 1375. Since the prices increase by 10%, revenue in 1997 will be 1.12 × 1375 = 1540; a growth of 100% from 770.

13. 4; As the number of units sold is not known, the question can not be answered.
14. 2;

PAL	Mumbai: 11000 × 32% = 3520	Calcutta: 9000 × 40% = 3600
DCM	Delhi: 10000 × 33% = 3300	Madras: 8000 × 41% = 3280
Opel	Mumbai: 11000 × 19% = 2090	Madras: 8000 × 29% = 2320
Mere	Delhi: 10000 × 5% = 500	Calcutta: 9000 × 6% = 540

The closest is the sales of DCM.

15. 1; 22% is the weighted mean of percentage sale of Opel Astra in Mumbai and Madras respectively.



Required ratio of sales volume = 7 : 3.

$\therefore$ Sales volume in Mumbai is $\frac{7}{3}$ times that in Madras.

16. 1; Prudential Insurance turnover = Rs 27 billion, which forms 31% in 1995.

Thus total turnover in 1995 = $\frac{100}{31} \times 27$ = 87.09 = 87 bn.

17. 3; In 1990, turnover of Prudential Insurance = 27 bn, which forms 33% of total turnover.

Total turnover = $\frac{100}{33} \times 27$ = 81.8 bn. = 82 bn.

Prudential Finance turnover increased by (26% of 87 - 19% of 82) / 19% of 82 = 45%.

18. 4; In 1990, income of Prudential Consultants = $\frac{8}{100} \times 82$ = 6.56 bn

Thus domestic income = 60% of 6.56 = 3.93 = 4 bn.

19-20: Decrease of Prudential Consultants = $\frac{6.56 - 5.22}{6.56} \times 100 \approx 20\%$

Decrease of Prudential Services = $\frac{16\% \text{ of } 82 - 14\% \text{ of } 87}{16\% \text{ of } 82} \approx 7\%$ drop.

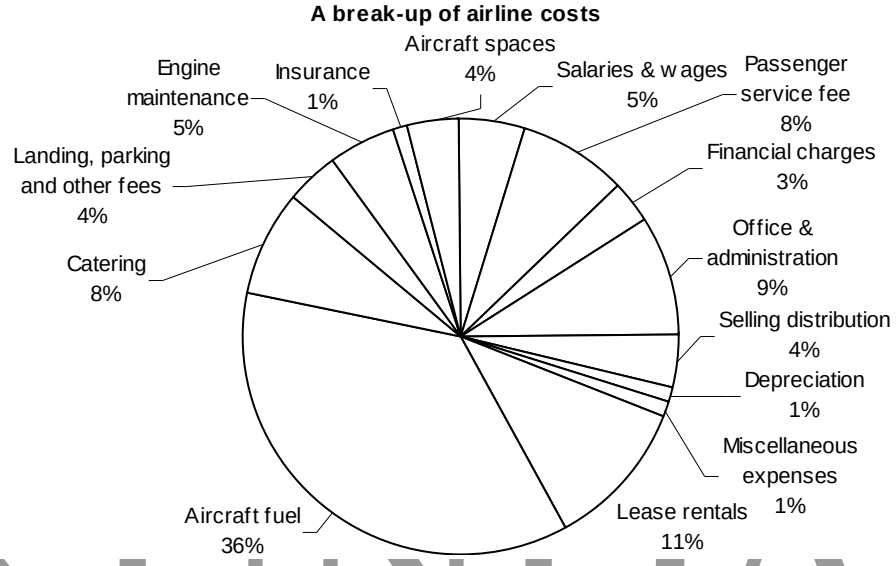
Thus there is decrease in turnover of Prudential Consultants and Prudential Services only.

19. 2 20. 1

Practice Exercise 8

Directions (Q. 1-2): Refer to the pie-charts below and answer the questions that follow.

Revenue of Jet Airways 2000-2002		
Year	Total cost as a percentage of revenue	Total revenue (Rs crore)
2000-01	85	12562
2001-02	94	15872



Note: The break-up of the airline costs is the same in both the years.

1. What is the percentage change in the Landing, Parking and Other fees in 2001-02 over 2000-01?
   1) 20% 2) 30% 3) 40% 4) 45%
2. What is the average cost of the Passenger Service Fee and Aircraft Spaces for both the years (in Rs crores)?
   1) 1385 2) 1536 3) 1825 4) 1575

Directions (Q. 3-6): Refer to the table below and answer the questions that follow.

Given below is the production cost and the price per unit of a product and also the number of units produced at that cost and price.

Units	50	100	150	200	250	300	350	400
Price per unit (Rs)	22	19	17	16	14	12	11	10
Cost per unit (Rs)	21	18	16.5	15	13.25	11	9	8.5

Value = Quantity × (Price - cost)

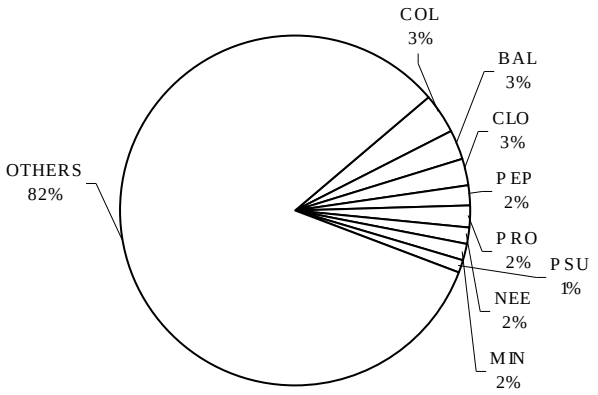
3. For the quantity with how many units is the value highest and how much is it?
   1) 200, 200 2) 400, 600 3) 350, 700 4) Can't be determined

4. If the factory operated in such a manner that it produced 50 units on first day and then 100, 150, ... 400 till the 8th day, what was the value (average) generated per unit of the product in the period of 8 days?
   1) Rs 1.23 2) Rs 1.46 3) Rs 1.09 4) Rs 1.14
5. What has been the average daily growth rate in the value for the given period (Use the data from the previous question)?
   1) 74% 2) 29% 3) 136% 4) 157%
6. Which of the following is not true?
   1) The highest cost-to-price ratio is at a production of 150 units.
   2) The average cost-to-price ratio for the given 8 levels is approximately 0.927 : 1.
   3) Average value for the given 8 levels is approximately Rs 276.5.
   4) All the above are false.

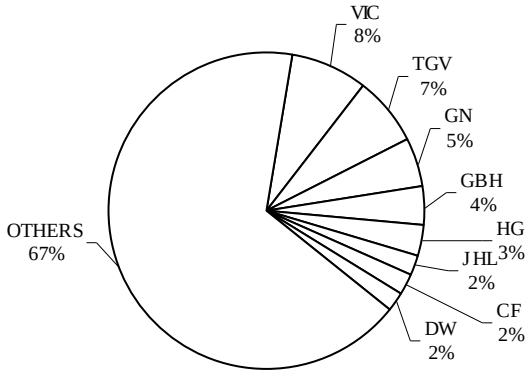
Directions (Q. 7-9): Refer to the charts below and answer the questions that follow.

Given below are two pie charts and a bar graph. The first pie chart gives the usage (in percentage) of leading Indian toothpaste brands, and the second pie chart gives the usage of leading Indian mouthwashes as a percentage of the total usage of all mouthwashes. The bar graph gives the sales as well as usage of mouthwashes, toothpastes and dental powder as percentages of population in Kolkata. Assume that the individual distribution of mouthwashes and toothpastes in the Others category is very small. Do not assume that all graphs represent the same total number of people.

Usage of Toothpastes

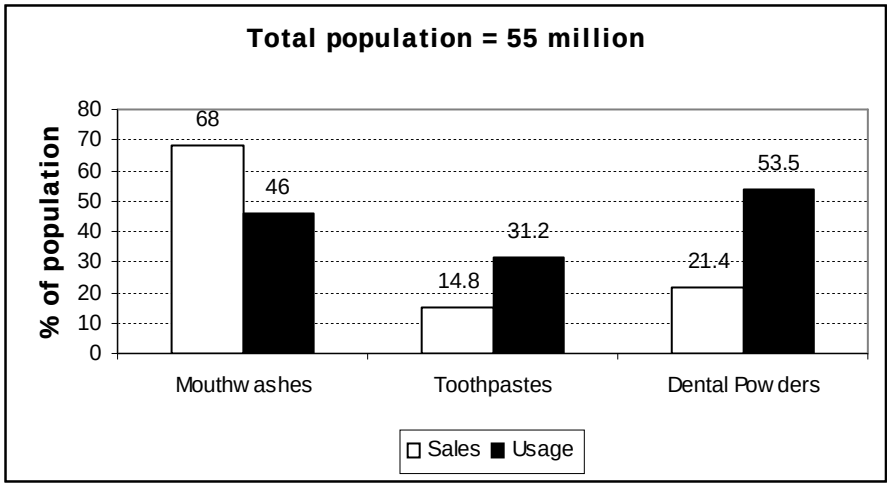


Usage of Mouthwashes



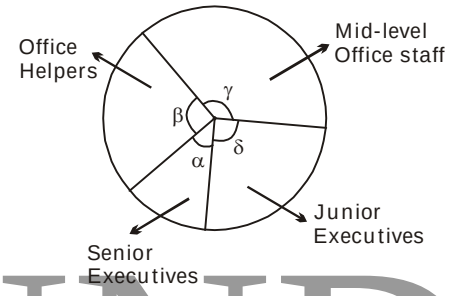
Total population = 50 million

Total population = 55 million

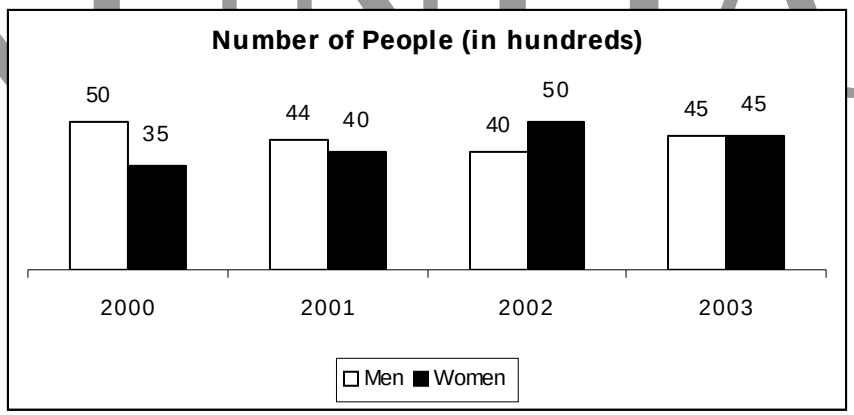


7. What is the ratio of the total usage of the top 4 brands of mouth washes to the total usage of toothpastes in Kolkata?
   1) 0.4 2) 0.5 3) 0.6 4) 0.7
8. If in Kolkata the sales of mouthwashes goes up by 20%, the sales of toothpastes goes down by 19% and the sales of dental powder goes up by 24%, then by what per cent will the total sales (of mouthwashes, toothpastes and dental powers) increase or decrease?
   1) 16.4% decrease 2) 15.3% increase 3) 14.4% decrease 4) 14.8% increase
9. A number N_i is defined such that N_i is equal to the difference between the number of people using the *i*th ranked mouthwash and the ith ranked toothpaste. The 1st ranked toothpaste/mouthwash is the one that has the highest sales. Consider the 'Others' category as one category.
   If $\sum_{i=1}^{9} N_i$ = number of people in Kolkata who are prospective dental powder users, then what is the ratio of the number of prospective dental powder users to the current users of dental powder in Kolkata? (If two ranks are same, consider the first one in the clockwise direction to be the higher ranked one).
   1) 0.39 2) 0.57 3) 0.23 4) 0.46

Directions (Q. 10-11): Refer to the charts below and answer the questions that follow.



Distribution of workforce



The above graphs are related to a company's statistics of its workforce. The workforce and men-women census for a given year is taken on 31st December in that year.

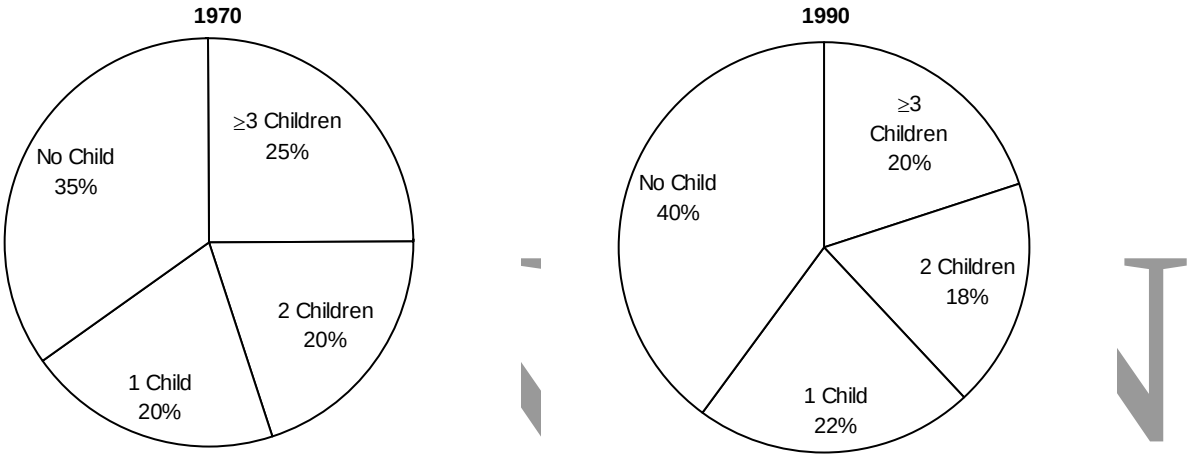
10. What was the net per cent increase in the number of women from the beginning of 2000 to that of 2003, and its ratio to the net per cent decrease in the number of men, for the same period?
    1) 28.5%, 2.85 2) 28.5%, 2.14 3) 42.8%, 2.14 4) 42.8%, 2.85
11. While making the workforce distribution chart for 2002, John, a junior executive, noticed something interesting. He noticed that the percentages of senior executives, office helpers and mid-level staff were in arithmetic progression. John also knew that people of his designation were

always one-fourth of the workforce. Find the value of $\alpha, \beta, \gamma, \delta$ for the year 2002. John also knows that there are 1125 senior executives in 2002.

1) (30, 90, 150, 90) 2) (45, 90, 135, 90) 3) (60, 90, 120, 90) 4) (15, 90, 165, 90)

Directions (Q. 12-13): The following table gives the number of households in a country during the period 1970-90 and the pie charts below show the distribution of households based on the number of children for the years 1970 and 1990. Refer to the table and pie charts to answer the questions that follow.

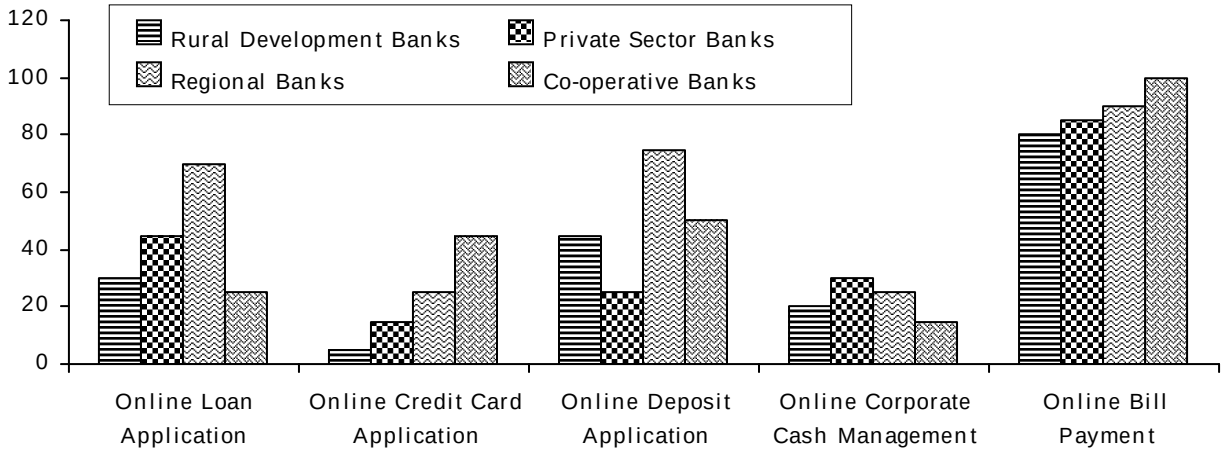
Year	No. of households (Million)	Year	No. of households (Million)	Year	No. of households (Million)
1970	120	1978	132	1986	150
1972	123	1980	135	1988	155
1974	126	1982	140	1990	160
1976	129	1984	145		



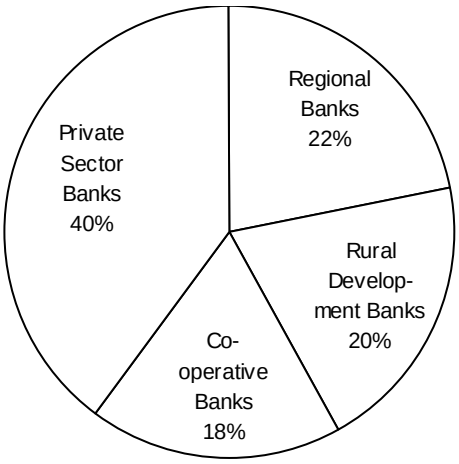
12. Which of the following statements about the households is true?
    1) There were more households with children in 1970 than in 1990.
    2) There were more households with 3 or more children in 1970 than in 1990.
    3) The number of households with two children decreased slightly from 1970 to 1990.
    4) None of the above
13. Assuming that the average number of children per household in 1970 was 3, how many households were without any children in 1970?
    1) 24 million
    2) 42 million
    3) 14 million
    4) Cannot be determined

Directions (Q. 14-16): Refer to the following bar graph and pie chart to answer the questions that follow.

The following bar graph shows the percentage of banks of different sectors providing Internet Banking facilities (five types of services)



Number of banks offering Internet Banking service in India (Total Banks = 600)



14. What is the ratio of the number of Regional Banks providing Online Deposit Application to total number of Regional Banks?
    1) 9 : 7 2) 7 : 9 3) 3 : 4 4) 4 : 3
15. The difference between the number of Private Sector Banks providing Online Bill Payment and the number of Regional Banks providing Online Corporate Cash Management is
    1) 171 2) 152 3) 165 4) 185
16. If the names of Rural Development Banks and Private Sector Banks are interchanged, what will be the difference in Rural Development Banks providing Online Credit Card Application after interchanging with original value?
    1) 30 2) 10 3) 12 4) 6

Directions (Q. 17-21): These questions are based on the following table which provides the profile of the batch of students of 2001 at IIM Bangalore.

Sex		
Male	Female	Total
147	33	180

Age			
19-24	24-26	>26	Total
115	60	5	180

Qualification (Graduate in)					
Arts	Commece	Science	Engg/Tech (Non IIT)	Engg/Tech (IIT)	Total
27	43	27	52	31	180

Work Experience (in months)						
0	< 12	12-24	24-36	36-48	> 48	Total
88	23	21	33	13	2	180

17. If all but 9 girls have no work experience, then the boys with no work experience at all form what percentage of the total students?
    1) 35.5% 2) 36.3% 3) 12.2% 4) 43.3%
18. If all the commerce and arts graduates in the batch take finance as their specialization, what percentage of the batch comprises finance specialists?
    1) 38.88% 1) 38.5% 3) 33.33% 4) Cannot be determined
19. If all the students with 3 years and more experience are engineering graduates and are more than 24 years in age and all of them except 4 are from the IITs then what is the ratio of IITians to non-IITians among the <3-year work experience category?
    1) 11: 4 2) 5 : 12 3) 11 : 24 4) Indeterminate
20. If all those with a non-Engg background are less than 24 years in age, then what percentage of those less than 24 years are engineers?
    1) 21.6% 2) 15.6% 3) 18.4% 4) 10%
21. If the batch of 2002 has 21.2% more girls than the previous batch, 10% of the girls are from an Engg (IIT) qualification and 20% of the girls are from Engg (non-IIT) background, then what is the ratio of the non-Engg girls to the total strength of the batch?
    1) 15.5% 2) 13.3% 3) 17.2% 4) Cannot be determined

Answers and explanations

1. 3; Total cost for 2000-01 = $0.85 \times 12562 \approx$ Rs 10680 crore
   Total cost for 2001-02 = $0.94 \times 15872 \approx$ Rs 14920 crore
   $\therefore$ Landing, parking and other fees for 2000-01 = $0.04 \times 10680 \approx$ Rs 430
   $\therefore$ Landing, parking and other fees for 2001-02 = $0.04 \times 14920 \approx$ Rs 600
   $\therefore$ Percentage change = $\frac{170}{430} \times 100 \approx 40\%$
2. 2; Total cost of aircraft spaces $0.04 \times (10680 + 14920) \approx$ Rs 1024
   Total cost of passenger fees $0.08 \times (10680 + 14920) \approx$ Rs 2048
   $\therefore$ Average = Rs 1536 crore.
3. 3; The values generated in all the quantities are
   $(22 - 21) \times 50 = 50$
   $(19 - 18) \times 100 = 100$
   $(17 - 16.5) \times 150 = 75$
   $(16 - 15) \times 200 = 200$
   $(14 - 13.25) \times 250 = 187.5$
   $(12 - 11) \times 300 = 300$
   $(11-9) \times 350 = 700$
   $(10 - 8.5) \times 400 = 600$
   So, 350 and 700 is the answer.
4. 1; The total quantity produced in 8 days: 50 + 100 + ... + 400 = 1800 units.
   And the value generated = 50 + 100 + 75 + 200 + 187.5 + 300 + 700 + 600
   Average value generated per unit = Rs 2212.5 = $\frac{2212.5}{1800}$ = Rs 1.23.

5. 4; From Rs 50 it went up to Rs 600 in given 7 days.
So, 1100% is the growth in 7 days.

Average daily growth rate = $\frac{1100}{7} = 157\%$

6. 4; (1) is true. $\frac{16.5}{17}$ is the highest.

(2) is also true as the average cost is $\frac{112.5}{8}$ and average price is $\frac{121}{8}$.

(3) is also true as it is $\frac{2212}{8}$ = 276

(4) is not correct.

7. 4; The top 4 brands of mouthwashes are VIC, TGV, GN and GHB, which account for a total of

8 + 7 + 5 + 4= 24% = $\frac{24}{100} \times 50$ = 12 million.

Total usage of toothpastes = $\frac{31.2}{100} \times 55$ = 17.16 million

$\therefore$ Required ratio = $\frac{12}{17.16} = 0.699 \approx 0.7$.

8. 2; Sales of mouthwashes goes up to 68 × 1.2 = 81.6%
Sales of toothpastes falls to 14.8 × 0.81 = 11.988%
Sales of dental powder goes up to 21.4 × 1.24 = 26.536%
Initial sales = 104.2%
New sales = 120.124%

$\therefore$ Percentage change = $\frac{120.124 - 104.2}{104.2} \times 100 = 15.28\%$.

9. 1; N_1 (Others category) = 36 - 33.5 = 2.5 million

$\left[\because \frac{67}{100} \times 50 = 33.5\right]$

N_2 = 4 - 1.6 = 2.4 million (COL and VIC)

N_3 = 3.5 - 1.2 = 2.3 million (BAL and TGV)

N_4 = 2.5 - 1.1 = 1.4 million (CLO and GN)

N_5 = 2 - 1.8 = 1.2 million (PEP and GHB)

N_6 = 1.5 - 0.8 = 0.7 million (PRO and HG)

N_7 = 1 - 0.7 = 0.3 million (NEE and JHL)

N_8 = 1 - 0.7 = 0.3 million (MIN and CF)

N_9 = 1 - 0.5 = 0.5 million (PSU and DW)

$\therefore \sum_{i=1}^{9} N_i$ = 2.5 + 2.4 + 2.3 + 1.4 + 1.2 + 0.7 + 0.3 + 0.3 + 0.5 = 11.6 million

Current users of dental powder = $\frac{53.5}{100} \times 55$ = 29.43 million.

The required ratio = $\frac{11.6}{29.43}$ = 0.39.

10. 1; Percentage increase for women = $\frac{45-35}{35}\times 100 \approx 28.5\%$

Percentage decrease for men = $\frac{50-45}{50}\times 100 = \frac{1}{10}\times 100 = 10\%$

$\therefore$ Ratio = 2.85.

11. 2; Since the number of Senior Executives (S), the number of office helpers (H) and the number of mid-level staff (M) are in AP, we can write:
S = a - d, H = a, M = a + d
As junior executives are one-fourth of the workforce,

$\delta = 90^0\left(=\frac{1}{4}\times 360^0\right)$

$\therefore$ S + H + A = 360 - 90 $\Rightarrow$ 3a = 270 $\Rightarrow$ a = 90 $\Rightarrow$ β = 90°

Percentage of senior executives = $\frac{1125}{5000+4000}\times 100 = \frac{1125}{9000}\times 100 = 12.5\%$

$\therefore\ \alpha = \frac{12.5}{100}\times 360 = 45^0$

$\therefore$ d = 45° $\Rightarrow$ M = 135°. Hence, (2).

12. 4; Let us examine the statements
Statement 1: Number of households with children :

in 1970 : $\frac{120\times(100-35)}{100}$ million = 78 million

in 1990 : $\frac{160\times(100-40)}{100}$ million = 96 million

This statement is not true.
Statement 2: Number of households with 3 or more children:

in 1970 : $\frac{120\times 25}{100}$ million = 30 million

in 1990 : $\frac{160\times 20}{100}$ million = 32 million

Statement 3: Number of households with 2 children:

in 1970: $\frac{120\times 20}{100}$ million = 24 million

in 1990: $\frac{160\times 18}{100}$ million = 28.8 million

This statement is also not true. Hence statement 4 is true.

13. 2; Number of households without children in 1970 = $\frac{120\times 35}{100}$ = 42 million.

(The information that the average number of children per household in 1970 was 3 is not required for answering the question).

14. 3; Number of Regional Banks providing Online Deposit Application = $\frac{75}{100}\times 132 = 99$

Required ratio = $\frac{99}{132} = \frac{9}{12} = \frac{3}{4}$.

Quicker Approach: Required ratio = $\frac{75}{100} = \frac{3}{4}$

15. 1; Number of Private Sector Banks providing Online Bill Payment = $\frac{85}{100} \times 240 = 204$

Number of Regional Banks providing Online Corporate Cash Management = $\frac{25}{100} \times 132 = 33$

Required difference = 204 - 33 = 171.

16. 1; Number of Rural Development Banks providing Online Credit Card Application originally

$= \frac{5}{100} \times 120 = 6$

Number of Rural Development Banks providing the same function after interchanging

$= \frac{15}{100} \times 240 = 36$

$\therefore$ the required difference = 36 - 6 = 30.

17. 1; Total number of girls = 33

with work experience = 9

$\therefore$ No work experience = 24 girls

Boys with no work experience = 88 - 24 = 64

$\therefore$ percentage of boys with no work experience = 64 / 180 × 100 = 35.5%

18. 4; All commerce and arts graduates take finance as specialization but nothing is mentioned about others. Apart from arts and commerce graduates, others may opt finance.

Hence, can't be determined.

19. 2; Students with >3 years experience = 13 + 2 = 15

IITians with >3 years experience = 15 - 4 = 11

IITians with <3 years experience = 31 - 11 = 20

Non-IITians with >3 years experience = 4

$\therefore$ Non-IITians with <3 years experience = 52 - 4 = 48

Answer = 20 : 48 = 5 : 12

20. 2; Non-Engg background = 180 – 83 = 97

Number of students who are <24 years old = 115

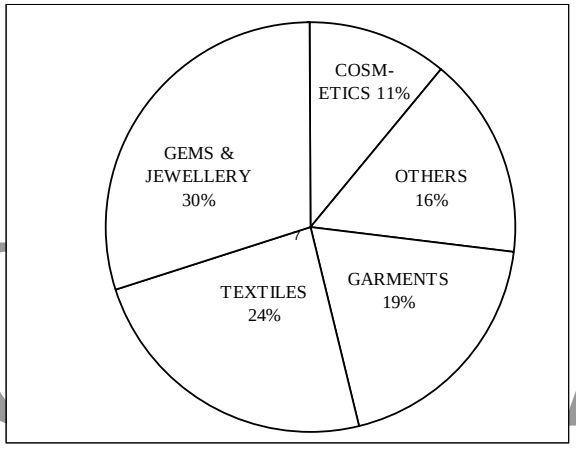
$\therefore$ Engineers = $\frac{115 - 97}{115} \times 100$ = 15.6%

Choices are far apart, so you can rule out options (1), (3) and (4)

21. 4; Data regarding strength of boys in the batch of 2002 is missing. As a result, we cannot estimate the total strength of the batch of 2002. Therefore, the answer cannot be determined.

Practice Exercise 9

Directions (Q. 1-4): The following bar graph shows the total Indian Export (in $ billion) during a period of 8 months. The pie chart shows the breakup of this Export during this period. Refer to the graphs to answer the questions that follow.



1. The exports of Textiles and Others in the month of July is approximately equal to the exports of Gems & Jewellery and Others in the month of
   1) April 2) August 3) October 4) November
2. What is the ratio of the exports of first four months to those of the last four months?
   1) 1.12 2) 0.89 3) 1.5 4) 0.75
3. If the target for the export of Gems and Jewellery for the complete year is set at $120 billion, then what should be the total value of exports of the same for the remaining four months (assume April-March as the Financial Year)?
   1) $ 46 billion 2) $ 38 billion 3) $ 32 billion 4) $ 44 billion
4. If the government charges 12% tax on all exports of Textiles and 15% on Gems and Jewellery, what is the revenue earned from these sectors during the given eight-month period?
   1) $ 15 billion 2) $ 18 billion 3) $ 22 billion 4) $ 25 billion

Directions (Q. 5-10): The following tables show the percentage distribution of India's population by age group and sex in the given years. Refer to the tables to answer the questions that follow.

DISTRIBUTION OF INDIA'S POPULATION BY AGE AND SEX (1901-1971)
(All figures are percentages of Males/Females to respective total)

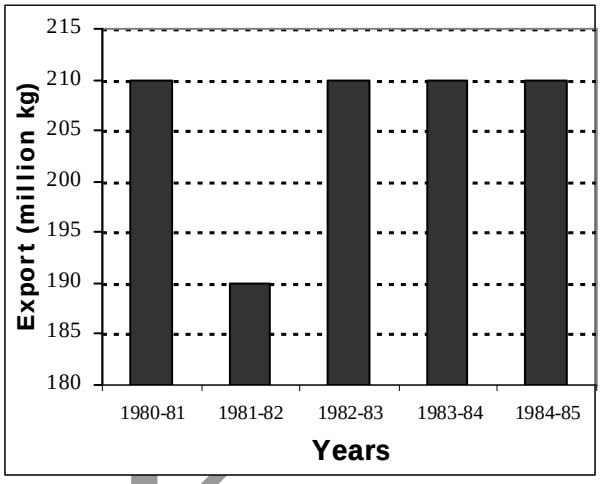
	1901		1911		1921		1931	
AGE GROUPS	Male	Female	Male	Female	Male	Female	Male	Female
0-4	12.5	13.3	13.3	14.3	12.1	13.2	14.7	16.0
5-9	14.0	13.8	13.8	13.8	14.8	15.0	13.3	12.8
10-14	12.7	10.9	11.7	10.0	12.5	10.8	12.0	11.2
0-14	39.2	38.0	38.8	38.1	39.4	39.0	40.0	40.0
15-24	16.5	17.2	16.7	17.6	16.0	16.8	17.9	19.2
25-34	17.2	17.5	17.2	17.5	16.9	17.3	16.4	16.2
15-34	33.7	34.7	33.9	35.1	32.9	34.1	34.3	35.4
35-44	12.6	12.2	12.6	11.9	12.6	11.9	11.9	11.0
45-59	9.9	9.6	9.9	9.4	10.1	9.5	9.9	9.4
35-59	22.5	21.8	22.5	21.3	22.7	21.4	21.8	20.4
60 and above	4.6	5.5	4.8	5.5	5.0	5.5	3.9	4.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
	1941		**1951**		**1961**		**1971**	
AGE GROUPS	Male	Female	Male	Female	Male	Female	Male	Female
0-4	13.2	14.0	13.1	13.7	14.7	15.5	14.3	15.1
5-9	13.6	13.6	12.6	12.9	14.6	14.9	15.0	15.1
10-14	11.3	10.8	11.4	11.3	11.6	10.8	12.7	12.1
0-14	38.1	38.4	37.1	37.9	40.9	41.2	42.0	42.3
15-24	18.1	18.3	18.9	19.1	16.3	17.1	16.5	16.7
25-34	15.9	16.3	15.4	15.3	15.2	15.5	13.5	14.6
15-34	34.0	34.6	34.3	34.4	31.5	32.6	30.0	31.3
35-44	12.1	11.6	12.0	11.3	11.4	10.6	11.4	11.0
45-59	10.9	10.5	11.1	10.6	10.7	9.8	10.7	9.4
35-59	23.0	21.1	23.1	21.9	22.1	20.4	22.1	20.4
60 and above	4.9	4.9	5.5	5.8	5.5	5.8	5.9	6.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

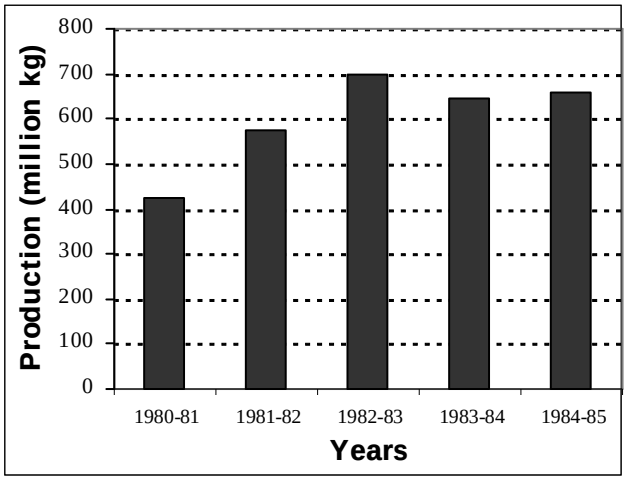
5. For both the sexes in the given years, the most thickly populated age group is
   1) 0-14 2) 35-59 3) 15-34 4) 15-24
6. The total number of times a 1: 1 ratio of male to female percentage is displayed in any age group (all the mentioned groups) is
   1) Four 2) Three 3) Five 4) One
7. If the population in 1961 was 400 crores, the difference between the number of males and females is highest in which of the given age groups?
   1) 0-4 2) 10-14 3) 35-44 4) 45-59
8. In the given tables, how many times is the percentage value for any group (in any year) above 20%?
   1) 36 2) 44 3) 48 4) 50
9. Over the given period (1901 - 1971), the least number of males and females belong to which of the following age groups?
   1) 0-4 2) 45-49 3) 10-14 4) 60 and above
10. If the total population in the age group 0-4 years in year 1971 is 14.68%, find the sex ratio (ie ratio

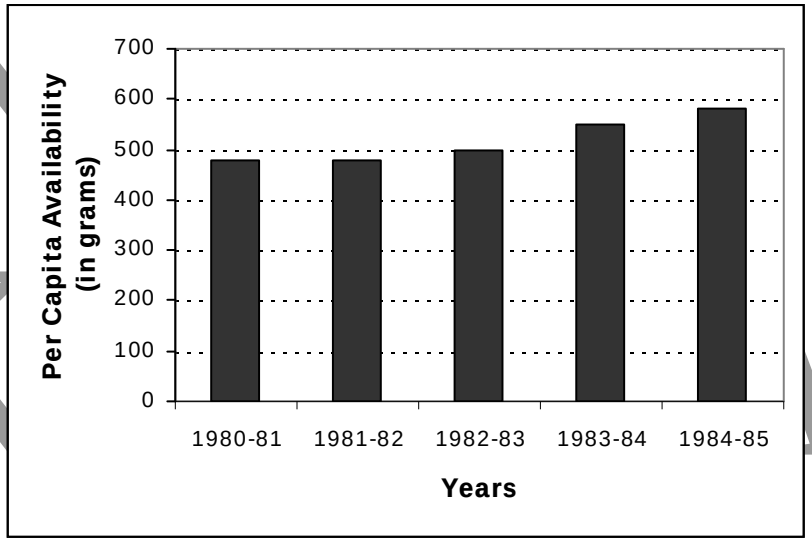
of males to females) in year 1971.

1) 21 : 19 2) 37 : 29 3) 17 : 13 4) 29 : 27

Directions (Q. 11-13): The following bar graphs show the data regarding Export, Production and Per Capita Availability of Coffee. Refer to the graphs to answer the questions that follow.







11. If the area under coffee production was less by 10% in 1984-85 than that in 1983-84, then the rate of increase in productivity of coffee in 1984-85 was

1) 4% 2) 27% 3) 2.3% 4) 13.6%

12. Which year, except 1980-81, represents the highest proportion of coffee exported by India out of its production?

1) 1983-84 2) 1982-83 3) 1984-85 4) 1981-82

13. The population of India in 1983-84 was

1) 395 million 2) 790 million 3) 1,185 million 4) 670 million

Directions (Q. 14-17): Answer the questions on the basis of the information given below.

The table below provides certain results of a survey taken among 46 people. The parameters are: gender, number of servants owned, and age of the participants. The first number in each cell is the number of people in the that group. The minimum and maximum age of people in each group is given in brackets. For example, there are 10 female participants with 0 servant and among these 10 the

youngest is 34 years old, while the oldest is 46.

No. of Servants	Male	Female	Total
0	2(38, 38)	10(34, 49)	12
1	2(32, 32)	16(35, 63)	18
2	4(32, 33)	4(27, 40)	8
3	4(32, 33)	4(27, 40)	8
Total	12	34	46

14. The percentage of participants aged less than 40 years is at least
    1) 35% 2) 16.67% 3) 43% 4) 27%
15. Given the information above, the percentage of people older than 35 can be at most
    1) 69.6% 2) 73.33% 3) 30% 4) 90%
16. The percentage of people that fall into the 35-to-40-years age group (both inclusive) is at least
    1) 10.86% 2) 26.67% 3) 8.33% 4) 6.67%
17. The maximum no. of persons having at least two servants and age at least 35 years is
    1) 2 2) 4 3) 6 4) 0

Directions (Q. 18-20): Answer the questions on the basis of the information given below.

The correspondence coming to a certain office can be classified under various headings. The following table shows the percentage distribution of such correspondence over time. The total number of correspondence received during December 1998 was larger than the number received in June 1999. The total number of correspondence received during September 1998 was larger than the number received in March 1999.

Category	Sep - 98	Dec - 98	Mar - 99	Jun - 99
Business	40	33	19	17
Feedback	25	30	37	44
Government	11	19	5	17
Products	3	3	10	6
Advertisement	4	7	10	12
Stocks	5	6	11	2
Inventory	12	2	8	2

18. In which category was the percentage of correspondence increasing but at a decreasing rate?
    1) Feedback 2) Stocks 3) Advertisement 4) Cannot be determined
19. In the Government category, the number of the correspondence received in December 1998 as compared to June 1999
    2) was larger 2) was smaller 3) was equal 4) Cannot be determined
20. In the Feedback category, the number of corespondence received in September 1998 as compared to March 1999
    1) was larger 2) was smaller 3) was equal 4) Cannot be determined

Answers and explanations

1. 3; Export of Textiles and Others in July = $\frac{40}{100} \times 32 = \$12.8$ billion

Export of Gems and Jewellery and Others in October = $\frac{46}{100} \times 28 = \$12.8$ billion.

Quicker Approach: Now here the trick is to realize that since for Textiles and Others, we are calculating 40% of $32 billion for July, the only month where we would get a near equal for exports of Gems and Jewellery and Others, accounting to 46% of the export's basket, would be for a month in which the total exports is just near but less than that of July. Hence directly from observation, we can mark on the month of October.

2. 1; Export for the first 4 months (Apr-July) = 35 + 22 + 42 + 32 = $ 131 billion
Export for the last 4 months (Aug-Nov) = (38 + 18 + 28 + 33) = $ 117 billion
$\therefore$ Ratio = 131 / 117 = 1.119 $\approx$ 1.12.

3. 1; Gems and Jewellery export for the first 8 months (Apr-Nov) of the year = 0.3 × 248 = $74.4 billion.
Total value of the exports for the remaining 4 months (Dec-Mar) of the year
= Target - $74.4 billion = $120 - $74.4 = $45.6 billion $\approx$ $46 billion.

4. 2; Textile exports over the period = 0.24 × 248 = $59.52 billion.
Gems and Jewellery exports over the period = $74.4 billion
Revenue from Textile exports = 0.12 × 59.52 = $7.14 billion
Revenue from Gems and Jewellery exports = 0.15 × 74.4 = $11.16 billion.
Total revenue from these sectors = 7.14 + 11.16 = 18.3 $\approx$ $18 billion.

5. 1; 0-14 years is made up of three groups, viz 0-4, 5-9, 10-14. It gives the maximum percentages.

6. 1; If we refer to the table, we get the ratio 1 : 1 between male and female 4 times.
In 1911, age group 5-9.
In 1931, age group 0-14.
In 1941, age groups 5-9 and 60 & above.

7. 4; In 1961, for 0-4 group, difference = 15.5 - 14.7 = 0.8
For 10-14 group, difference = 11.6 - 10.8 = 0.8
For 35-44 group, difference = 11.4 - 10.6 = 0.8
But for the age-group 45-59, it is more than this value.

8. 3; It is more than 20% for age groups 0-14, 15-34 and 35-39, for males and females in all the years, i.e. 8 × 3 × 2 or 48.

9. 4; Clearly, the least number of males and females belong to age group 60 and above.

10. 1; Let the total population of males and females in 1971 be X and Y respectively.
According to the question,

$$\frac{14.3\%\text{ of } x + 15.1\%\text{ of } y}{x+y} \times 100 = 14.68$$

$$\Rightarrow 14.3x + 15.1y = 14.68x + 14.68y$$

$$\Rightarrow 0.42y = 0.38x$$

$$\Rightarrow \frac{x}{y} = \frac{0.42}{0.38} = \frac{21}{19}$$

Quicker Method: By the method of alligation,
14.68% is the weighted mean of 14.3% and 15.1%.

M		F
14.3		15.1
	14.68	
0.42		0.38
$\equiv$ 21	:	19

11. 4; Productivity = $\frac{\text{Total coffee production}}{\text{Area under production}}$. Let area under production in 1983-84 be x hectares.

$\therefore$ Productivity in 1983-84 = $\frac{645}{x}$.

Productivity in 1984-85 = $\frac{660}{0.9x}$ [Area is less by 10%] = $\frac{733}{x}$.

Rate of increase in productivity in1984-85 = $\frac{\frac{733}{x} - \frac{645}{x}}{\frac{645}{x}} = \frac{88}{645} \times 100 = 13.6\%$.

12. 1; Proportion of coffee exported in any year = $\frac{\text{Exports in that year}}{\text{Production in that year}}$.

Calculate and check with the value to get the answer as 1983-84.

13. 2; Per capita availability in 1983-84 = 545 gram = 0.545 kg.

Per capita availability = $\frac{\text{Total production of coffee - export of coffee}}{\text{total population}}$

Total population = $\frac{(645 - 210)\text{million kg}}{0.545\text{kg}}$ = 798 million (approx).

Option (2) is closest to this value.

14. 1; Minimum number of participants aged less than 40 = 2 + 1 + 2 + 1 + 4 + 1+ 4 + 1 = 16

$\therefore$ Percentage = $\frac{16}{46} \times 100 \approx 35\%$.

15. 1; Maximum number of participants older than 35 = 2 + 9 + 15 + 3 + 3 = 32

$\therefore$ Percentage = $\frac{32}{46}$ × 100 < 70%.

16. 1; Minimum number of participants that fall into 35 to 40 years age group = 2 + 1 + 1 + 1 = 5

$\therefore$ Percentage = $\frac{5}{46} \times 100$ = 10.86%.

17. 3; Maximum no. of participants having age at least 35 years and at least 2 servants = 3 + 3 = 6.

18. 3; By observation we can say that the percentage of correspondence is increasing for both Feedback and Advertisement, but it is increasing at a decreasing rate for Advertisement.

19. 1; Correspondence in Government category for December 1998 = 0.19 × [December 1998 total].
Correspondence in Government category in June 1999 = 0.17 × [June 1999 total].
19% of December 1998 total > 17% of June 1999 total.
$\therefore$ Correspondence in Government category was greater in December 1998.

20. 4; Number of correspondence in September 1998 > March 1999.
For feedback in September 1998 = 0.25 × [September 1998 total]
For feedback in March 1999 = 0.37 × [March 1999 total]
Since we de not know the exact amount of correspondence in both the categories, we cannot compare the values.

Practice Exercise-10

Directions (Q. 1-3): Answer the questions on the basis of the information given below.

The data below shows the rankings of twenty-five companies on the basis of various parameters as shown below.

Rank	Companies	Total Income		Net Profit		Net Worth		NPM	RONW	ROCE
		2004		2004		2004		2004	2004	2004
2004		Rs Crore	% chg	Rs Crore	% chg	Rs crore	% chg	%	%	%
1	Tata Sons	4410.86	35.39	863.29	20.97	3396.38	25.91	19.57	25.42	14.55
2	Tata International	1970.32	-9.28	-830	—	108.15	-7.13	-0.42	-7.67	-2.92
3	Teech Pacific (India)	1772.39	40.95	26.9	-9.1	87.79	43.76	1.52	30.64	12.11
4	TV Sundram Iyengar & Sons	1754.07	4.79	34.28	101.7	130.95	7.76	1.95	36.18	11.96
5	Nirma Consumer Care	1604.4	-12.76	0.39	77.27	3.13	13.82	0.02	12.46	0.99
6	Bennett, Coleman & Co.	1457.18	19.95	49.73	-75.85	910.14	5.52	3.41	5.46	5.46
7	Haldia Petrochemicals	1434.91	15.686	-501.55	—	614.09	-44.96	-35	-81.67	-9.24
8	Toyota Kirloskar Motor	1695.26	22.25	-102.01	—	452.38	-18.41	-6.02	-22.55	-12.25
9	Adani Wilmar	1166.78	179.11	11.63	5.73	58.42	58.84	1.00	19.91	11.67
10	Ford India	1064.79	—	-60.52	—	321.87	-15.83	-5.68	-18.8	-3.87
11	Gitanjali Gems	1032.47	-74.87	21.9	-51.72	207.94	11.77	2.12	10.53	4.71
12	Hero Cycles	985.04	5.38	68.56	83.46	264.36	24.06	6.96	25.93	16.4
13	Riddisiddhi Bullions	952.67	130.67	0.21	505.5	1.85	190.41	0.02	11.55	3.12
14	Samsung Electronics	941.81	44.36	4.91	-4.11	34.94	16.36	0.52	14.06	6.43
15	Godrej & Boyce Mfg Co.	889.54	5.07	11.45	-5.99	280.65	3.75	1.29	4.08	1.57
16	Allanasons	562.87	-0.4	4.78	33.87	64.51	1.82	0.55	7.42	5.75
17	Honda Siel Cars India	855.45	18.89	26.48	—	235.3	12.68	3.1	11.25	5.22
18	Bharat Aluminium Co.	826.96	-17.88	18.76	—	588.06	-2.98	2.27	3.19	2.42
19	Lafarge India	816.46	69.31	-14.39	—	649.73	137.02	-1.76	-2.21	-1.06
20	Reliance Ports & Terminals	806.67	49.23	-20.97	—	491.38	-4.09	-2.6	-4.27	-0.69
21	Tractors & Farm Equipment	805.42	-6.13	23.83	-0.96	416.18	5.16	2.96	5.73	4.51
22	Bhushan	805.12	34.38	26.18	13.28	240.84	12.16	3.25	10.87	4.06
23	Jaypee Cement	1200.44	117.88	63.39	—	245.05	26.05	5.28	25.87	6.88
24	Essar Power	1140.51	-15.21	62.39	-34.35	781.71	21.29	5.47	7.98	2.77
25	Bharti Cellular	725.73	38.96	98.63	16.05	287.89	42.15	13.59	34.26	4.64

1. In how many companies was the percentage change for net worth greater than the percentage change for total income?

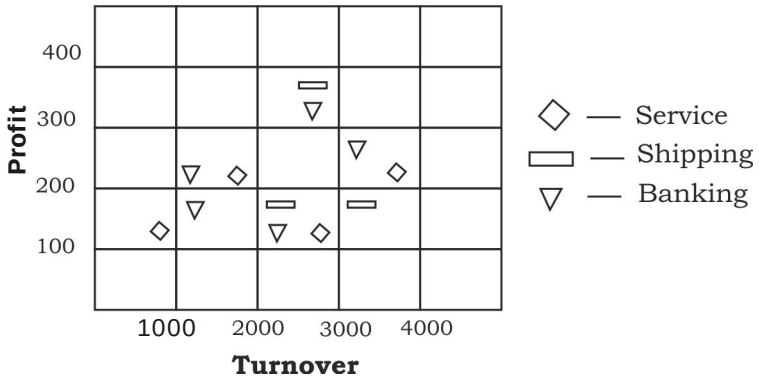
   1) 13 2) 20

   3) 12 4) 16

2. Which of the following is true?
   1) The percentage ROCE for the top five companies is always less than the percentage RONW.
   2) The percentage ROCE for the top five companies is always greater than the percentage RONW.
   3) The percentage ROCE for the top five companies is greater than the percentage RONW for only one company.
   4) None of the above is true.
3. Which of the following statements is not true?
   1) As many companies are ranked above RiddhiSiddhi Bullions as below it.
   2) The net worth as a percentage of total income for Hero cycles is 26.8%
   3) If the top ten companies were ranked on the basis of net profit, from highest to lowest, the fifth-ranked company would be Adani Wilmar.
   4) All are true

Directions (Q. 4-6): Answer the questions on the basis of the information given beow.

Each point in the graph below shows the profit and turnover for a company. Each company belongs to one of the three industries: Service, Shipping and Banking.



4. For how many companies does the profit exceed 10% of the turnover?
   1) 8 2) 7
   3) 6 4) 5
5. For how many banking companies with a turnover of more than 2000 is the profit less than 300?
   1) 0 2) 1
   3) 6 4) 7
6. An investor wants to buy stocks of only banking or shipping companies with a turnover of more than 1000 and profit exceeding 10% of turnover. How many choices are availiable to the investor?
   1) 6 2) 7
   3) 4 4) 5

Directions (Q. 7-9): Answer the questions on the basis of the information given below.

The following table shows the data about ages, height and weight of randomly selected 100 children of CATMOS Montessori. Table 1 provides data about ages of the children. For the age given in the first column, the second column gives the number of children not exceeding that age.

For example, the first entry indicates that there are 9 children aged 4 years or less. Tables 2 and 3 provide data on the heights and weights respectively on the same group of 100 children in a similar format. Assuming that an older child is always taller and weighs more than a younger child, answer the following questions.

TABLE 1	
Age (years)	Number
4	9
5	12
6	22
7	35
8	42
9	48
10	60
11	69
12	77
13	86
14	100

TABLE 2	
Height (cm)	Number
115	6
120	11
125	24
130	36
135	45
140	53
145	62
150	75
155	81
160	93
165	100

TABLE 3	
Weight (kg)	Number
30	8
32	13
34	17
36	28
38	33
40	46
42	54
44	67
46	79
48	91
50	100

7. What is the number of children of age 9 years or less whose height does not exceed 135 cm?
   1) 48 2) 45 3) 3 4) Cannot be determined
8. How many children of age more than 10 years are taller than 150 cm and do not weigh more than 48 kg?
   1) 16 2) 40 3) 9 4) Cannot be determined
9. Among the children older than 6 years but not exceeding 12 years, how many weigh more than 38 kg?
   1) 34 2) 52 3) 44 4) Cannot be determined

Directions (Q. 10-12): Answer the questions on the basis of the information given below.

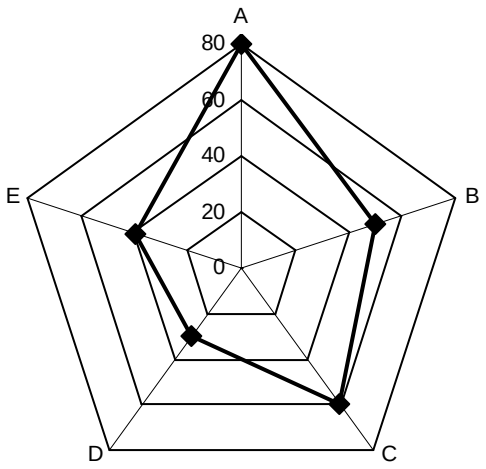
Nature's Best Juices (NBJ) is in the business of manufacturing fruit juices. NBJ buys APPLE, MANGO, GRAPE, ORANGE and LITCHEE juice. ORANGE juice can be made by adding artificial flavour to APPLE and MANGO juice in equal proportions. Similarly, LITCHEE juice can also be made by APPLE and GRAPE juice. Among other juices, NBJ sells MIXED JUICE (formed by mixing GRAPE and MANGO juice in the ratio 70 : 30), TROPICAL DELIGHT JUICE (formed by mixing equal amounts of ORANGE and LITCHEE juice) and SUMMER SONG juice (formed by mixing equal amounts of ORANGE and GRAPE juice). The following table provides the price at which NBJ buys the juices.

FLAVOUR	**Rs/Litre**
APPLE	20.00
MANGO	25.00
GRAPE	15.00
ORANGE	22.00
LITCHEE	18.00

10. The cheapest way to manufacture TROPICAL DELIGHT juice would cost
    1) Rs 19.50 per litre 2) Rs 19.75 per litre
    3) Rs 20.00 per litre 4) Rs 20.25 per litre
11. SUMMER SONG can be manufactured by mixing
    1) MIXED JUICE and APPLE in the ratio 14 : 10
    2) MIXED JUICE and APPLE in the ratio 3 : 1
    3) MANGO and LITCHEE in the ratio 1 : 1
    4) APPLE, MANGO and GRAPE in the ratio 1 : 1 : 2
12. Assume that TROPICAL DELIGHT, MIXED JUICE and SUMMER SONG each sell for the same price. Which of the three is the most profitable to the manufacturer?
    1) TROPICAL DELIGHT 2) MIXED JUICE
    3) SUMMER SONG 4) Data is insufficient

Directions (Q. 13-17): Answer the questions on the basis of information given below.

The following radar graph shows the percentage increase in the sale of companies A, B, C, D and E in year 2004 with respect to previous year.



13. Which company has the maximum sale in year 2004?
    1) A 2) C 3) E 4) Can't be determined
14. The ratio of sale of companies A, B, C, D and E in year 2003 is 5 : 4 : 3 : 2 : 6. Find the overall % increase in the sale of all the five companies together in year 2004.
    1) 46% 2) 54% 3) 59% 4) 64%
15. The overall % increase in the sale of company C and company D together is 55% in year 2004. Find the ratio of sale of company C and D in year 2004?
    1) 80 : 13 2) 192 : 17
    3) 84 : 31 4) 192 : 53
16. If the ratio of sale of company C, D and E in year 2004 is 5 : 3 : 4 then find the overall % increase in the sale of company C, D and E together from 2003 to 2004 (approx.).
    1) 41% 2) 39% 3) 54% 4) 46%
17. The overall % increase in the sale of companies B & C together is 57% and that of companies C & D together is 47% in year 2004. Find the ratio of sale of companies C, D and E in year 2003.
    1) 3 : 7 : 23 3) 5 : 9 : 13
    3) 6 : 7 : 11 4) None of these

Directions (Q. 18-20): Read the following information given below and answer the questions that follow.

The Shyam Dairy company is setting up a plant for manufacture and sale of flavoured milk. The investment of the plant is Rs 10 crores (to be invested in plant, machinery, advertising, infra-structure etc).

The following table shows the cost of different bottle sizes.

Bottle size	Bottling cost	Cost of liquid	Transportation cost	Sale Price	Dealer Margin
300 ml	Rs 2	Rs 8	10 paise per bottle	Rs 14	Rs 1.5
500 ml	Rs 5	Rs 10	15 paise per bottle	Rs 21	Rs 2
1.5 lit	Rs 10	Rs 25	20 paise per bottle	Rs 52	Rs 5

18. For which bottle should Shyam Dairy try to maximise sale to maximise its profit (assume that the total number of litres of flavoured milk sold is constant irrespective of break-up of the sales in terms of the bottle size).
    1) 1500 ml bottle
    2) 500 ml bottle
    3) 300 ml bottle
    4) Can't say
19. If the company sells only 300ml bottles in the first year, how many bottles shoud it sell to recover the investment made in the first year only?
    1) 41.66×10^6
    2) 35.84×10^6
    3) 44.56×10^6
    4) Can't say
20. If the ratio of sales of 300ml bottles to that of 500ml bottles is 4 : 1, and there is no sale of 1500ml bottles, how many 500ml bottles will be required to recover the investment?
    1) 17.96×10^6
    2) 24.8×10^6
    3) 7.43×10^6
    4) Can't say

Answers and explanations

1. 1; The percentage change to net worth is greater than the percentage change for total income in 13 companies.
2. 3; The percentage ROCE for the top five companies is greater than the percentage RONW for only the company Tata International.
3. 3; 1st to 5th are: Tata Sons, Bharti, Hero, Jaypee and Essar respectively.
4. 2; Draw a line from the bottom left corner to top right corner. The symbols lying above the line are ones in which profit exceeds 10% of turnover. There are 6 such companies.
5. 3; Six companies lie below 300 profit and more than 2000 turnover.
6. 4; Only five companies fulfil the requirement.
7. 2; Number of children aged 9 years or less = 48
   Number of children having height 135 cm or less = 45
   Thus 45 children satisfy both conditions.
8. 1;

	Number of children
age > 10 years	40
height > 150 cm	25
weight > 48 kg	9

   Thus required number of children = 25 – 9 = 16.
9. 3;

	Number of children
12 years > age > 6 years	55
weight > 38 kg	67

   Required number of children = 67 – 23 = 44.
10. 2; TROPICAL DELIGHT juice would cost minimum when its constituents have the minimum possible price. TROPICAL DELIGHT is made by mixing equal amounts of 'ORANGE' and 'LITCHEE'. We have the following possibilities:

FLAVOUR	COMBINATION	TOTAL COST (Rs.)	LIT	COST Rs./ LIT
TROPICAL DELIGHT	ORANGE + LITCHEE	22 + 18 = 40	2	20
	(APPLE + MANGO) + LITCHEE	$\left(\frac{20+25}{2}\right)+18=40.5$	2	20.25
	ORANGE + (APPLE + GRAPE)	$22+\left(\frac{20+25}{2}\right)=39.5$	2	19.75
	(APPLE + MANGO) + (APPLE + GRAPE)	$\left(\frac{20+25}{2}\right)+\left(\frac{20+15}{2}\right)=40$	2	20

From the table we have the minimum cost Rs 1975.

11. 4; The possible combinations for SUMMER SONG are given below.

Combination	Ratio
ORANGE + GRAPE	1 : 1
(APPLE AND MANGO) + GRAPE	1 : 1 : 2

12. 2; From Q. 10 we have: the least possible price for TROPICAL DELIGHT is Rs 19.75 per litre.
Similarly, least possible price for MIXED JUICE is Rs 18 per litre (when GRAPE + MANGO are mixed in the ratio 70 : 30). And least possible price for SUMMER SONG is Rs. 18.5 pre litre (when ORANGE + GRAPE is mixed in the ratio 1 : 1).
Hence profitability is maximum for MIXED JUICE .

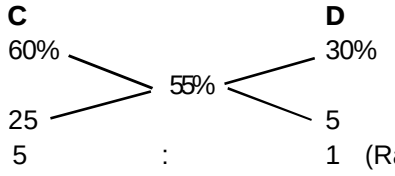
13. 4; Only the percentage increase in the sales of each of the company is given, not the previous year's sale. Hence data inadequate.

14. 2; The overall % increase in the sales of all the five companies together

$$=\frac{5}{20}\times 80+\frac{4}{20}\times 50+\frac{3}{20}\times 60+\frac{2}{20}\times 30+\frac{6}{20}\times 40$$

$$=20+10+9+3+12=54\%$$

15. 1; 55% increase in the sales of company C and D together is the weighted mean of 60% and 30%.



(Ratio of sale in year 2003)

Now, $\frac{\text{Sale of company C in year 2004}}{\text{Sale of company D in year 2004}}$

$$=\frac{5\times\frac{160}{100}}{1\times\frac{130}{100}}=\frac{80}{13}$$

$\therefore$ Required ratio = 176 : 13

16. 4; Let K be present in each of the ratios.

	2004	2003
C	5K	$5K \times \frac{100}{160} = 3.12$
D	3K	$3K \times \frac{100}{130} = 2.3$
E	4K	$4K \times \frac{100}{140} = 2.8$
Total	12K	8.2K

The overall % increase = $\frac{12K - 8.2K}{8.2K} \times 100 = \frac{3.8K}{8.2K} \times 100 \approx 46\%$

17. 1; Similar to solution of Q. 15.

B C C D

50% 60% 60% 30%

57% 37%

3 : 7 7 : 23

$\Rightarrow$ B : C : D $\equiv$ 3 : 7 : 23

18. 3; Profit from one 300ml bottle = 14 – (2 + 8 + 1.5 + 0.1) = Rs 2.4

Profit from one 500ml bottle = 21 – (5 + 10 + 0.15 + 2) = Rs 3.85

Profit from one 1500ml bottle = 52 – (10 + 25 + 0.20 + 5) = Rs 11.80

Selling 1500ml from 300ml bottles we get 2.4 × 5 = Rs 12 as profit.

Similarly, selling 1500 ml from 500ml bottles we get = 3.85 × 3 = Rs 11.55 as profit

Selling 1500ml from 1500ml bottle we get Rs 11.80 as profit.

Therefore, Shyam Dairy should maximise the production of 300ml bottles. (As the number of litres is constant)

19. 1; Let no. of bottles it should sell be x.

Cost of production of x bottles = x (2 + 8 + 0.1 + 1.5) = 11.6x

Fixed cost = 10^8

Now, to recover the cost

$$\frac{10^8 + 11.6x}{x} = 14 \Rightarrow x = \frac{10^8}{2.4} = 41.66 \times 10^6 \text{ bottle}$$

Quicker Approach: From solution of Q. 18.

Profit per bottle = Rs 2.4

$\therefore$ Total no. of bottles to sell = $\frac{10^8}{2.4}$

20. 3; Let K be present in the ratio.

The overall selling cost of 300 ml and 500 ml (where they are sold in the ratio 4 : 1)

$$= \frac{4 \times 14 + 1 \times 21}{4 + 1} = \frac{77}{5} = 15.4.$$

Cost of production of 300ml bottle = Rs 11.6

Cost of production of 500ml bottle = Rs 17.15

Now, $15.4 = \frac{(4K \times 11.6) + (K \times 17.15) + 10^8}{4K + K}$

$\Rightarrow 77K = 46.4K + 17.15K + 10^8 \Rightarrow 13.45K = 10^8$

$\Rightarrow K = \frac{10^8}{13.45} \approx 7.43 \times 10^6$ bottles

Practice Exercise 11

Directions (Q. 1-6)*:* These questions are based on the following information regarding the price changes that a certain pharmaceutical company is considering for its products.

Product	Existing Price (Rs.)	Revised Price (Rs.)
Antacid	1.50	2.50
Anti-Hypertensive	10.00	12.50
Expectorant	18.00/bottle	24.00/bottle
Anti-Asthmatic	20.00	26.00
Anti-Pyretic	5.00	8.00
Anti-Flatulent	7.50	9.00

The prices for all the products except Expectorant are the prices of 10 tablets.

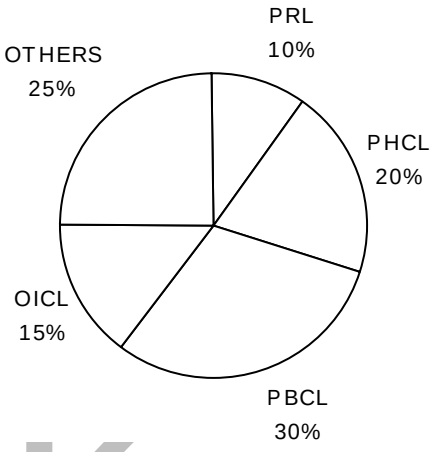
1. A man is prescribed a combination of Antacid and Anti-Hypertensive in the ratio 2 : 3 for the first week and of Anti-Hypertensive and Anti-Flatulent in the ratio 3 : 4 for the second week. The purchased all the medicines under the existing price. His expenditure in the second week is what % more than in the first week?
   1) 24% more 2) 18% less 3) 26% more 4) Data Inadequate
2. If a family has a hypertensive and an asthmatic patient, where the person with hypertension has to consume three tablets of Anti-Hypertensive per day and the asthmatic patient has to take two tablets of Anti-Asthmatic every alternate day, what will be the increase in expenditure on the two patients for 30 days?
   1) Rs 40.50 2) Rs 42.75 3) Rs 46.50 4) Rs 38.50
3. What is the percentage increase in the expenditure of a person for one year if he consumes 32 tablets of Antacid in one week?
   1) $7\frac{1}{2}\%$ 2) $6\frac{1}{2}\%$ 3) $6\frac{2}{3}\%$ 4) None of these
4. A person is prescribed to take two spoonfuls of Expectorant thrice everyday for a period of 20 weeks. Assuming that each bottle of Expectorant contains 90 spoonfuls, find the expenditure according to the existing prices.
   1) Rs 200 2) Rs 180 3) Rs 168 4) Rs 240
5. A person is prescribed a combination of Anti-Pyretic and Anti-Asthmatic such that he has to take one of these before breakfast, the other after lunch and the one he had at breakfast after dinner also; if he consumed an Anti-pyretic at the end of the dinner on the 7^{th} day of the course, he started the course with
   1) Anti-Asthmatic 2) Anti-Pyretic
   3) Not possible to determine 4) None of the above
6. In the question no. (1), average cost per tablet for the first week is what % less than the average cost per tablet for the second week?
   1) 17.9% 2) 22.35% 3) 24.5% 4) Can't say

Directions (Q. 7-11): These questions are based on the pie diagrams given below.

Shefali, a first-year student of management from a well-known institute of management in western India, was doing her internship with a leading public sector bank in India. Her project involved analyzing the market shares of various Indian companies that manufacture and sell

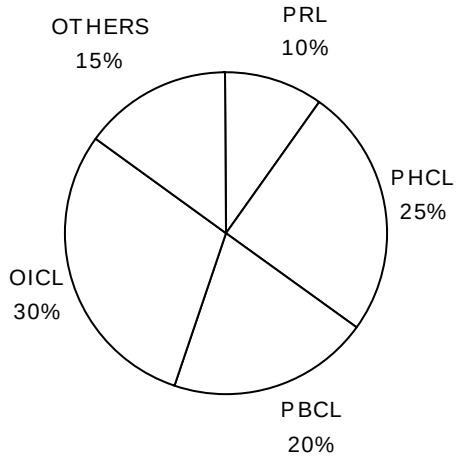
fuels and lubes. Halfway through her project, she managed to collect the following information from the sales figures of various companies:

Percentage shares of various companies in total sales of lubes (by value)



Total sales of lubes for the year 2000-2001 = Rs 22,400 crores

Percentage shares of various companies in total sales of fuels (by value)



Total sales of fuels for the year 2000-2001 = Rs 11,200 crores

Shefali's project guide, after reviewing the above information, pointed out the fact that the above figures were inclusive of the considerable volumes of inter-company sales that occur every year. Therefore the correct market shares of the companies should be arrived at after deducting the inter-company sales figures from the present figures. Shefali then further collected the following information regarding the inter-company sales.

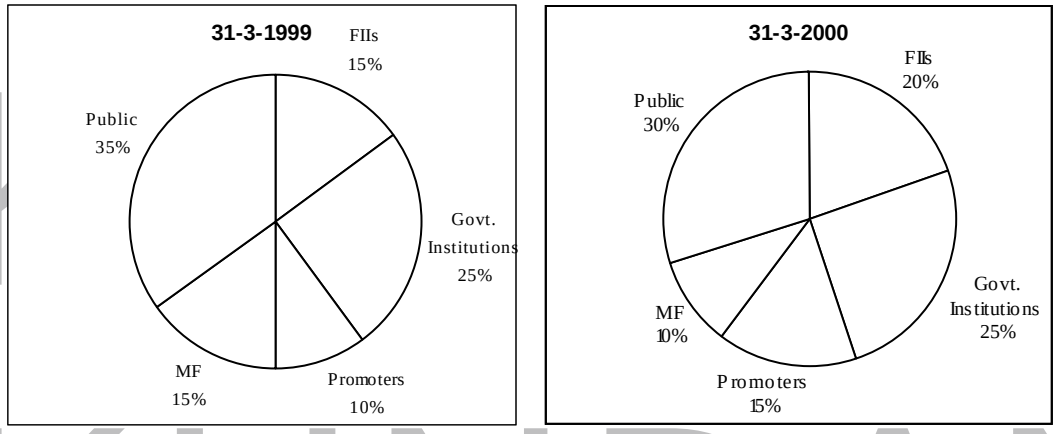
BUYER / SELLER		Sale value as a percentage of the total sales of the selling company				
		PRL	OICL	PHCL	PBCL	OTHERS
PRL	Fuels	—	50	10	—	40
	Lubes	—	30	—	10	60
OICL	Fuels	—	—	15	20	10
	Lubes	—	—	20	—	40
PHCL	Fuels	—	20	—	20	20
	Lubes	—	10	—	25	40
PBCL	Fuels	—	30	10	—	35
	Lubes	—	15	5	—	25
OTHERS	Fuels	—	10	5	10	—
	Lubes	—	15	5	15	—

7. By approximately what percentage did Shefali overestimate the correct value of the total sales of fuels?
   1) 135% 2) 200% 3) 110% 4) 180%
8. If the correct sales figures are considered, then which of the following has the largest percentage share by value of the sales of fuels and lubes put together?
   1) PRL 2) OTHERS 3) OICL 4) PBCL

9. If for any company, Sales - Purchases = Profit, then neither fuels nor lubes were profitable for
   1) PRL 2) PHCL 3) OTHERS 4) OICL
10. Assuming the information given in the above question to be true, which of the following had the maximum profitability for fuels?
   1) OICL 2) PHCL 3) PBCL 4) OTHERS
11. Which of the following had the second largest percentage share by value when the correct sales figures of fuels and lubes put together are considered?
   1) OTHERS 2) PHCL 3) OICL 4) PBCL

Directions (Q. 12-15): Refer to the pie-charts below and answer the questions that follow.
The following pie-charts represent the shareholding pattern of various investor groups in the company XYZ Ltd as on 31.03.1999 and 31.03.2000 respectively.

SHAREHOLDING PATTERN



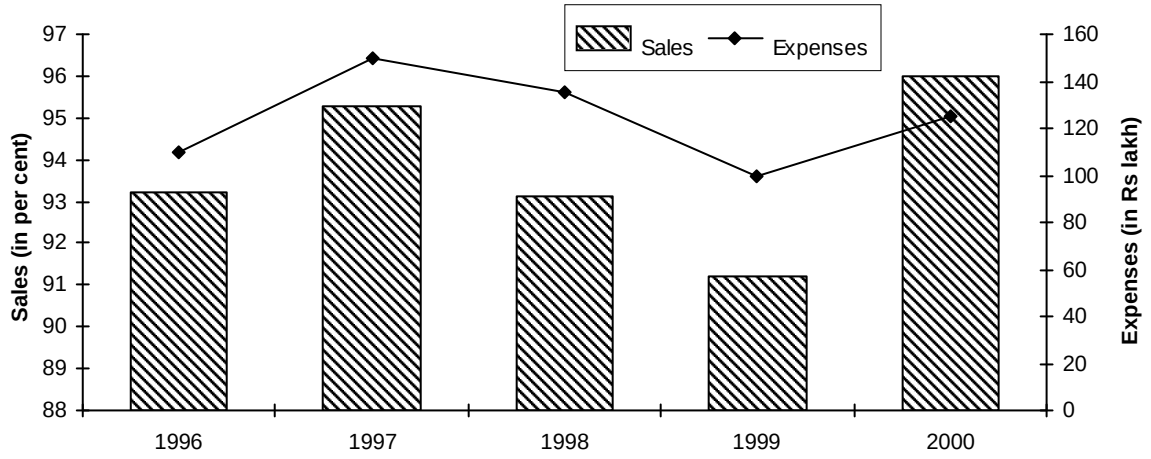
Market Price = Rs 138 per share **Market Price = Rs 167 per share**
Market Capitalisation = Rs 559 cr **Market Capitalisation = Rs 846 cr**

Market capitalisation (market value) = Number of outstanding shares × Market price of share.

12. The number of outstanding shares have increased by what percentage from 31.03.1999 to 31.03.2000?
   1) 10% 2) 15% 3) 25% 4) 30%
13. If you have more than 50% shareholding in a company, then you can control the management of that company. Then, which of the following statements is are true?
   In 1999 (i.e. the year ending on 31.03.99)
   I. Management control can be with a coalition of two investor groups.
   II. Management control can be with FIIs.
   III. Management control can be with promoters.
   1) I only 2) II only
   3) III only 4) All three
14. Market value of shares held by FIIs has gone up by what percentage from 31.03.1999 to 31.03.2000?
   1) 200% 2) 100%
   3) 50% 4) 5%
15. If the FIIs together cannot hold more than 24% of outstanding shares, then what is the maximum value of shares that the FIIs can purchase as on 31.03.2000?
   1) 2 lakhs 2) 0.2 lakhs
   3) 2 crore 4) 20 lakhs

Directions (Q. 16-19): Refer to the graph below and answer the question that follows.

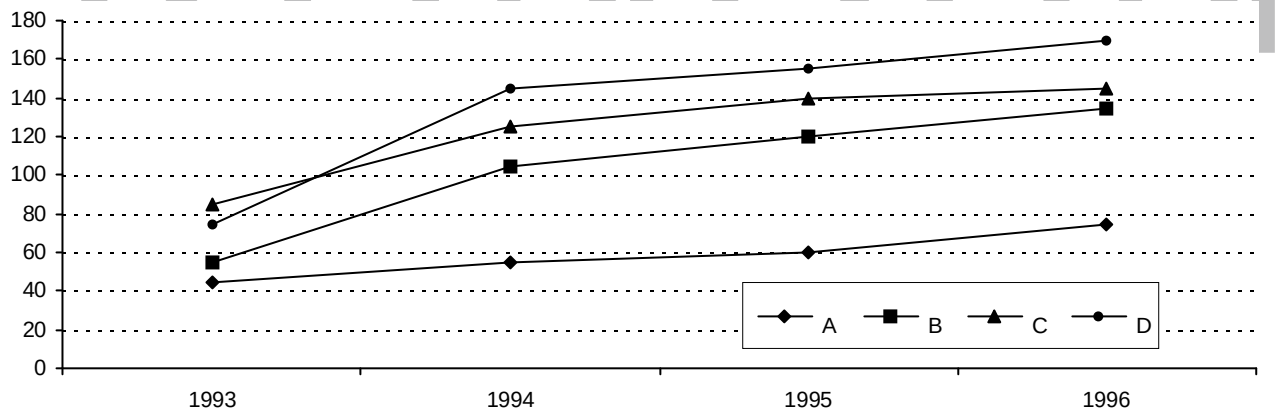
XYZ Ltd manufactures locks.



The above graph shows the sales revenues of XYZ Ltd. in terms of percentage of target achieved and the expenses in Rs. lakhs for the years 1996 to 2000. The target sales were constant at Rs. 180 lakhs over the period.

16. In which year did the company earn the most profit?
    1) 1996 2) 1997 3) 1998 4) 1999
17. What is the maximum drop in sales between any two consecutive years?
    1) Rs 1.2 lakhs 2) Rs 4 lakhs 3) Rs 5.4 lakhs 4) Rs 6.3 lakhs
18. During the 5-year period, what is the highest ratio of sales to expenses?
    1) 1.2 2) 1.9 3) 1.4 4) 1.64
19. What is the increase in sales (in Rs lakhs) from 1999 to 2000?
    1) 6.20 2) 10.80 3) 8.00 4) 8.64

Directions (Q. 20-24): Following graph shows the production at different plants (A, B, C, D) of Torrent Ltd for four years. Ordinate is production figures in '000 MTs.



(i) Capacity utilization = Production × 100 / Capacity

(ii) Production is undertaken uniformly during the year.

(iii) Capacity of four plants (in '000 MTs) in 1996 is as follows: A = 222, B = 160, C = 180, D = 190

(iv) Raw material availability at the plants in 1996 is to produce following quantities ('000 MTs): A = 123, B = 148, C = 185, D = 198

20. Which plant has the highest capacity utilization in 1996?
    1) B 2) A 3) D 4) C

21. Plant D operated only for 8 months in 1993. What would have been the capacity utilization in 1993 if the plant had run for the entire year? [Total capacity of D in 1993 = 190000 MTs]
    1) 60% 2) 50.67% 3) 40% 4) 70%
22. If plant C operated at 60% capacity utilization in 1993 and 80% in 1994, what was the capacity addition during that period?
    1) 20 2) 15 3) 25 4) Nil
23. What is the maximum possible production, taking into account raw material availability constraint in 1996?
    1) A-222, B-160, C-180, D-190 2) A-123, B-148, C-185, D-198
    3) A-123, B-148, C-180, D-190 4) A-123, B-148, C-180, D-198
24. In 1996 bonus is to be given to employees of the plant which produces at least 25% of total company production and which achieves capacity utilization of more than that achieved by the whole company. Which plants received the bonus in 1996?
    1) C & D 2) B, C & D 3) D 4) None of these

Answers and explanations

1. 4; The constant present in the first week combination is either similar or different from the constant present in the second week combination. Hence we can't find the expenditures of first and second weeks.
   Hence data inadequate.
2. 1; Three tablets/day would mean the hypertensive has to be taken 90 times in 30 days.
   The increase is of Rs 2.50 for 10 tablets
   Hence increase will be of 2.50 × 9 = 22.50 for 90 tablets
   Asthmatic has to consume 30 tablets.
   $\therefore$ increase = 6.00 × 3 = 18.00
   $\therefore$ total increase = 22.50 + 18 = 40.50.
3. 4; $\frac{1.00}{1.50}\times 100 = \frac{2}{3}\times 100 = 66\frac{2}{3}\%$.
4. 2; He has to consume = 2 × 3 × 7 × 20 = 840 spoonfuls
   90 spoonfuls --- 1 bottle
   840 spoonfuls ---- 10 bottles
   (since he cannot buy $9\frac{1}{3}$ bottles)
   Hence expenditure according to the existing prices = 10 × 18.00 = Rs 180.
5. 3; Since he may change the order in which he takes the tablets, it is not possible to determine.
6. 2; Average cost per tablet for the first week = $\frac{2\times 1.5 + 3\times 10}{2+3}\times\frac{1}{10} = \frac{33}{5\times 10} = 0.66$

   Average cost per tablet for the second week $= \frac{3\times 10 + 4\times 7.5}{3+4}\times\frac{1}{10} \approx 0.85$

   Required % = $\frac{0.85 - 0.66}{0.85}\times 100 = \frac{1900}{85} = 22.35\%$
7. 1; To arrive at the correct value of the total sales of fuels the inter-company sales figures should be subtracted from the present total sales.
   To be subtracted from 100%:
   PRL $\Rightarrow$ 50 + 10 +40 = 100%, i.e. has sold all its sales to other companies only $\Rightarrow$ correct sales = 0%

OICL $\Rightarrow$ 15 + 20 + 10 = 45 $\Rightarrow$ (100 – 45)% of 30% = 16.5%

PHCL $\Rightarrow$ 20 + 20 + 20 = 60

$\Rightarrow$(100 - 60)% of 25% = 10%

PBCL $\Rightarrow$ 30 + 10 + 35 = 75

$\Rightarrow$ (100 - 75)% of 20% = 5%

OTHERS $\Rightarrow$ 10 + 5 + 10 = 25

$\Rightarrow$ (100 - 25)% of 15% = 11.25%

$\therefore$ Actual sales = (0 + 16.5 + 10 + 5 + 11.25) = 42.75% of given sales

$\therefore$ % by which total sales of fuels were overestimated = $\frac{(100-42.75)}{42.5}\times 100 \approx 135\%$

8. 3; The correct sales figures = (100 - % sales to other companies) × % share of total sales given
= (100 – M) × p (say)

$\therefore$ M should be minimum and p maximum. By observation, this is true for OICL in case of fuels and for PBCL for lubes.

(Note that OTHERS and PRL are eliminated.)

Calculations between PBCL and OICL:

OICL = (100 – 45) × 30% × 25 + (100 – 60) × 15% × S

(where S = sales of lubes and since sales of fuels = 25) $\cong$ 45

For PBCL = (100 – 75) × 20% × 25 + (100 – 45)% × 30% × S $\cong$ 0.275S

Clearly, it is maximum for OICL.

9. 3; We need to find that company for which total sales are less than total purchases = S – P is minimum (and –ve)

i.e. S is minimum and P is maximum.

S is from the pie chart and P is the sum of purchases obtained from the columns in the table.

By mere observatio,

OTHERS have purchased far more than any of the rest.

And its sales are also minimal for both lubes and fuels.

10. 2; For maximum profitability, Sales - Purchases should be maximum.

$\therefore$ S – P must be maximum.

For ICL, the total purchases are 17.5% [i.e. 50% of PRL + 20% of PHCL + 30% of PBCL + 10% of OTHERS]

$\therefore$ Profitability = 30 – 17.5 = 12.5%

Similarly, for PHCL, profitability = 25 – 8.25 = 16.75%

For PBCL, profitability = 20 – 12.5 = 7.5%

And for Others, there is negative profitability.

11. 1; The correct sales figures for fuels have already been calculated in solution (7) and in similar manner we calculate those of lubes.

OTHERS $\Rightarrow$ [100 -(15+5+15)] × 25% = 16.25%

PHCL $\Rightarrow$ [100 - (10+25+40)] × 20% = 5%

OICL $\Rightarrow$ [100 - (20+40)] × 15% = 6%

PBCL $\Rightarrow$ [100 -(15+5+25)] × 30% = 16.5%

Now total sales of lubes = $\frac{1}{2}$ × that of fuels

$\Rightarrow$ values for above are

OTHERS $\Rightarrow$ 8.125%

PHCL $\Rightarrow$ 2.5% (of total sales of fuels)

OICL $\Rightarrow$ 3%

PBCL $\Rightarrow$ 8.25%

The total correct sales value of fuels and lubes put together:

OTHERS $\Rightarrow$ 11.25 + 8.125 = 19.375%

PBCL $\Rightarrow$ 5 + 8.25 = 13.25%

OICL $\Rightarrow$ 16.5 + 3 = 19.5%

PHCL $\Rightarrow$ 10 + 2.5 = 12.5%

$\therefore$ OTHERS is second in terms of (correct) total value of sales of fuels and lubes put together.

12. 3; Number of outstanding shares as on 31.03.1999 $= \frac{559}{138} \approx \frac{560}{140}$ = 4 cr.

Number of outstanding shares as on 31.03.2000 = $\frac{846}{167} \approx \frac{850}{170}$ = 5 cr.

Therefore, percentage increase in outstanding shares $= \frac{5-4}{4} = \frac{1}{4}$ = 25%.

13. 1; It is clear that Public (35%) and Govt Institutions (25%) can form a coalition and control management.

14. 2; Market value of shares held by FIIs as on 31.03.1999 = 15% × 559 $\approx$ 84

Market value of shares held by FIIs as on 31.03.2000 $= 20\% \times 846 \approx 169$

$\therefore$ Percentage increase = $\frac{169-84}{84} \times 100 = \frac{85}{84} \times 100 \approx 100\%$.

15. 4; Total outstanding shares as on 31.03.2000 = 5 cr. FIIs can buy 4% more as they already hold 20% of the shares, i.e.

$\frac{4}{100} \times 5$ cr = 0.2 cr = 20 lakhs.

16. 4; Calculating the sales revenue and the profit, year 1999 has the highest profits.

Year	Revenue (Sales)	Cost	Profit
1996	(93.2% of 180) 168	110	58
1997	(95.3% of 180) 170	150	20
1998	167	135	32
1999	164	100	64
2000	173	125	48

17. 2;

Sales	Percentage of target	Difference
1996	93.2	
1997	95.3	2.10%
1998	93.1	-2.2%
1999	91.2	-1.9%
2000	96	4.80%

Since the year 1997-1998 has the largest fall of 2.2% of Rs. 180 lakhs, the value is Rs. 3.96

lakhs.

18. 4; Calculate from table in solution 16. Highest ratio is 1.64 for year 1999.

19. 4; Increase in sales = $\frac{96-91.2}{100}\times 180$ = Rs 8.64 lakh.

20. 3; Capacity utilization for the plants is
A = 75 × 100/222 ≈ 33.8%
B = 135 × 100/160 ≈ 85%
C = 145 × 100/180 ≈ 80%
D = 170 × 100/190 ≈ 90%

21. 1; Plant D produced 75 ('000 MTs) in 1993 in 8 months. If the plant had been operative throughout the year it would have produced 12 × 75/8 = 112.5 ('000 MTs)

The capacity utilization = 112.5 × $\frac{100}{190}$ ≈ 60%

22. 2;

Year	% Capacity Utlz.	Total Capacity
1993	60	85 × 100/60≈ 140
1994	80	124 × 100/80 = 156.25

Increase in capacity ≈ 15

23. 3; Using both the constraints: Capacity of four plants: A = 222, B = 160, C = 180, D = 190; and Raw material availability at the plants in 1996 is to produce following quantities ('000MTs): A = 123, B = 148, C = 185, D = 198. Hence minimum value between Capacity and Raw material availability is the maximum production possible. Hence answer option is (3).

24. 4;

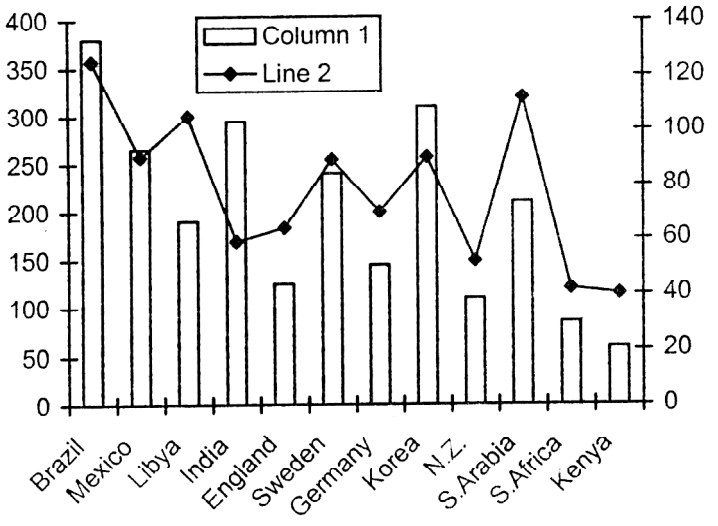
Plant	Capacity considering constraints	Actual Production	% Utilization
A	123	75	61
B	148	135	91
C	180	145	81
D	190	170	90
Total	**641**	**525**	**82**
25% of Total		131.25	

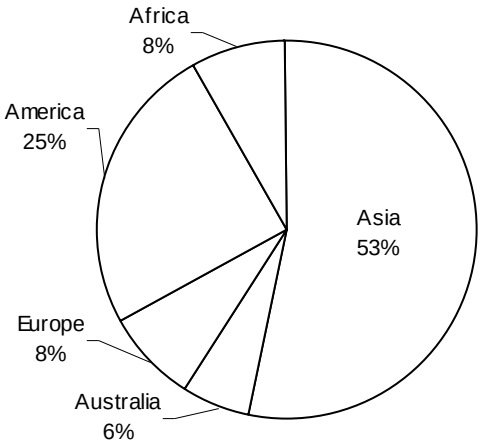
Only B & D satisfy the given condition.

Practice Exercise 12

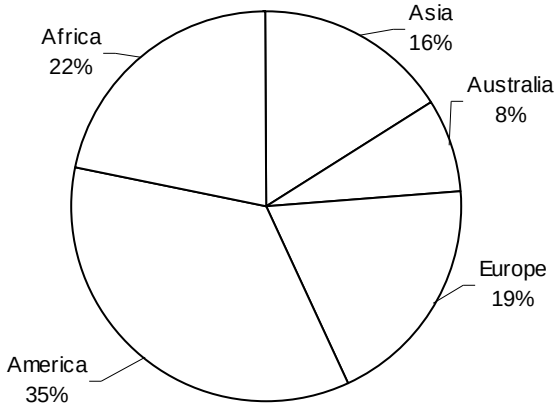
Directions (Q. 1-6): These questions are based on the following information.

The bar graphs show the coal reserves of various nations in metric tonnes where as the line graph shows the number of years up to which the reserves would last. Data for the bar graphs have to be read from the left side of the Y-axis and those for the line graph have to be read from right side of the Y-axis.





Share of the continents in the world population of 6 billion



Breakup of the share of various continents in the global coal resource

1. What is the expected average consumption of coal per annum per thousand people in India if India's population is 50% of Asia's population? (Assuming that the world population remains constant)
   1) 3 gm 2) 3 kg 3) 0.003 gm 4) 30 kg
2. By how much (in metric tonnes) is the coal reserve of America more than that of Asia, if Kenya and South Africa contribute to 37.5% of Africa's coal reserves?
   1) 524 2) 434 3) 334 4) 234
3. By how many kg is the annual average consumption of coal of Korea more than that of Libya?
   1) 1450 2) 1740 3) 1850 4) 2050

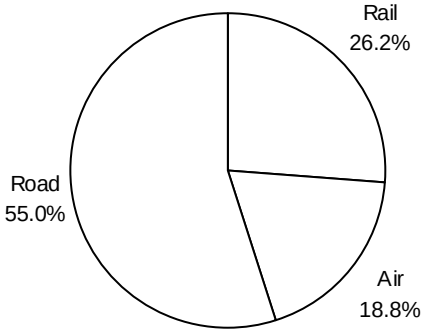
4. If after 50 years, the world population increases by 12.5% (with each continent having the same share of the world population), by how much per cent will the average per annum per capita consumption of coal in Germany change, if it is known that out of every 10 persons in Europe, approx 3.33 live in Germany? (Use data from previous question if required.)
   1) 6.83% 2) 7.7% 3) 9.41% 4) 12.32%
5. If the European nations plan to sell off 41% of their coal reserves equally to the nations of other continents (except to Africa), then the total coal reserves of India and New Zealand will increase by what percentage? (Given that India has 13.8% of Asia's coal reserves and New Zealand has 6.4% of Australia's coal reserves. Use data from previous question if required.)
   1) 20% 2) 25% 3) 27.23% 4) 31.62%
6. The difference between the ratio of coal reserves of Africa to those of Asia and the ratio of coal reserves of Europe to those of Australia is
   1) 1.21 2) 1.35 3) 1.0 4) None of these

Directions (Q. 7-12): These questions are based on the following information.

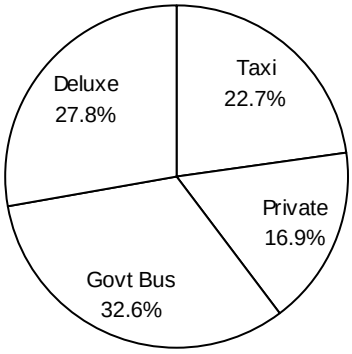
The table shows the numbers of persons commuting between different cities of India in five consecutive years (in thousands).

	1991	**1992**	**1993**	**1994**	**1995**
Mumbai to Pune	9372	11252	6127	12345	9877
Delhi to Bangalore	10765	8328	7056	9362	13125
Kolkata to Raipur	12823	11675	13157	14106	16132
Pune to Delhi	7352	9137	11346	13451	15769
Chennai to Mumbai	8767	10789	12523	14323	16239

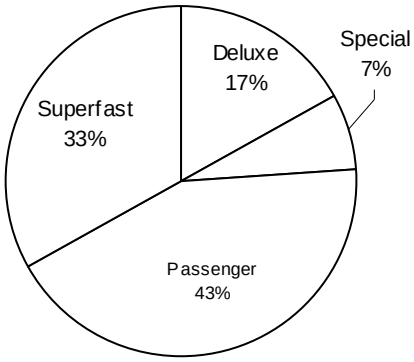
% share of various modes of transport



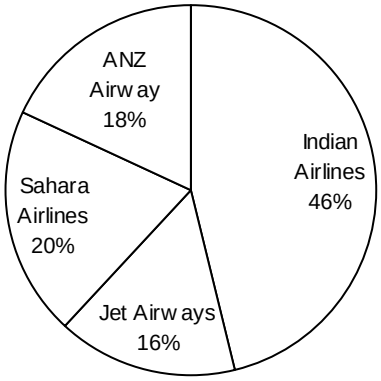
Modes of road transport



Modes of rail transport



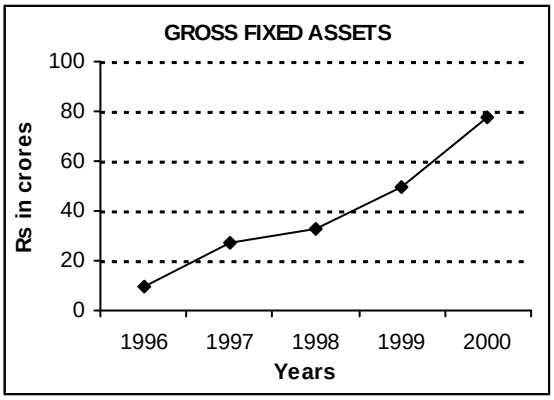
Percent share of various airline services

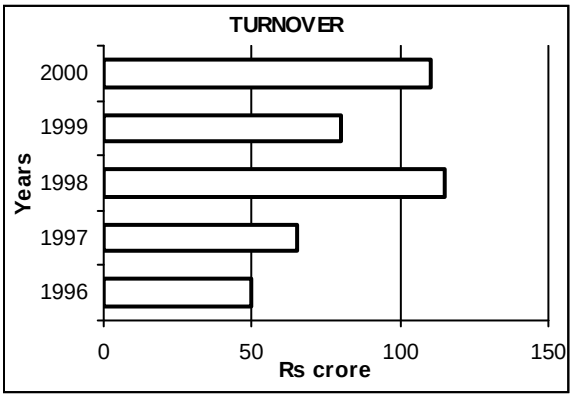


7. In 1995, what is the difference (in thousands) between the number of people commuting by Deluxe buses and that of those by Jet Airways?
   1) 8522 2) 10145 3) 9132 4) 8738
8. What is the percentage change from percentage increase in the number of persons going by Deluxe train from Mumbai to Pune from 1991 to 1992 to the percentage increase in those going by Indian Airlines from Pune to Delhi?
   1) 10.21% 2) 20.21% 3) 15.42% 4) 30.42%
9. If a Sahara Airlines ticket from Chennai to Mumbai costs Rs 3800 and a deluxe train A/C ticket from Pune to Delhi costs Rs 2375, what is the difference in revenues generated (in crore rupees) by Sahara Airlines and Indian Railways on these routes over the period? (Assume that all trains are run by the Indian Railways.)
   1) 320 2) 291.5 3) 250 4) 190.9
10. What is the percentage increase in the number of people travelling by ANZ Airways over the period?
   1) 45% 2) 34% 3) 58% 4) 62%
11. What is the ratio of the number of people travelling from Mumbai to Pune (from 1991 to 1993) by Deluxe Trains to that of those travelling from Chennai to Mumbai (from 1993 to 1995) by Indian Airlines?
   1) 0.41 2) 0.53 3) 0.32 4) 0.25
12. What is the highest percentage growth in the number of persons travelling by passenger train between two consecutive years?
   1) 20.89% 2) 26.64% 3) 32.12% 4) 30.21%

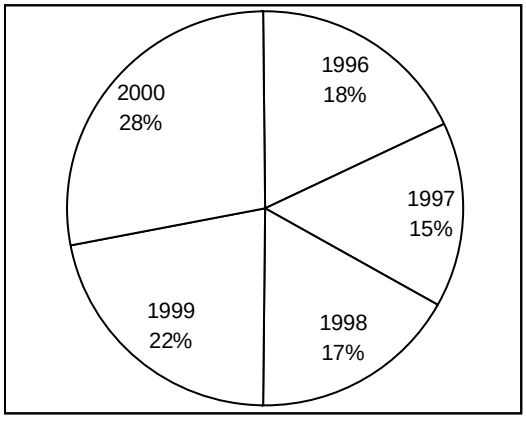
Directions (Q. 13-18): These questions are based on the following information.

The following graphs and pie chart indicate the economic condition of *chatonline.com*, a dotcom company, over five years (1996-2000).





Gross profit for all five years (Rs 50 crore), before depreciation and tax



The net profit is calculated as (G – D – T)
where G = Gross profit
D = Depreciation
T = Tax
Depreciation and Tax are calculated on the Gross profit.

13. If in 1996, there was 6.25% depreciation and 13.75% tax deduction, then the net profit in 1996 (Rs crore) was
    1) 5.21 2) 6.82 3) 7.29 4) 6.0
14. For which year was the ratio of turnover to gross fixed assets is the maximum?
    1) 1997 2) 1998 3) 1996 4) 2000
15. What is the percentage increase in the ratio of gross fixed assets to gross profit from 1996 to 1999?
    1) 96% 2) 135% 3) 236% 4) 310%
16. If in 1998, there was 9.65% depreciation and 11.63% tax deduction, then the ratio of net profit in 1998 to that in 1996 works out to
    (Use data from previous questions if required.)
    1) 0.92 2) 0.68 3) 1.82 4) 2.97
17. For which year was the ratio of turnover to gross profit the maximum?
    1) 1996 2) 1998 3) 1999 4) 2000
18. For how many years is the ratio of (gross fixed assets + turnover) to gross profits lesser than the succeeding year?
    1) 1 2) 2 3) 3 4) 4

Directions (Q. 19-22): Refer to the tables below:

The following tables give information related to fertilisers (nitrogen and phosphate).

Fertilizer output in Nineties				
Year	Nitrogen (lac tonnes)	Cap. util. (%)	Phosphates (lac tonnes)	Cap. util. (%)
1990-91	69.93	85.80	20.51	74.50
1991-92	73.01	88.50	25.62	93.10
1992-93	74.30	88.00	23.06	82.10
1993-94	72.31	83.90	18.16	64.30
1994-95	79.45	91.20	24.93	88.30
1995-96	87.77	96.90	25.58	90.60
1996-97 (Est.)	90.23	97.00	26.80	91.00

Year	Fertilizer consumption (lac tonnes)
1990-91	125.46
1991-92	127.28
1992-93	121.55
1993-94	123.66
1994-95	135.64
1995-96	144.30

19. By what percentage was consumption of fertilizers greater than the production of fertilizers in the year 1992-93?
    1) 22 2) 23 3) 25 4) 26
20. What was the increase in total production capacity of phosphate fertilizers between 1991-97?
    1) 1.5 lac tonnes 2) 2 lac tonnes 3) 2.5 lac tonnes 4) 1 lac tonnes

21. Total fertilizer production in 1995-96 was what percentage of total fertilizer consumption (approximately)?
1) 78 2) 79 3) 77.5 4) 78.5

22. Between 1990-96, production of nitrogen fertilizer was what percentage of total consumption of fertilizers?
1) 50 2) 45 3) 60 4) 65

Answers and explanations

1. 1; Expected per annum consumption of coal in ndia = $\frac{290}{60}$ = 4.8 metric tonnes per year

Population of India = 50% of (53% of 6 billion) $\approx$ 1.6 billion

$\therefore$ expected average consumption of coal per annum per thousand people

$$= \left[\frac{(4.8 \text{ metric tonnes})}{(1.6 \text{ billion})}\right] = \frac{(4.8 \times 10^6 \text{ kg})}{(1.6 \times 10^9)} \approx 0.003 \text{ kg} = 3 \text{ gm.}$$

2. 3; Total coal reserves of S Africa and Kenya = 90 + 60 = 150 metric tonnes

But 145 = 37.5% of Africa's coal reserves

So, Africa's coal reserves $\frac{(150 \times 8)}{3} = 400$ metric tonnes

Again, 400 = 22% of global coal reserves

So, the global coal reserves = 1820 metric tonnes

$\therefore$ required difference = 19% of 1820 metric tonnes $\approx$ 346 metric tonnes

3. 2; Annual average consumption of coal in Korea = $\frac{320}{90}$ = 3.55 metric tonnes

Annual average consumption of coal in Libya = $\frac{190}{105}$ = 1.81 metric tonnes

$\therefore$ required difference = 1.74 metric tonnes = 1740 kg.

4. 2; Present population of Germany = 33% of (8% of 6 bn) $\approx$ 0.16 bn

Present average consumption of coal per annum per capita in Germany

$$= \frac{145 \times 10^6}{70 \times 0.16 \times 10^9} \approx 0.013 \text{ gm.}$$

Amount of coal consumed in Germany in 50 years = $\frac{145}{70} \times 50 \approx 103.6$ metric tonnes

So, amount of coal left = 41.4 metric tonnes.

After 50 years, population of Germany = (1.125) × (0.16) $\approx$ 0.18 bn

After 50 years, average per annum per capita consumption = $\left[\frac{(41.4)}{(20 \times 0.18 \times 10^6)}\right]$ kg $\approx$ 0.012 gm.

$\therefore$ % change = $\left[\frac{(13-12)}{13}\right] \times 100\% = 7.7\%$

5. 1; Total coal reserves of European nations = 19% of 1820 $\approx$ 346 metric tonnes

Amount of coal sold off by European nations = 41% of 346 $\approx$ 142 metric tonnes

So, increase in the coal reserves of the three continents (except Africa)

$$= \frac{142}{3} = 47.33 \text{ metric tonnes.}$$

Originally, the coal reserves of Asia = 291 metric tonnes
and the coal reserves of Australia = 146 metric tonnes
So, the original coal reserves of India and NZ = $(13.8\% \text{ of } 291)+(6.4\% \text{ of } 146)$
$\approx$ 49.5 metric tonnes.
Now, the increased coal reserves of Asia = 291 + 47.33 = 338.33 metric tonnes
and the increased coal reserves of Australia = 146 + 47.33 = 193.33 metric tonnes
Now, the increased total coal reserves of India and N.Z = (13.8% of 338.33) + (6.4% of 193.33)
$\approx$ 59 metric tonnes.
So, the % increase in the total coal reserves of India and NZ = $\left[\frac{(59.43-49.5)}{49.5}\right] \approx 20\%$

6. 3; The required difference = $\frac{19}{8}-\frac{22}{16}$ = 2.375 – 1.375 = 1.0.

7. 4; Total number of people commuting in 1995 = 71142.
Number of people commuting by road = 55% of 71142 = 39128.
So, the number of people commuting by deluxe buses = 27.8% of 39128 = 10878.
Number of people commuting by air route = 18.8% of 71142 = 13375.
So, the number of people commuting by Jet Airlines = 16% of 13375 = 2140.
Hence, the required difference = 10878 - 2140 = 8738.

8. 2; Number of persons going by deluxe train from Mumbai to Pune in 1991
= 17% of (26.2% of 9372) = 417.
Number of persons going by deluxe train from Mumbai to Pune in 1992
= 17% of (26.2% of 11252) = 501.
$\therefore$ % increase in the number of persons going by deluxe train from Mumbai to Pune from 1991 to 1992 = $\left[\frac{(501-417)}{417}\right] \times 100\% = 20.14\%$.
Number of persons going by Indian Airlines from Pune to Delhi in 1991
= 46% of (18.8% of 7352) = 636.
Number of persons going by Indian Airlines from Pune to Delhi in 1992
= 46% of (18.8% of 9137) = 790.
$\therefore$ % increase in the number of persons going by deluxe train from Pune to Delhi from1991 to 1992 = $\left[\frac{(790-636)}{636}\right] \times 100\% = 24.21\%$.
$\therefore$ % change in % increase = $\left[\frac{(24.21-20.14)}{(20.14)}\right] \times 100\% = 20.21\%$.

9. 2; Number of people travelling from Chennai to Mumbai by Sahara Airlines over the period
= 20% of (18.8% of 62641)= 2355 thousands.
Total revenue generated by Sahara Airlines over the period on the Chennai to Mumbai route
= Rs (3800 × 2355) thousand = Rs 8949000 thousand $\approx$ Rs 895 crores.
Number of people travelling from Pune to Delhi by deluxe train over the period
= 17% of (26.2% of 57055)= 2541 thousand.
Total revenue generated by Indian Railways over the period on the Pune to Delhi route
= Rs (2375 × 2541) thousand = Rs 6034875 thousand $\approx$ Rs 603.5 crores.
$\therefore$ the difference in the revenues generated = Rs 291.5 crores.

10. 1; Just simply calculate $\frac{71142-49079}{49079} \times 100$ = 45% (approx.)

11. 3; Number of people travelling from Mumbai to Pune from 91 to 93 by deluxe trains
= 17% of (26.2% of 26751) = 1191 thousand (approx.)
Number of people travelling from Chennai to Mumbai from 93 to 95 by Indian Airlines = 46% of (18.8% of 43085) = 3726 thousand (approx.)

So, the required ratio = $\frac{1191}{3726} = 0.32$

12. 2; The highest % growth in the total number of people is from 93 to 94.
Number of people travelling by passenger trains in 1993 = 43% of (26.2% of 50209) = 5657 thousand
Number of people travelling by passenger trains in 1994
= 43% of (26.2% of 63587) = 7164 thousand

So, the required % growth = $\left[\frac{(7164 - 5657)}{5657}\right] \times 100\% = 26.64\%$.

OR just calculate $\left[\frac{(63857 - 50209)}{50209}\right] \times 100 = 26.69\%$

13. 2; Gross Profit of the company in 1996 = 18% of 50 = Rs 9 crores
Net Profit of the company in 1996 = 9 – (6.25 + 13.75)% of 9 = Rs 7.29 cr.

14. 3

15. 4; Gross Fixed Assets of the company in 1996 = Rs 10 crores.
Gross Profit of the company in 1996 = 18% of 50 = Rs 9 crores.

So, the ratio of Gross Fixed Assets to the Gross Profit of the company in 96 = $\frac{10}{9} = 1.11$

Gross fixed assets of the company in 1999 = Rs 50 crores.
Gross Profit of the company in 1999 = 22% of 50 = Rs 11 crores.

So, the ratio of Gross Fixed Assets to the Gross Profit of the company in 1999 = $\frac{50}{11} = 4.5$

So, the required % increase = $\left[\frac{4.5 - 1.11}{1.11}\right] \times 100 \approx 310\%$

16. 1; Gross Profit of the company in 1998 = 17% of 50 = Rs 8.50 crore.
Net Profit of the company in 1998 = 8.5 (100 – 9.65 – 11.63)% = 6.7 cr
From soln (13), Net profit of the co. in 1996 = Rs 7.29 cr
$\therefore$ required ratio = 0.92

17. 2; We have to compare ratio of Turnover (T) to Gross Profit (GP) for the years mentioned in the options.
The ratios for different years are as follows:

For 1996, required ratio = $\frac{50}{18\% \text{ of } 50} = \frac{50}{18x}$

Similarly, for 1997 $\rightarrow \frac{65}{15x}$

1998 $\rightarrow \frac{115}{17x}$

1999 $\rightarrow \frac{80}{22x}$

$2000 \rightarrow \frac{110}{28x}$

It's obvious that the ratio is maximum in 1998 because only it is more than 6.

18. 3; For the years 96, 97 and 99, the required ratio is less than the succeeding years.

19. 3; For 1992-93:

Production = 74.30 + 23.06 = 97.36

Consumption = 121.55

$\therefore$ Percentage lead of consumption over production = $\frac{121.55 - 97.36}{97.36} \times 100 \approx 25\%$

20. 2; Production capacity in 1991 = $\frac{\text{Production}}{\text{Capacity utilisation}} = \frac{20.51}{0.7450} \approx 28$

Production capacity in 1997 = $\frac{26.8}{0.91} \approx 30.$

Hence increase in capacity = 30 – 28 = 2.

21. 4; Total fertilizers production in 1995-96 = 87.77 + 25.58 = 113.35

Total consumption in 1995-96 = 144.36

$\therefore$ required percentage = $\frac{113.35}{144.3} \times 100 \approx 78.5\%$

22. 3; Production of nitrogen fertilizers from 1990-96

= 69.93 + 73.01 + 74.3 + 72.31 + 79.45 + 87.77 = 456.77

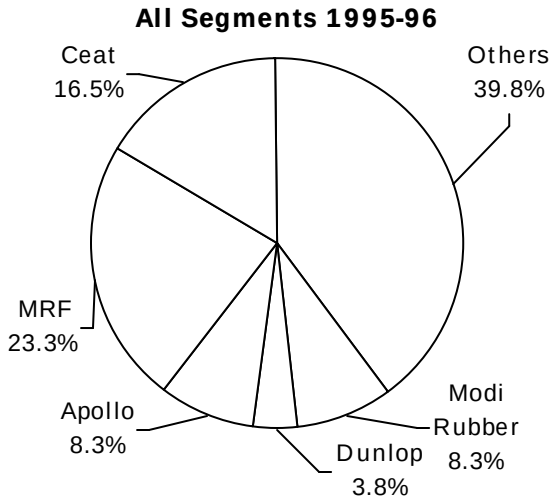
Consumption of fertilizers from 1990-96

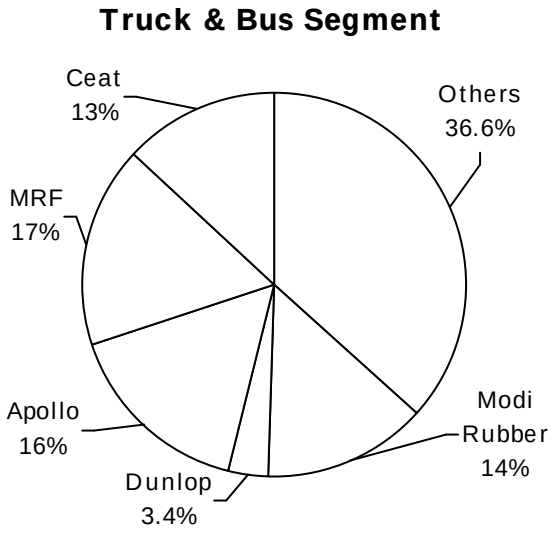
= 125.46 + 127.28 + 121.55 + 123.66 + 135.64 + 144.3 = 777.89

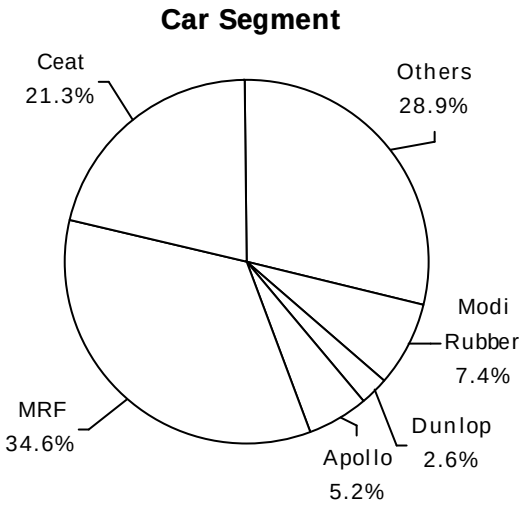
$\therefore$ Required percentage = $\frac{\text{Production}}{\text{Consumption}} \times 100 = \frac{456.77}{777.84} \times 100 \approx 60\%$

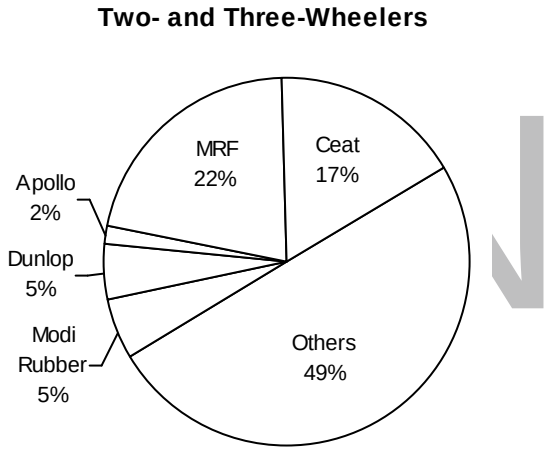
Practice Exercise 13

Directions (Q. 1-6): The following charts give data about the "total" and "segment-wise" market shares of all the rubber companies in India, for the year 1995-1996.









The total sales of Apollo in 1995-96 were Rs. 1245 crore; this was because of a 25% growth over the previous year's sales. Apollo's sales in the car segment was Rs 208 crore. The truck and bus segment conssitituted 40% of the total sales in 1995-96.

1. Apollo's sales in the "two-and three-wheelers" segments was Rs
   1) 82 crore 2) 75 crore 3) 70 crore 4) Can't be determined
2. The sales in the truck and bus segment exceeded those in the car segment by
   1) 50% 2) 75% 3) 100% 4) 150%
3. Which of the following had the maximum value of sales?
   1) Apollo in truck & bus segment 2) Ceat in two- and three-wheelers
   3) Ceat in car segment 4) Modi Rubber in all segments

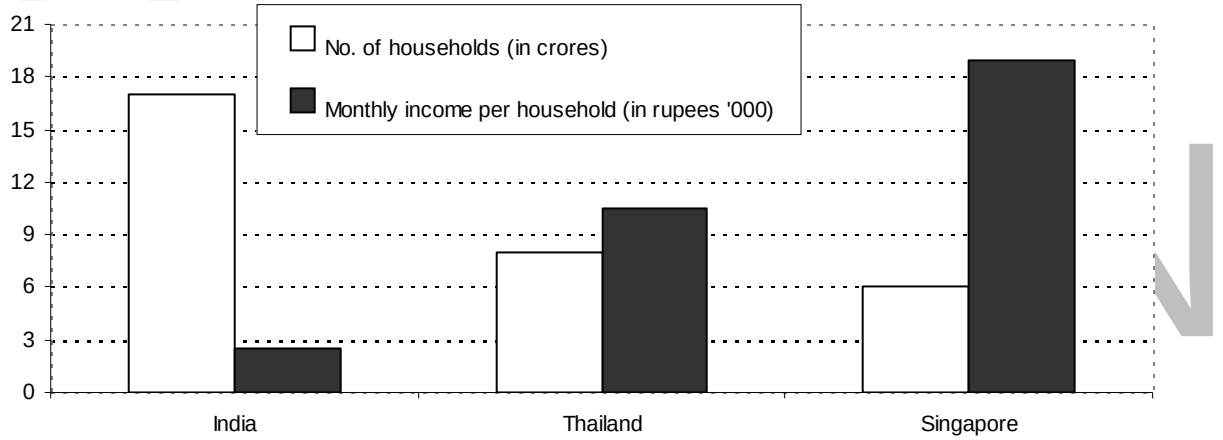
4. The sales by MRF in the truck and bus segment was
   1) Rs 840 crore 2) Rs 1384 crore 3) Rs 1020 crore 4) Rs 1395 crore
5. Apollo's sales in 1994-95 was
   1) Rs 996 crore 2) Rs 1156 crore 3) Rs 750 crore 4) None of these
6. If the sales of Car segment and Two- and Three-Wheeler segments are mixed, the overall share of Ceat is 18.7% in year 1995-96. The total share of Two- and Three-Wheeler segment is what % more/less than that of the Car segment?
   1) 13.7% less 2) 44.4% more 3) 37.7% more 4) Can't be determined

Directions (Q. 7-12): Refer to the charts below and answer the questions that follow.

Household Consumptions (%) during 2001-02

	India	Thailand	Singapore
Food and beverages	48	37	14
Clothing	4	13	4
Rent and utilities	12	10	16
Health expenditure	5	7	6
Transport and communication	13	13	22
Education	4	9	17
Household equipment	3	8	7

All except above mentioned expenses are savings

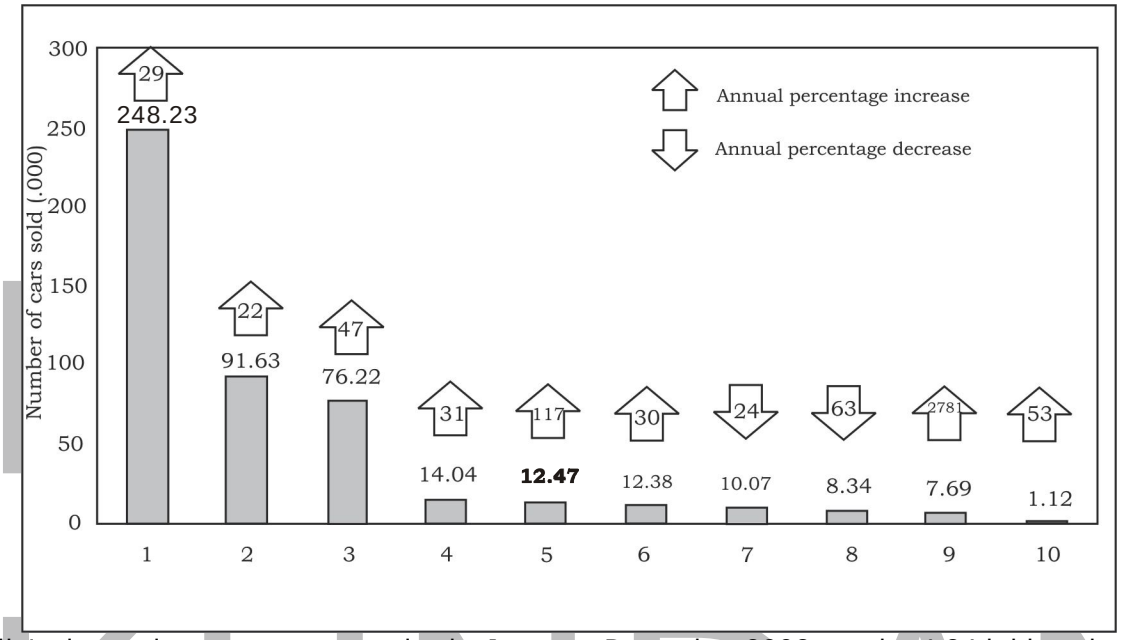


7. What is the difference between the average annual spendings per household on clothing in India and in Singapore during 2001-02?
   1) Rs 1200 2) Rs 9120 3) Rs 7920 4) Rs 28440
8. What percentage of average household savings in Singapore during 2001-2002 is the average household savings in Thailand?
   1) 10.7% 2) 22.1% 3) 32.1% 4) 50%
9. By what percentage is the average monthly spendings per household on education in Thailand more than that on health expnditure in India during 2001-2002?
   1) 80% 2) 140% 3) 280% 4) 584%
10. The number of households in Thailand is expected to grow by 15% next year while the average monthly salary per household is expected to fall by 13%. If the percentage distribution of household expenditures remains the same, what will be the total monthly expenditure on rent and utilities next year?

1) Rs 6920 crores 2) Rs 6540 crores 3) 7600 crores 4) Rs 8740 crores

11. Which of the following is true for the given three countries during 2001-2002?
    1) Average monthly expenditure per household on food and beverages is maximum for India.
    2) Total annual household expenditure on health is maximum for Thailand.
    3) Total annual household expenditure on household equipment is maximum for India.
    4) None of these
12. Find the percentage household consumption on education of India and Thailand together.
    1) 7.1% 2) 6.8% 3) 8.2% 4) Can't say

Directions (13-17): Refer to the bar graph below and answer the questions that follow.

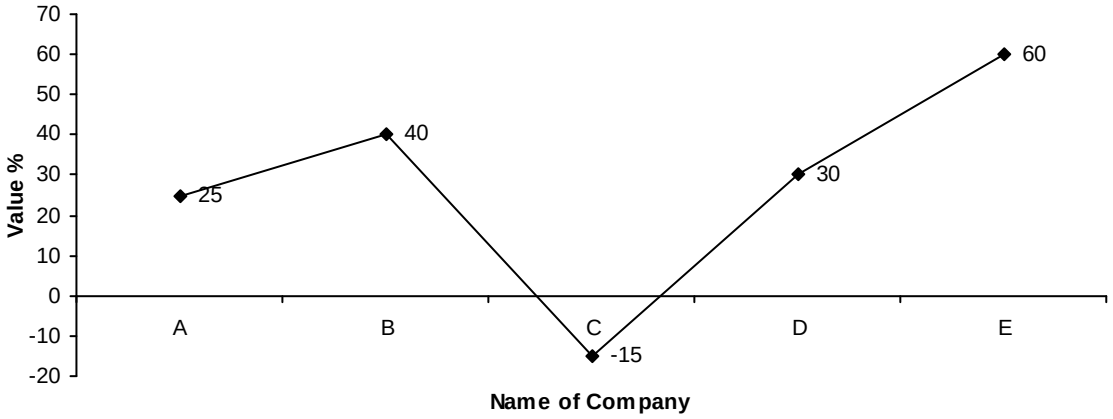


India's domestic passenger car sales in January-December 2003; total = 4.84 lakh units

1. Maruti Udyog Ltd
2. Hyundai Motors India Ltd
3. Tata Motors Ltd
4. Ford India Ltd
5. General Motors Ltd
6. Honda Seie Cars India Ltd
7. Hindustan Motors Ltd
8. Fiat India Pvt Ltd
9. Toyota Kirloskar Motor Pvt Ltd
10. Daimler-Chrysler India Pvt Ltd

13. In 2003, how many units are sold by companies other than those given in the chart?
    1) 2320 2) 1810 3) 3805 4) 2830
14. How many units of cars were sold by the given companies in the year 2002?
    1) 480000 2) 420340
    3) 382120 4) 342140
15. If annual percentage change remains the same for Ford India Ltd and Hindustan Motors Ltd for the year 2004, then what will be the difference between the numbers of cars sold by these two companies in year 2004?
    1) 9740 2) 11400 3) 10739 4) 12742
16. In year 2002, how many companies sold more than 10000 cars?
    1) 6 2) 5 3) 4 4) 2
17. What percentage of combined sales of General Motors Ltd, Fiat India Pvt Ltd and Tata Motors Ltd in year 2003 is the combined sales of Hindustan Motors Ltd, Ford India Ltd, Hyundai Motors Ltd?
    1) 100% 2) 80% 3) 120% 4) 95%

Directions (Q. 18-20): The following line chart shows the percentage increase in the sale of companies A, B, C, D and E in year 2002 with respect to year 2001.



18. The ratio of sales of company A, B, C, D and E in year 2001 is 5 : 4 : 3 : 2 : 6. Find the overall % increase in the sale of all the five companies together.
    1) 33% 2) 37% 3) 39% 4) 42%
19. If the overall percentage increase in the sale of companies B and C together is 19% in year 2002, find the ratio of sale of companies B and C in year 2001.
    1) 11 : 7 2) 34 : 21 3) 17 : 14 4) Can't say
20. Which company has the maximum sale in year 2002?
    1) E 2) B 3) D 4) Can't say

Answers and explanations

1-6: In the beginning, please note that all the pie charts add up to hundred, so the shares given are the per cent shares. Apollo's share in all segments is 8.3% in 1995-96 = Rs 1245 crore.

$\therefore$ Total sales in 1995-96 = (1245) (100) / 8.3 = Rs 15000 crore;

Apollo's share in car segment is 5.2% = Rs 208 crore.

$\therefore$ Total sales in car segment = (208) (100) / 5.2 = Rs 4000 crore;

Total sales in trucks & buses segment = 40% of total sales = (40) (15000) / 100 = Rs 6000 crore;

Total sales in two- & three-wheeler segment = (15000 - 4000 - 6000) = Rs 5000 crore.

1. 2; Apollo's sales in two- & three-wheeler segment = (1.5) (5000) / 100 = Rs 75 crore.
2. 1; Sales in the truck & bus segment exceeded that in the car segment by = (6000 - 4000) (100) / (4000) = 50%.
3. 4; Apollo's sales in truck & bus segment = 16% of 6000 = Rs 960 crore.

   Ceat's sales in two- and three-wheeler segment = 16.9% of 5000 = Rs. 845 crore.

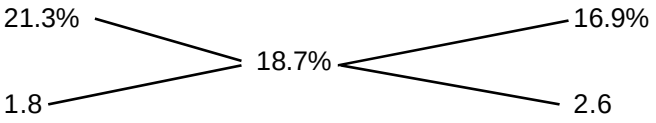
   Ceat's sales in car segment = 21.3% of 4000 = Rs. 852 crore.

   Modi Rubber sales in all segments = 8.3% of 15000 = Rs 1245 crore

   Among the above, Modi Rubber sales in all segments is the maximum.
4. 3; MRF sales in truck & bus segment = (6000) (17) / (100) = Rs 1020 crore.
5. 1; Apollo's sales in 1994-95 = (1245) / (1.25) = Rs 996 crore.
6. 2; 18.7% is the overall share of Car segment and Two- and Three-Wheeler segment. Therefore as per the method of alligation discussed in theory part:

   18.7% is the weighted mean of 21.3% and 16.9%.

Car Segment | Two- and Three-Wheelers Segment



$\equiv$ 9 : 13

Now, total sales of the Two- and Three-Wheeler Segment is greater than that of the Car segment.

$$\text{Required \%} = \frac{13K - 9K}{9K} \times 100 = \frac{400}{9} = 44.4\%$$

7. 3; Average annual spending per household on clothing in India during 2001-2002

$$= \frac{4}{100} \times 2500 \times 12 = \text{Rs. } 1200.$$

Average annual spending per household on clothing in Singapore during 2001-2002

$$= \frac{4}{100} \times 19000 \times 12 = \text{Rs. } 9120.$$

$\therefore$ Difference = 9120 - 1200 = Rs. 7920.

Alternative Method:

Since percentage shares of spending on clothes are the same,

difference = $\frac{4}{100} \times (19000 - 2500) \times 12 = \frac{4}{100} \times 16500 \times 12$ = Rs 7920.

8. 1; Household savings in Singapore and Thailand are 14% and 3% of household income respectively.

$\therefore$ Ratio of total household savings in Thailand and Singapore during 2001 -2002

= Ratio of % of household savings × Ratio of average household income

$$= \frac{3}{14} \times \frac{9500}{19000} = \frac{3}{28} = 0.107, \text{ i.e. } 10.7\%.$$

9. 4; Average monthly spending per household on education in Thailand = $\frac{9}{100} \times 9500$ = Rs 855.

Average monthly spending per household on health in India = $\frac{5}{100} \times 2500$ = Rs 125.

$\therefore$ Required % = $\frac{855 - 125}{125} \times 100 = 584\%$

$\therefore$ The former is 584% = (6.84 – 1) × 100) more than the latter.

10. 3; Number of households in Thailand next year = 8 × 1.15 = 9.20 crores.

Average monthly salary per household next year = 9500 × 0.87 = Rs 8265.

Total monthly expenditure on rent and utilities next year

$$= \frac{10}{100} \times 8265 \times 9.20 \approx \text{Rs } 7600 \text{ crores.}$$

11. 4; Statement (1) is false as for Thailand, average monthly expenditure per household on food and beverages is maximum.

Statement (2) is false as total annual household expenditure on health is maximum for Singapore.

Statement (3) is definitely false for India.

12. 1; Nos. of households in India and Thailand are in the ratio 17 : 8.

Monthly incomes per household in India and Thailand are in the ratio 2.5 : 9.5 = 5 : 19

Required % = $\frac{(17\times5\times0.04)+(8\times19\times0.09)}{(17\times5)+(8\times19)}\times100=\frac{3.4+13.68}{237}\times100\approx7.2\%$

13. 2; Total number of units sold by the given companies
= 248.23 + 91.63 + 76.22 + 14.04 + 12.47 + 12.38 + 10.07 + 8.34 + 7.69 + 1.12
= 482.19 = 482190
Total number of units sold = 484000.
Cars sold by companies other than those given in the chart = 484000 - 482190 = 1810.

14. 3;

	Sales in 2002 (in '000)
Maruti Udyog Ltd	192.42
Hyundai Motors India Ltd	75.1
Tata Motors Ltd	51.85
Ford India Ltd	10.71
General Motors Ltd	5.74
Honda Seil Cars India Ltd	9.52
Hindustan Motors Ltd	13.25
Fiat India Pvt Ltd	22.54
Toyota Kirloskar Motors Pvt Ltd	0.26
Daimer-Chrysler India Pvt Ltd	0.73
Total	**382.12**

15. 3; Sales of Ford India Ltd in 2004 = 14.04 × 1.31 = 18.3924
Sale of Hindustan Motors Ltd in 2004 = 10.07 × 0.76 = 7.6532
Difference = 18392 - 7653 = 10739.

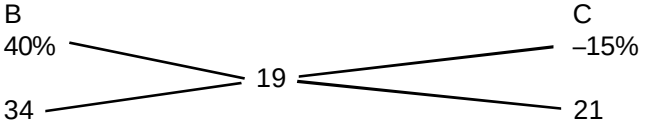
16. 1; Refering to the table from soln of Q 14 we can find that only 6 companies managed to sell more than 10000 cars in year 2002.

17. 3; In 2003, combined sales of Hindustan Motors Ltd, Ford India Ltd and Hyundai Motors Ltd
= 10.07 + 14.04 + 91.63 = 115.74
Combined sale of General Motors Ltd, Fiat India Pvt Ltd and Tata Motors Ltd
= 12.47 + 8.34 + 76.22 = 97.03

Required % = $\frac{115.74}{97.03}\times100=119.28\approx120\%$

18. 1; Required percentage increase = $\frac{5}{20}\times25+\frac{4}{20}\times40-\frac{3}{20}\times15+\frac{2}{20}\times30+\frac{6}{20}\times60=\frac{660}{20}=33\%$

19. 2; 19% increase is the weighted mean of 40% and –15%. The base year is 2001.



Required ratio of sales of companies B and C in year 2001 = 34 : 21.

20. 4; Since, sales of company in year 2001 is not given. Hence, data inadequate.

Practice Exercise 14

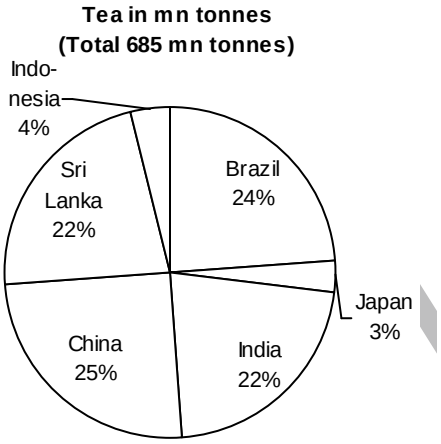
Directions (Q. 1-4): Refer to the charts below and answer the questions that follow.

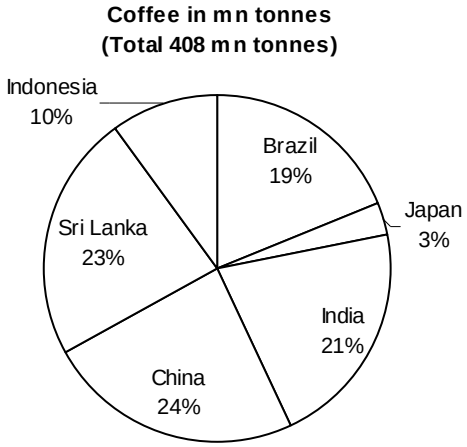
Out of 100 people who took CAT last year, 3 got a call from IIM - A, 7 from IIM - B, 13 from IIM - C and 17 from one or more of the other IIMs (L, K and I). Every person who had a call from IIMs A, B & C also had a call from one of the other IIMs (L, K & I). Only one person was lucky enough to get a call from A, B and C. 5 people had calls from both B and C, and nobody had a call from only A and C. 2 people had calls from both A & B.

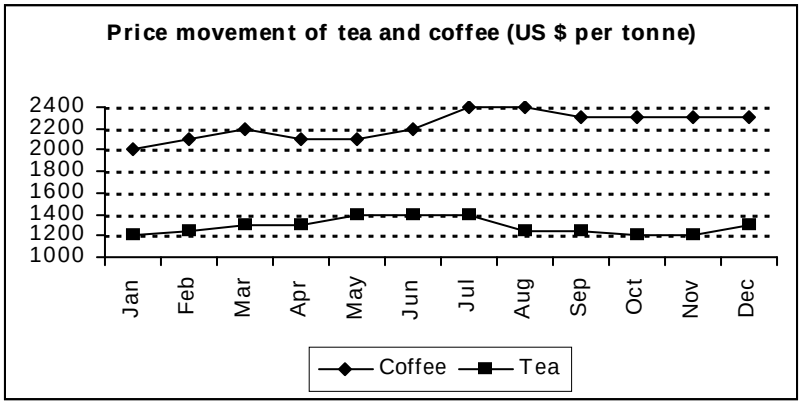
1. How many people had a call from IIM - C, but not from A or B?
   1) 10 2) 9 3) 8 4) 7
2. How many people received a call from any one or more of the IIMs L, K & I but not from A, B and C?
   1) None 2) 1 3) 3 4) Data insufficient
3. In all, how many people received calls from the IIMs?
   1) 17 2) 18 3) 20 4) 33
4. What is the minimum number of people who have received calls from at least 3 IIMs?
   1) 1 2) 2 3) 5 4) 6

Directions (Q. 5-8): Refer to the charts below and answer the questions that follow.

The following pie charts give the data regarding the world-wide tea and coffee production for the year 1999-2000.



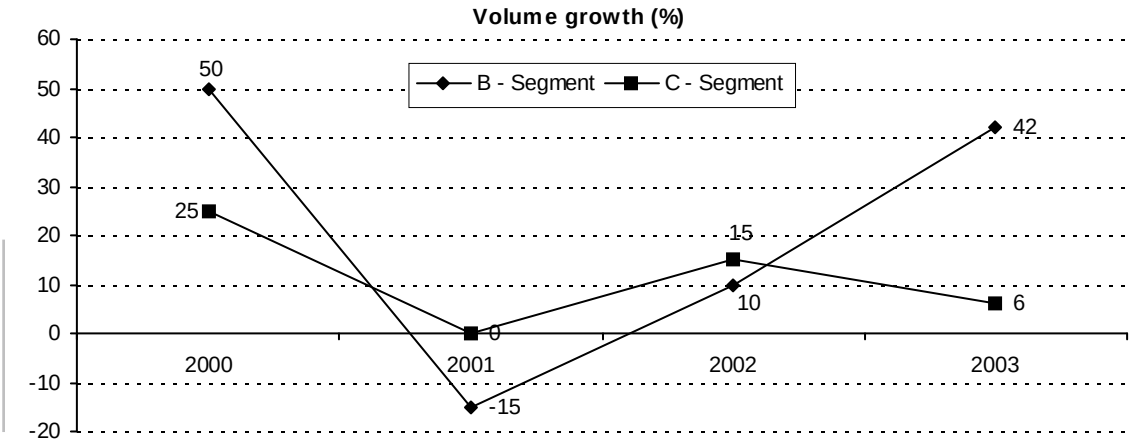




5. The tea production of India exceeded its coffee production by ..... %.
   1) 60 2) 54 3) 75 4) 82

6. The average value of Japan's tea production during 1999-2000 was ..... (in billion US $).
   1) 35.5 2) 26.25 3) 40.25 4) Can't be determined
7. If 30% of the world's tea and 20% of the world's coffee was produced in the month of May then the value of production of these two commodities for the month of May would be ..... (in billions of US $).
   1) 396 2) 356 3) 508 4) 459
8. Brazil's tea production exceeded that of Indonesia and Japan put together by ..... %.
   1) 200 2) 156 3) 240 4) 298

Directions (Q. 9-11) Refer to the charts below and answer the questions that follow.



All the models under a particular segment follow the same trend as that of the entire segment.

C-Segment		
Model price (Rs lakh)	**2001**	**2003**
Maruti Esteem	4.9	4.66
Tata Indigo	-	4.63
Ford Ikon	5.35	4.95
Hyundai Accent	6.00	5.69
Honda City	6.86	6.67
Mitsubishi Lancer	7.1	6.5

9. The volume of Ford Ikon cars is 670000 in 1999. Then, what is the collective cost of all Ford Ikons in year 2001?
   1) Rs 8044625 lakh 2) Rs 4480625 lakh 3) Rs 44506150 lakh 4) Rs 804462 lakh
10. If for Maruti 800, which is a segment B car, the volume is 530000 in 1999, then what is the difference between the volumes of Maruti 800s and Ford Ikons in year 2002? (Refer data from previous question.)
    1) 186000 2) 219800 3) 161000 4) 147000
11. If the volume of B segment cars is the same as that of C segment cars in 1999 as well as in 2004 and there is no increase in the volume of B segment cars in 2004, then what must be the increase in the volume of C segment cars in 2004?
    1) 22.22% 2) 36.66% 3) 43.33% 4) 30.73%

Directions (Q. 12-15): Refer to the table below and answer the questions that follow.

The number of students in five Engineering Colleges P, Q, R, S and T is 20 boys and 20 girls each.

The table gives the average marks obtained by each boy and girl in five subjects from these colleges.

Subject	Max. Marks	Colleges									
		P		Q		R		S		T	
		B	G	B	G	B	G	B	G	B	G
Physics	200	145	170	160	150	120	130	165	170	155	160
Applied Mechanics	200	100	110	90	100	100	110	100	90	130	120
Mathematics	200	120	110	95	85	130	130	75	80	130	135
Computer	200	105	125	110	120	115	115	85	90	140	135
Electronics	200	100	100	100	70	110	100	100	110	120	130

12. In which of the following subjects did girls have the highest average marks?
    1) Computer 2) Electronics 3) Mathematics 4) Physics
13. Which of the following Engineering colleges has the least pooled average (of boys and girls) in all subjects?
    1) S 2) P 3) Q 4) R
14. Which of the following Enginnering colleges has the highest difference between the marks scored by the girls in Mathematics and that by the boys in Applied Mechanics?
    1) Q 2) P 3) R 4) S
15. What was the difference between the Mathematics marks of boys of college P and girls of college R?
    1) 120 2) 130 3) 100 4) None of these

Directions (Q. 16-20): Refer to the table below and answer the questions that follow.

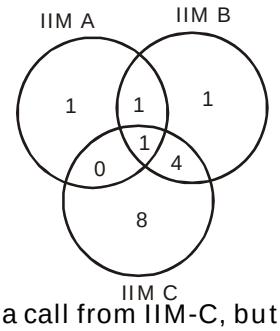
Salary range for an organisation for all male and female employees

Range (in Rs)	Males	Females
Salary < 3000	70	45
3000 ≤ Salary < 5000	140	90
5000 ≤ Salary < 8000	48	28
8000 ≤ Salary < 12000	16	8
12000 ≤ Salary < 20000	9	3
20000 ≤ Salary	3	1

16. What is the approximate average monthly income of males in the organisation?
    1) Rs 6248 2) Rs 5840 3) Rs 7102 4) Data Insufficient
17. What is the minimum average monthly income (approximately) of the female employees who do not earn less than Rs 3000?
    1) Rs 4077 2) Rs 3946 3) Rs 4388 4) Data Insufficient
18. What is the ratio of the maximum average monthly salaries of all the male employees to all the female employees who earn equal?
    1) 19 : 10 2) 5 : 4 3) 4.5 : 3.0 4) Data Insufficient
19. What per cent of the total employees earn less than Rs 12000 but more than or equal to Rs 5000 as their monthly salary?
    1) 17.4% 2) 21.7% 3) 19.8% 4) Data Insufficient
20. Which of the following cannot be deduced from the given data?
    1) On an average, out of 66 employees in the organisation approximately 25 are females.
    2) Less than 3% employees of the organisation earn more than Rs 20000 per month.
    3) Majority of the employees earn more than or equal to Rs. 3000 but less than or equal to Rs 5000 as per month's salary.
    4) Both (1) and (2)

Answers and explanations

1-4:



1. 3; 8 people had a call from IIM-C, but not from A or B.
2. 2; From the figure $n(A \cup B \cup C) = 16$
   All these people got a call from one of L, K, I
   Total who received call from L, K, I = 17 $\Rightarrow$ 17 – 16 = 1 person received a call from one of L, K and I and not from A, B or C. Hence (2).
3. 1; Since every person who received calls from A, B, or C also received calls from L, K and I and the total from L, K, I is 17, it follows that in all only 17 people received calls.
4. 4; All those who received a call from more than one of IIMs A, B and C, also received a call from at least one among L, K, and I. This is the minimum number of people receiving calls from at least three IIMs.
   1 (A, B, and C) + 1(A and B) + 4(B and C) = 6 people minimum.
5. 3; Tea production in India = 22% of 685 = 151
   Coffee production in India = 21% of 408 $\approx$ 86.
   $\therefore$ Required percentage = $\frac{151-86}{86} \times 100 \approx 75\%$
6. 4; Since we do not know which month's tea was produced and sold in Japan, average value cannot be determined. Hence, (4)
7. 4; (30% of 685 × 1400) + (20% of 408 × 2100)
   $\approx$ (30 × 700 × 14) + (20 × 400 × 21) = (294000 + 168000) million \$
   = 462000 × 10^6 \$ = \$462 billion. The nearest option is 459.
8. 3; Brazil's tea production = 24% of 685
   Indonesia and Japan's tea production = 7% of 685
   $\therefore$ % excess = $\frac{(24-7)\% \text{ of } 685}{7\% \text{ of } 685} \approx 243\%$.
9. 2; Volume of Ford Ikon in 1999 is 670000
   Volume in 2000 = 670000 × 1.25 = 837500
   Volume in 2001 = 837500 × 1.00 = 837500
   So, total cost of all Ford Ikons = 837500 × 5.35 = Rs 4480625 lakhs.
10. 2; From the previous question,
    volume of Ford Ikon in 2001 = 837500
    and volume of Ford Ikon in 2002 = 837500 × 1.15 = 963125
    Volume of Maruti 800 in 2002 = 530000 × 1.5 × 0.85 × 1.1 = 743325
    So, required difference = 963125 - 743325 = 219800
11. 4; Let the volume in 1999 be 100 for both the segments.
    Volume of B segment cars in 2004 = 100 × 1.5 × 0.85 × 1.1 × 1.42 × 1.00 = 199.155 = 199
    Let percentage increase in the volume of segment C cars be *x* in 2004.

Volume of C segment cars in 2004 = $100 \times 1.25 \times 1.00 \times 1.15 \times 1.06 \times \left(1+\frac{x}{100}\right) = 152\left(1+\frac{x}{100}\right)$

Equating the volumes, $152\left(1+\frac{x}{100}\right)=199 \Rightarrow x \approx 30.92\%$.

Note: Use the multiplying factor where necessary.

12. 4; Average marks obtained by girls from all Engineering colleges is as follows:

Average marks in Physics = $\frac{1}{5}(170+150+130+170+160) = \frac{1}{5}(780)=156$

Similarly, average marks in Applied Mechanics = 106, Mathematics = 108, Computer = 117 and Electronics = 102.

Hence, the average is highest for Physics.

13. 1;

Enginnering Colleges	Average Marks of Boys	Average Marks of Girls	Pooled Average Marks
P	114	123	118.5
Q	111	105	108
R	115	117	116
S	105	108	106.5 (Minimum)
T	135	136	135.5

The minimum pooled average marks is from college S.

14. 3; 130 – 100 = 30 is the highest difference in college R.
15. 4; Required difference = (130 – 120) × 20 = 200.
16. 4; Unless we know the exact salary of the employees, we can't calculate the average salary.
17. 1; As we are talking about the minimum average salary, we will assume the minimum value of the range for each group. For example, 90 females will have Rs 3000 as the minimum salary and 28 female employees will have Rs 5000 as the minimum salary.

$\frac{90\times3000+28\times5000+8\times8000+3\times12000+1\times20000}{90+28+8+3+1} \approx$ Rs 4077

18. 4; We do not know exact salaries of those 3 male employees and 1 female employee who earn more than Rs 20000. So we can't say anything about this.
19. 4; Total no. of employees = 461

No. of employees who earn more than or equal to 5000 but less than 12000

= 48 + 28 + 16 + 8 = 100

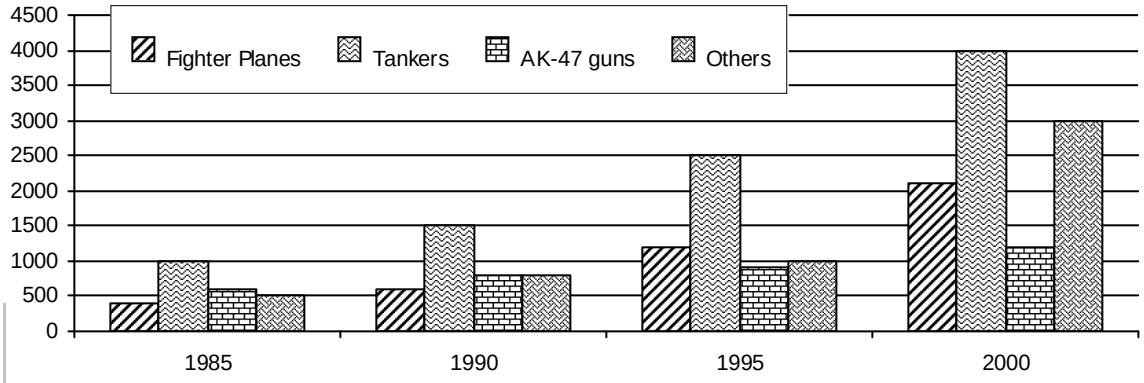
$\therefore$ required % = $\frac{100}{461}\times100 \approx 21.7\%$

20. 3; There are 286 male employees and 175 female employees in the company. (1) and (2) are easily inferred from the data but (3) is not, as we cannot find the number of employees earning more than or equal to 3000 but less than or equal to 5000.

Practice Exercise 15

Directions (Q. 1-6): These questions are based on the following information.
Use data from previous questions if required.

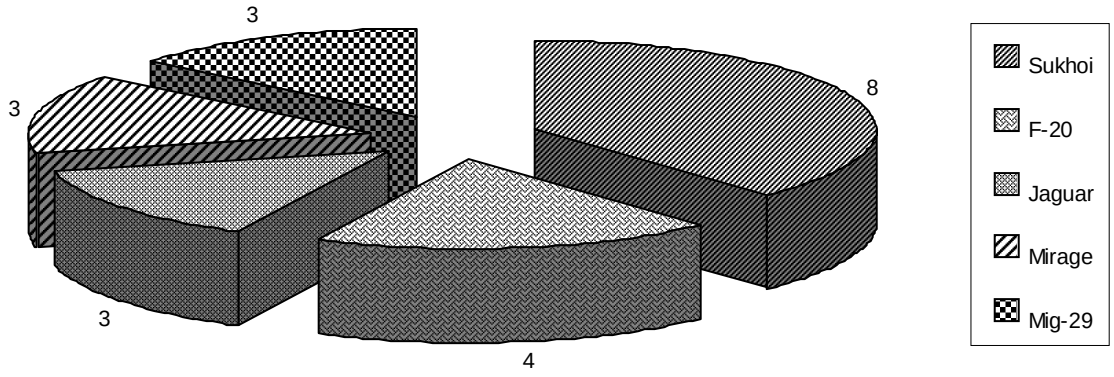
The bar-graph gives the amount spent by India on defence equipment purchase over different years. The values mentioned above are in US dollars. For fighter planes and Others, the values are in crores while, the values for AK-47 guns and tankers are in lakhs.



The following table gives the sources of India's purchase of defence equipment for the year 1995.

Country	Value of Purchase (in billion US $)
Russia	12
Sweden	3
North Korea	2
Britain	2
USA	2
Others	1.34

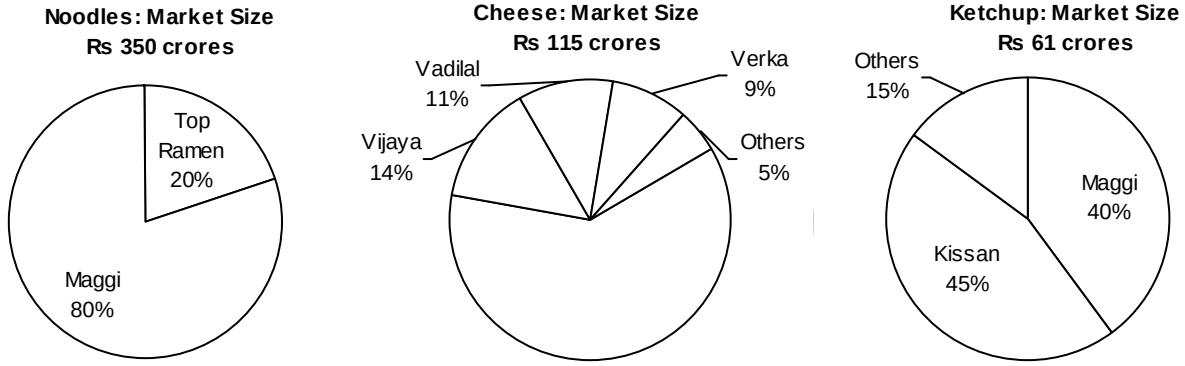
The following pie-chart gives the breakup of expenditure (in billion US $) involved in purchase of different fighter planes in the year 2000.



1. The average price of all the purchased fighter planes combined together is $20 million in 1985. The average price of a plane increases by $1 million every year. What is the increase in the no. of fighter planes bought in 2000 as compared to 1985?
   1) 300 2) 350 3) 400 4) Indeterminable

2. Sukhoi is a fighter plane bought only from Russia. In 2000, price of a Sukhoi becomes $50 million after witnessing an increase of 25% over its 1995 value. The expenditure on Sukhoi in 2000 also increased by 33.3% over the expenditure in 1995. The no. of Sukhoi aircraft purchased in year 1995 is what percentage of the total number of Sukhoi aircraft purchased in year 2000?
   1) 79.5% 2) 84.25% 3) 93.75% 4) Indeterminable
3. What is the average price of all other aircraft excluding Sukhoi in 1995?
   1) $ 20 m 2) $ 24 m 3) $ 30 m 4) Indeterminable
4. In the year 2000, 60% of the amount spent under 'Others' was utilized for importing electric fencing equipment for the Indian border with its neighbouring countries. India has a land border of 10000 km with its neighbouring countries, of which 30% is land bordering with Pakistan. Further, installation, maintenance, labour and other charges of Rs 5 million per km were required. What was the total amount spent on the entire process of fencing the Indo-Pak border? (Given 1 US $ = Rs 45)
   1) Rs 6.9 billion 2) $ 6.9 billion 3) $ 6.06 billion 4) $ 5.73 billion
5. In 2000, purchases from Britain increased by 50%. So, what per cent of total purchases is done from Britain in the year 2000?
   1) 5.5% 2) 6.5% 3) 8% 4) 10%
6. The AK-47 is a fast and light machine gun. For every purchase of an AK-47, 1000 rounds of free bullets are distributed as a complimentary gift. The price of an AK-47 is $ 0.016 million in 1990. How many free bullets were obtained for free in the year 1990?
   1) 5 million 2) 5 lakhs 3) 4 million 4) 4 lakhs

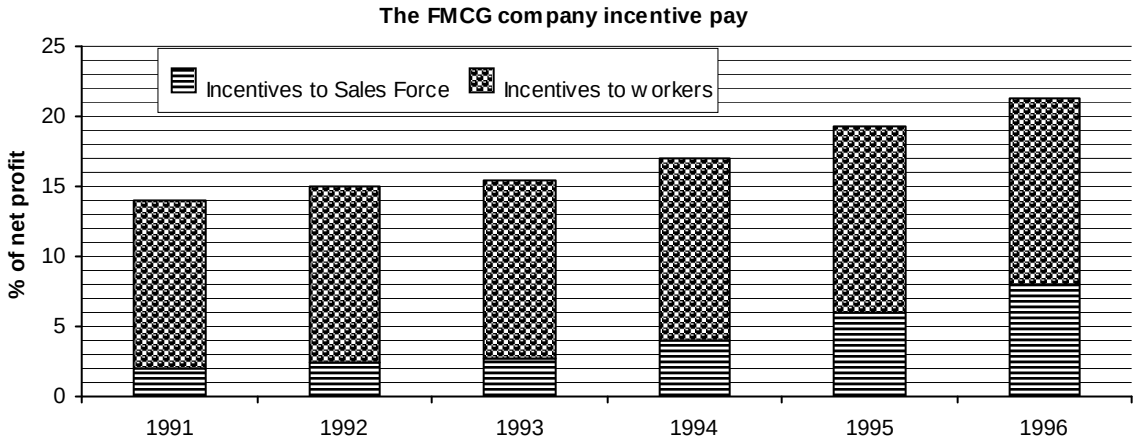
Directions (Q. 7-11): These questions are based on the following pie-charts.



7. In the chart of cheese, what is the difference between the central angles formed by Amul and Vadilal?
   1) 180° 2) 186° 3) 189° 4) 178°
8. A town named Khanapur is exactly representative of the total market for these products, except that it is one-thousandth the size of the total market. If it has a population of 52000 people, what is the average total per capita expenditure (in Rupees) on these three items?
   1) 97 2) 110 3) 105 4) 101
9. The elders in Khanapur recalled that a couple of decades ago, when the population of the town was just 30000 (present population = 52000), they used to spend Rs 125 per capita for these items as well as bread. At that time, the total market share of bread must have been _____ lakh rupees. Assume per capita expenses growth at 1% p.a.
   1) 7.15 2) 7.51 3) 8.15 4) Indeterminable
10. If Kissan diversified into the Noodles market, capturing 15% of the market held by Maggi, what would be the share of Kissan in the entire food market given (Rs crores)?
   1) 75 2) 65 3) 70 4) 72

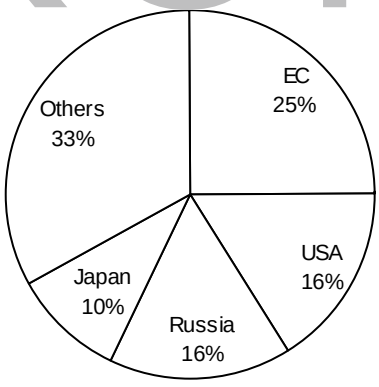
11. If Maggi produces Superior and Ordinary types of its products - noodles and ketchup - in the ratio of 3 : 2 and 7 : 3 respectively, find the total market share (in Rupees crore) of the Ordinary type of products of Maggi.
1) 119.3 2) 124.3 3) 109.3 4) 115.3

Directions (Q. 12-14): These questions are based on the following bar graph. Data from questions may be used in subsequent questions.

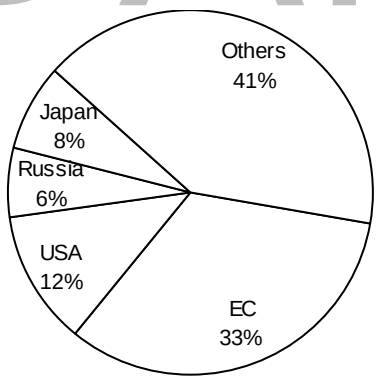


12. If the total incentive given to workers and the sales force in 1991 was Rs 14 lakhs what was the net profit of the company in that year?
1) Rs 50 lakh 2) Rs 1 crore 3) Rs 90 lakh 4) Rs 1.5 crore
13. In 1992 the net profit increased by 25% over the previous year. What was the amount (in Rs lakhs) disbursed by way of incentives to the workers?
1) 13.5 2) 14.5 3) 15.625 4) 16.5
14. In 1993 the net profit increases by 20% over the previous year. If each member of the sales force received Rs 10000 by way of incentive, how many people constituted the sales force?
1) 42 2) 52 3) 62 4) 72

Directions (Q. 15-17): The following pie-charts show the Exports and Imports of India. Refer to the graphs to answer the questions that follow.



Exports from India



Imports to India

15. Out of the total exports to Russia, the export earnings from watches amounted to US $ 1.5 million. So India's total imports are more than its exports. This statement
1) is true 2) is false
3) requires data on total exports to Russia 4) is uncertain

16. If 50% of the exports to Japan now get diverted to the EC, then the exports to EC would increase by 20%. This statement
    1) is true 2) is false
    3) requires data on exports to Japan and EC 4) is uncertain
17. If total exports are one-tenth the total imports, what is the deficit in India's trade with Japan as a percentage of trade deficit with Russia?
    1) 59% 2) 63% 3) 159% 4) uncertain

Directions (Q. 18-20): The following table shows the marks obtained by 100 students in Maths, Science and the average of the two subjects.

Subjects	Marks obtained out of 100				
	0-20	20-40	40-60	60-80	80-100
Maths	9	13	17	38	23
Science	12	16	18	32	22
Average of the two subjects	11	17	19	34	19

18. Find the number of students who got 60% or more marks in both subjects.
    1) 15 2) 61 2) 53 3) Can't be determined
19. If to qualify in the examination one has to secure a minimum of 60% marks in either of the subjects, find the least number of students who have qualified the examination.
    1) 53 2) 54 3) 61 4) Can't be determined
20. If to qualify in the examination one has to secure a minimum of 60% marks in both subjects, find the maximum number of students who have qualified the examination.
    1) 15 2) 54 3) 32 4) 53

Answers and explanations

1. 3; In 1985, amount spent on fighter planes is \$ 400 crore = \$ 4000 million. So, no. of planes bought $= \frac{4000}{20} = 200$. In 2000, average price becomes \$ 35 m (increase of \$ 1 m per year from 1985). In 2000, amount spent on fighter planes = 2100 crores = 21000 million. So, no. of planes bought = $\frac{21000}{35}$ = 600. So, increase in the no. of planes bought = 600 – 200 = 400.

2. 3; In 1995, the average price of Sukhoi aircraft = $50\left(\frac{100}{100+25}\right) = 40$ million

In 1995, total amount spent on Sukhoi aircraft

$$= 8 \text{ billion } \left(\frac{3}{4}\right) = 6 \text{ billion US \$} = 6000 \text{ million US \$}$$

$\therefore$ Total number of Sukhoi aircraft purchased = $\frac{6000}{40} = 150$

And, the total number of Sukhoi aircraft purchased in year 2000 = $\frac{8000}{50} = 160$ million

Required % = $\frac{150}{160} \times 100 = 93.75\%$.

3. 2; In 1995, spending on other planes = \$ 12b – \$ 6b = \$ 6b. Other aircraft bought = 400 – 150 = 250

(from previous solution).

Hence, average price of other planes = $\frac{6000}{250}$ = $ 24 m.

4. 4; In 2000, total amount spent on Others is $ 30b. 60% of 30 = $ 18 b is spent on purchasing electric fencing equipment. Equipment required for fencing Pakisan border with India = 30% of $ 18 b = $ 5.4 billion.
Land border with pakistan = 30% of 10000 = 3000 km
So, other costs = Rs 3000 × 5 million = Rs 15000 million = Rs 15 billion

= $ $\frac{15}{45}$ = US $ 0.33 billion.

So, total costs = 5.4 + 0.33 = $ 5.73 b.

5. 1; In 1995, purchase from Britain = $ 2b.
It increased by 50%, so purchase from Britain becomes $ 3b for 2000.
In 2000, total purchases = 21b + 0.4b + 0.12b + 30b = $ 51.52b.

So, required % = $\left(\frac{3}{51.52}\right)\times 100$ approx. < 6% = 5.5%.

6. 1; In 1990, no. of AK-47 bought = $\frac{80}{0.016}$ m = 5000.

So, no. of free bullets = 5000×10^3 = 5 million bullets.

7. 1; Amul and Vadilal hold 61% and 11% of the cheese market respectively. This is a difference of 50%, ie a difference of 180° between the respective central angles.

8. 4; The total market for cheese, ketchup and noodles is 526 crores. Khanapur has a market which is $\frac{1}{1000}$ the total market, ie 52.6 lakhs. As the population of Khanapur is 52000, the average total per capita expenditure is 101.15.

9. 4; The rate of expansion is not given. Therefore we can't calculate the total market share.

10. 3; If Kissan diversified into the noodles market and captured 15% of Maggie's share, Kissan's total share would be (45% × 61) + (15% of 80% × 350) = 27.45 + 42 = 69.45.

11. 1; Maggie's market share for ketchup and noodles is 40% × 61 = 24.4 and 80% × 350 = 280 respectively. The share of ordinary ketchup is $\frac{3}{10}\times 24.4 = 7.32$ and the share of ordinary noodles is $\frac{2}{5}\times 280 = 112.$ So the total market share of ordinary products is 119.3.

12-14: From the data given we can deduce the following information:

Year	1991	1992	1993	1994	1995	1996
% P to sales force	2%	2.5%	2.75%	4%	6%	8%
% P to workers	12%	12.5%	12.75%	13%	13.5%	13.5%
Total % P	14%	15%	15.5%	17%	19.5%	21.5%

12. 2; In 1991, 14% of profit amounted to Rs 14 lakhs. So total profit was Rs 1 crore.

13. 3; In 1992 net profit increased by 25% and amounted to Rs 1.25 crores. The amount dispersed to workers is 12.5%, ie Rs 15.625 lakhs.

14. 1; In 1993 net profit increased by 20% to become Rs 1.25 × 1.2 = 1.5 crores and the number of

people in the sales force = $\frac{2.75\% \text{ of } 1.5 \text{ crore}}{10000} \approx 42$

15. 4; It is not possible to calculate either India's total imports or its total exports. So, the validity of the given statement cannot be determined. Option (3) also can't be the answer as not only total exports to Russia, but also total imports from it should be known. So, it is uncertain.
16. 1; If 50% of exports to Japan, ie 5% of the total exports, are diverted to the EC, the exports to the EC become 30% of total exports. This is an increase of 20%. So, the given statement is true.
17. 3; Let imports be = 1000y; then exports = 100y. Trade deficit with Japan = 80y – 10y. Trade deficit with Russia = 60y – 16y. So, trade deficit as % = $\left(\frac{70y}{44y}\right) \times 100 \cong 160\%$.
18. 4; The particular student who got 60% or more marks in Maths may or may not get 60% or more marks in Science. Hence we can't find the number of students who got 60% or more marks in both subjects.

    Therefore, data inadequate.
19. 3; The number of students who got 60% or more marks in any one subject qualifies the examination.

    Therefore, the least number of students who have qualified the examination = 38 + 23 = 61.
20. 2; For maximum number of students to get 60% or more marks in both subjects, 32 + 22 = 54 students who got 60% or more marks in Science must get 60% or more marks in Maths.

Practice Exercise 16

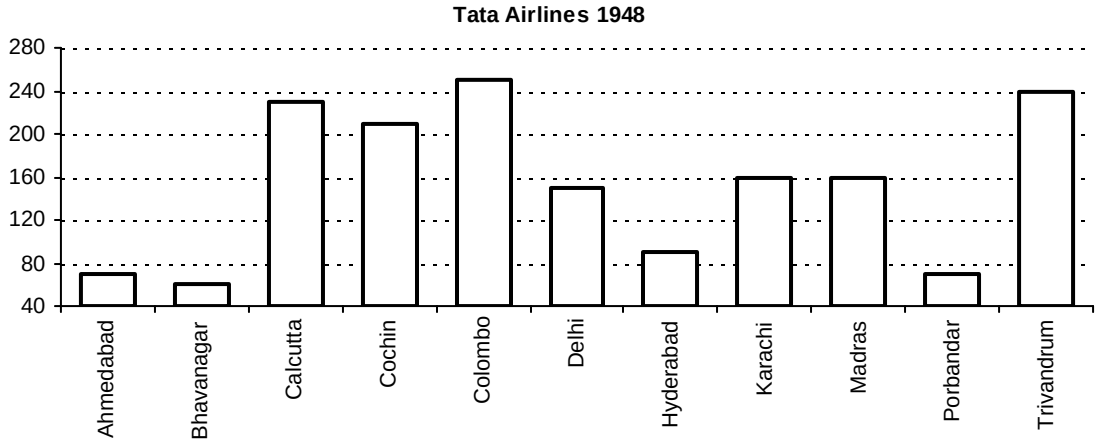
Directions (Q. 1-5): These questions are based on the following information.

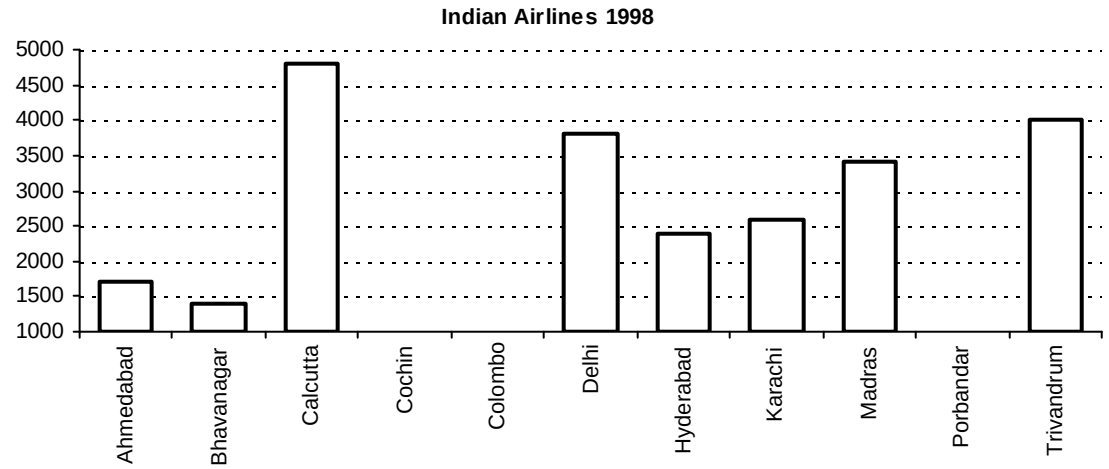
The following table gives information about the total mineral extraction in India (in thousand tonnes) for different years.

Year	Total Minerals extracted	Iron and Coal extracted
1989	220000	22000
1990	250000	25000
1991	270000	32400
1992	230000	32200
1993	240000	24000
1994	240000	21600
1995	220000	33000
1996	240000	38400
1997	240000	43200
1998	220000	35200
1999	250000	45000

1. In which year was the percentage of iron and coal extracted with respect to the total minerals extracted exactly twice that in 1994?
   1) 1997
   2) 1999
   3) Both (1) and (2)
   4) Neither (1) nor (2)
2. In which year was the total minerals extracted 900% more than iron and coal extracted in the previous year?
   1) 1993 2) 1994
   3) 1995 4) 1996
3. How many times was the percentage share of iron and coal extraction with respect to the total mineral extraction a multiple of three?
   1) 6 2) 5
   3) 4 4) 3
4. What is the average percentage share of iron and coal extracted with respect to the total minerals extracted, for the given period?
   1) 13.4% 2) 14.4%
   3) 15.4% 4) 16.4%
5. How many times has the iron and coal extraction, as a percentage of the total mineral extraction, shown a decline over the previous year?
   1) Once 2) Twice
   3) Thrice 4) Four times

Directions (Q. 6-9): These questions are based on the following bar graphs. These show the passenger fares for daily services from Mumbai (in Rs).

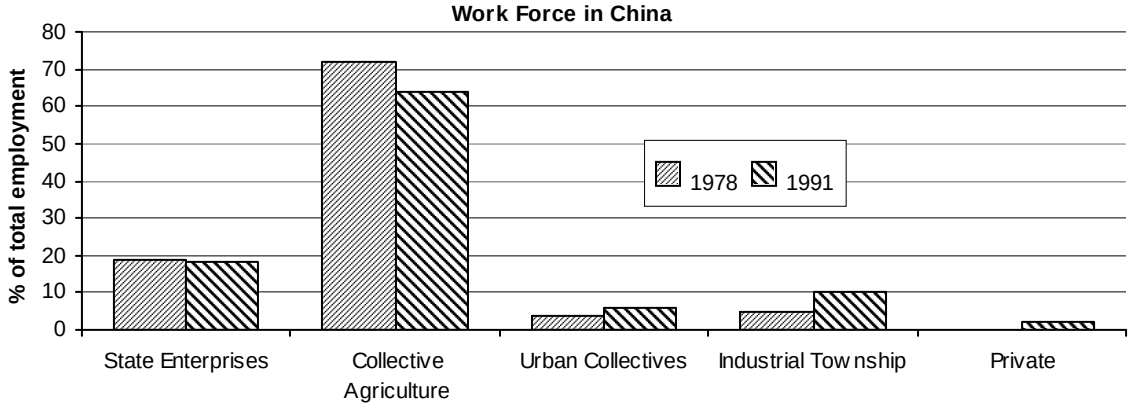




6. The total fares from Mumbai to those places to which Tata Airlines did have a flight but Indian Airlines does not, is what % of the total of fares of Tata Airlines from Mumbai to all places?
   1) 20% 2) 10%
   3) 32% 4) 42%
7. The total fares of flights of Tata Airlines from Mumbai to other cities in India in 1948 form what per cent of the total fares of Indian Airlines from Mumbai to other cities in India?
   1) 6% 2) 8%
   3) 9% 4) 10%
8. If the annual simple rate of inflation is 7.5%, how would the fare from Mumbai to Calcutta by Tata Airlines compare with its counterpart Indian Airlines? (Assume the rate of inflation to be constant for all years)
   1) Indian Airlines fare would be 4.5 times the Tata Airlines fare.
   2) Indian Airlines fare would be 3.5 times the Tata Airlines fare.
   3) Tata Airlines fare would be 5.5 times the Indian Airlines fare.
   4) Tata Airlines fare would be 3.5 times the Indian Airlines fare.
9. Indian Airlines declared a discount of 37.5% on the fares for any person who travelled from Mumbai to all other places in India where they have flights, within a period of one year. What will such a person effectively have to pay (in Rs)?
   1) 15000 2) 13000
   3) 17000 4) 19000

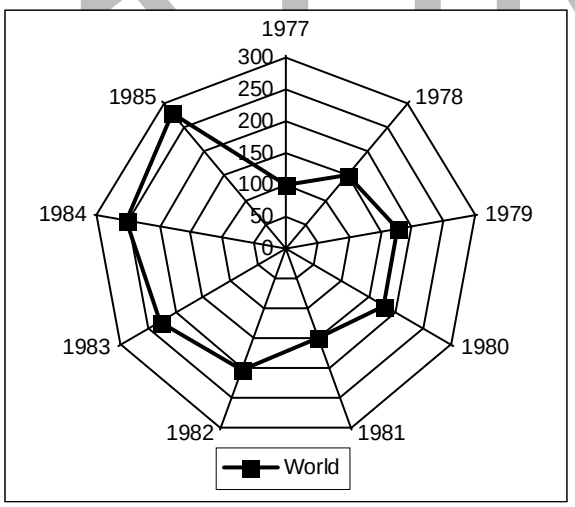
Directions (Q. 10-13): These are based on the following bar graph.

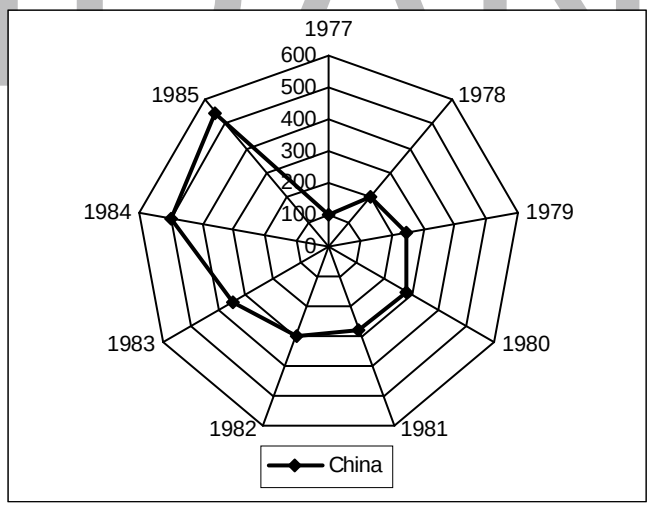
(Number of Industrial Townships in 1978 is 1,60,000)



10. Which was the first year when people were employed in private enterprises?
    1) 1978 2) 1991 3) 1989 4) Indeterminable
11. If it is known that the total work force in China increases at a simple rate of 10% per annum, then by what per cent does the number of people employed in the Urban Collectives change?
    1) 150 2) 190 3) 250 4) Indeterminable
12. It can be inferred that, in absolute terms,
    1) Collective agriculture has lost its charm for the work force.
    2) Collective agriculture remains at the 1978 level, in terms of attracting the work force.
    3) Collective agriculture has succeeded in attracting a larger work force in 1991 than in 1978.
    4) None of the above can be inferred
13. How many new industrial townships have been set up in China from 1978 to 1991?
    1) 150 2) 1500 3) 15000 4) Indeterminable

Directions (Q. 14-18): The following radar graphs show the Trade Growth (in $ billion) of World and of China from the previous year for the years 1977 to 1985. Refer to the graphs to answer the questions that follow.

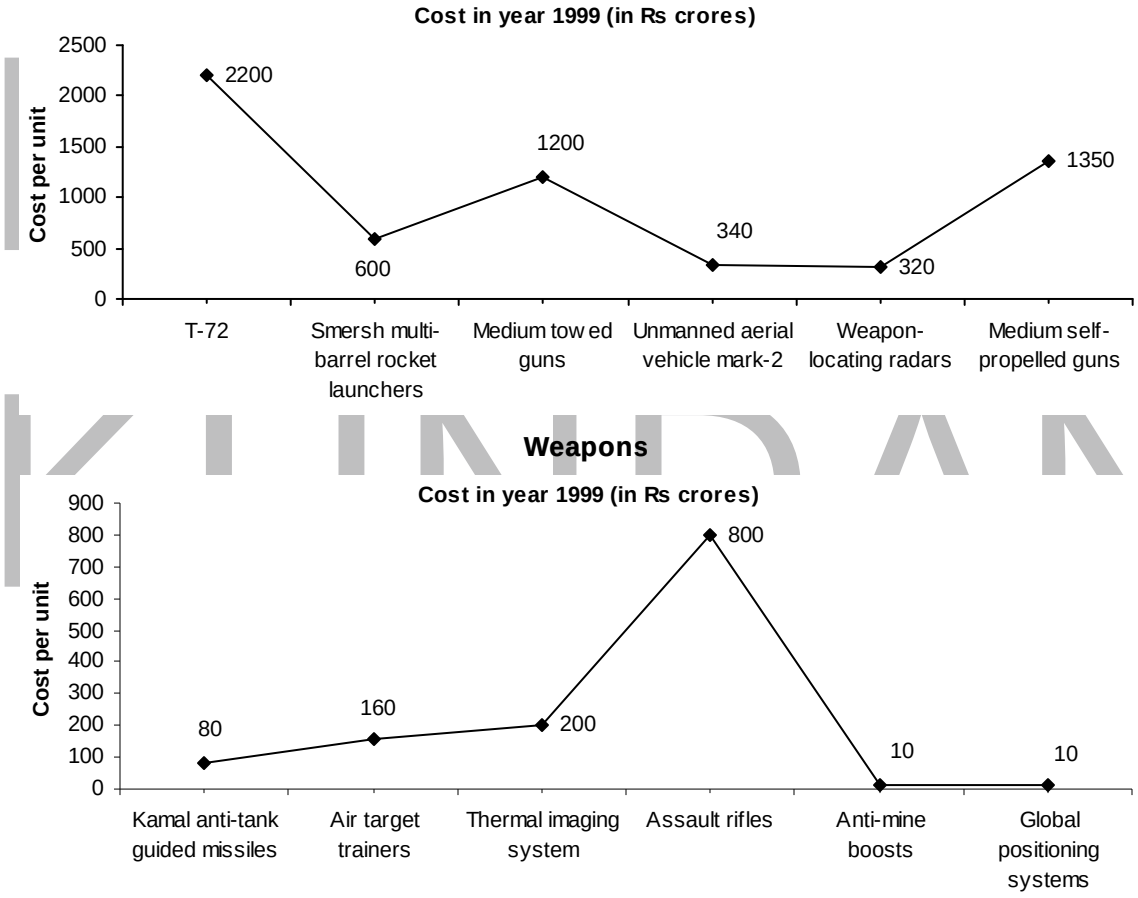




14. If the total trade of the World in the year 1976 is $ 5267 billion, what will it be in the year 1985?
    1) $ 6176 billion 2) $ 6967 billion 3) $ 6965 billion 4) $ 6987 billion
15. If the total trade of China in the year 1979 is $ 1200 billion, what will it be in the year 1985?
    1) $ 3456 billion 2) $ 3786 billion 3) $ 3954 billion 4) $ 3450 billion

16. What is the ratio of the total World trade to the total trade of China in the year 1985, if the total trade of the World in 1976 is $ 5267 billion and the total trade of China in 1979 is $ 1200 billion?
    1) 2 : 1 2) 3 : 1
    3) 2 : 3 4) 3 : 2
17. Average world trade growth is what per cent more or less than the average trade growth of China during the entire shown period?
    1) more, 25% 2) less, 30%
    3) less, 39% 4) more, 35%
18. What is the per cent increase in trade growth of China in the year 1980 over that of the same in 1979?
    1) 70% 2) 10%
    3) 17% 4) 80%

Directions (Q. 19-22): The following graphs show the cost of different weapons (in Rs crores) in the year 1999. Refer to the graphs to answer the questions that follow.



19. India purchased 22 'T-72' tanks from Russia in 1991. 10 'T-72' tanks were destroyed in Kargil war and India sold 8 'T-72' tanks to Sri Lanka at Rs 5500 crore per tank. India has returned the remaining tanks to Russia and got Rs. 300 crore per tank. On maintenance of each tank, India spent an amount similar to their cost in 1999. The total profit/loss % for India, if India purchased these tanks from Russia at Rs, 1000 crore per tank, is
    1) 25.4% loss 2) 31.0% loss
    3) 35.8% loss 4) 39.2% loss

20. India made 48 Weapon-locating radars in the year 1999 and sold 12 radars to Nepal on 20% profit, 6 radars to Australia on 16% profit, and 13 radars to Zimbabwe on 17% loss, and kept the remaining radars for self-use. What was the profit/loss of India?
    1) 3.2% profit
    2) 3.3% loss
    3) 4.0% loss
    4) 4.2% profit
21. Which of the following statements is/are true for the graph?
    I. The cost of the Air target trainers is approximately 1/5 of the cost of Assault rifles.
    II. The cost of Anti-mine boost is double the cost of Global positioning system.
    III. The cost of Smersh multi-barrel rocket launcher is thrice the cost of Thermal imaging system.
    1) Statement II only
    2) Statements I and II
    3) Statements II and III
    4) Statements I and III
22. In the condition of sudden attack on India, Indian military is in need of 27 'T-72' tanks, 6 Smersh multi-barrel rocket launchers, 12000 Medium towed guns, 2 Thermal imaging systems and 100 Anti-mine boosts. What is the approximate cost the Indian military will have to pay for the above arms?
    1) Rs 14484800 crores
    2) Rs 14464480 crores
    3) Rs 14644800 crores
    4) Rs 14464400 crores

Answers and explanations

1. 3; In 1994, the % of iron and coal extraction w.r.t. total mineral extraction = $\frac{21600}{240000} \times 100 = 9\%$.

   In 1997, the % of iron and coal extraction w.r.t. total mineral extraction = $\frac{43200}{240000} \times 100 = 18\%$.

   In 1999, the % of iron and coal extraction w.r.t. total mineral extraction = $\frac{45000}{250000} \times 100 = 18\%$.

   In both cases, it's twice the required % in 1994.
2. 2; Look for the values of total mineral extraction in a year, when it is ten times the value of iron and coal extraction in the previous year.
   In 1994, total mineral extraction = 240000.
   In 1993, iron and coal extraction = 24000. So, total mineral extraction is more than iron and coal extraction by $\left\{\frac{(240000 - 24000)}{24000}\right\} \times 100 = 900\%$.
3. 2; The % share of iron and coal extraction in total mineral extraction is a multiple of 3 in five cases. In 1991 (12%), 1994 (9%), 1995 (15%), 1997 (18%), 1999 (18%).
4. 1; The total iron and coal extraction after adding all the values = 352000.
   The total mineral extraction after adding all the values = 2620000.

   So, required % = $\frac{352000}{2620000} \times 100 = 13.4$ approx.
5. 3; After calculating the percentage share for every year, its seen that the decline occurs thrice: in 1993 (14% to 10%), 1994 (10% to 9%), 1998 (18% to 16%).

6-9:

	Tata	Indian
Ahmedabad	70	1700
Bhavnagar	60	1400
Calcutta	230	4800
Cochin	210	—
Colombo	250	—
Delhi	150	3600
Hyderabad	90	2400
Karachi	160	2600
Madras	160	3400
Porbandar	70	—
Trivandrum	240	4000
Total	**1690**	**23900**

6. 3; Tata Airlines' total fare was 1690.
The fare for Colombo, Porbandar and Cochin was (250 + 70 + 210) = 530. This formed around 31% of the total fare.

7. 1; Indian Airlines' total fare to cities in India was 21300. Tata Airlines' total fare to cities in India was 1280. This amount was around 6% of the fare of Indian Airlines.

8. 1; If the simple rate of inflation is 7.5%, it means that we have to pay 7.5% more over the previous year's fare. Since it is simple rate of inflation, the increase in fare every year would remain the same. So, we can use the Simple Interest formula to calculate the total increase in price in 50 years for Tata Airlines.
In 1948, for Tata Airlines, the Mumbai-Calcutta fare was 230

Total increase = $230 \times 50 \times \frac{7.5}{100} = 862.5$.

So, the fare now becomes 230 + 862.5 = Rs 1092.50.
In 1998, Indian Airlines' Mumbai-Calcutta fare is 4800, which is around 4.5 times the fare charged by Tata Airlines.

9. 1; A person travelling to all other places in the year has to pay a total of Rs 23900. A person availing of the 37.5% discount will have to pay just 62.5% of the total fare, ie $\frac{5}{8} \times 23900 = 15000$.

10. 4; Although we can definitely say that the people were employed in Private Enterprises after 1978 and before or in 1991, we do not have data prior to 1978 and intermediate years' data. So, cannot be determined.

11. 3; Let total work force in 1978 be 'n'. Then in 1991, it will be = $\left[n \times \left(\frac{10}{100} \right) \times 13 \text{ years} + n \right] = 2.3n$. So, people employed in urban collectives in 1978 = 0.04n; in 1991 = 0.06 × 2.3n = 0.138n.

So change = $\left[\frac{(0.138n - 0.04n)}{(0.04n)} \right] \times 100\% = \left(\frac{9.8}{0.04} \right)\% = 245\%$

12. 4; Option (1) does not define 'charm' which may have different interpretations. If it means the

percentage of populace, collective agriculture is still the largest employer. Options (2) and (3) require the actual total work force figures, which are not aailable. So, none of the given statements can be inferred in absolute terms.

13. 4; The number of Industrial Townships in 1978 is known. But that for 1991 is not known (this could've been determined if we had data for total work force in 1991). Hence, cannot be determined.

14. 2; Total trade of World in year 1976 = $ 5267 billion.
So it will be in year 1985 = 5267 + 100 + 150 + 175 + 175 + 150 + 200 + 225 + 250 + 275
= $ 6967 billion

15. 4; Total trade of China in year 1979 = $ 1200 billion.
Trade of China in year 1985 = 1200 + 275 + 275 + 300 + 350 + 500 + 550 = $ 3450 billion

16. 1; From questions 14 and 15, we know that the total trade of World in year 1985 = $ 6967 billion and the total trade of China in year 1985 = $ 3450 billion. Hence, the ratio = 1 : 1/2 (approximately)
or 2 : 1.

17. 3; Average world trade growth = $\frac{100+150+175+175+150+200+225+250+275}{9} = 188.89 \approx 190$

Average trade growth of China

$= \frac{100+200+250+275+275+300+350+500+550}{9} = 311.11 \approx 310$

Required per cent $= \frac{310-190}{310} \times 100 \approx 39\%$

18. 2; Percentage growth in trade of China in 1980 = $\frac{(275-250)\times 100}{250} = 10\%$

19. 3; The total cost (purchase + maintenance) of T-72 Tanks = (22 × 1000) +(22 × 2200)
= 22000 + 48400 = Rs 70400 crores.
The total earning = 8 × 5500 + 4 × 300 = 44000 + 1200 = Rs 45200 crores.

Hence the loss % $= \frac{(70400-45200)\times 100}{70400} = \frac{25200}{70400} \times 100 = 35.8\%$.

20. 2; Total cost = 48 × 320 = Rs 15360 crores.

Total earning = $\frac{12\times 320\times 120}{100} + \frac{6\times 320\times 116}{100} + \frac{13\times 320\times 83}{100} = \frac{320}{100}[1440+696+1079]$
= Rs 10288 crores.

Loss percentage = $\frac{15360-10288}{15360} \times 100 = 3.3\%$.

21. 4; **I:** The cost of Air target trainers = Rs 160 approximately.

The cost of Assault rifles = Rs 800 approximately. Hence, the cost of the Air target trainers is $\frac{1}{5}$ th of the cost of Assault rifles. Statement I is true.

II: By visualising the graph,
the cost of Anti-mine boost is equal to that of the Global positioning system. Statement II is false.

III: The cost of Smersh multi-barrel rocket launcher = Rs 600 crores approximately.
The cost of Thermal imaging system = Rs 200 crores (approximately).
Hence, the cost of Smersh multi-barrel rocket launcher is thrice that of the Thermal imaging

system.
Statement III is true.
Quicker Approach: Check the 1st condition and get the answer.

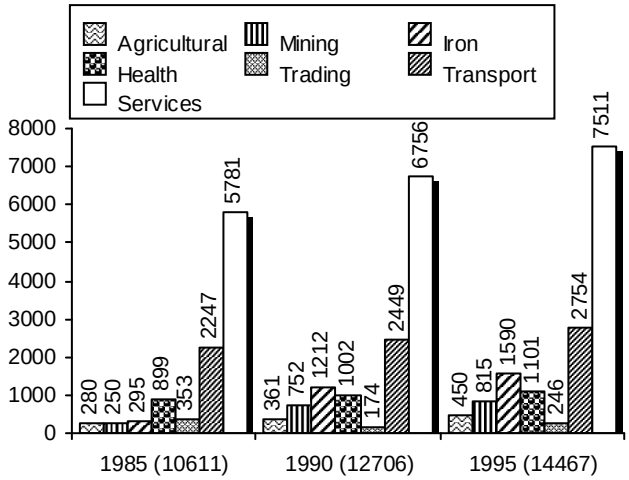
22. 4; The cost that Indian military have to pay
= (27 × 2200) + (6 × 600) + (12000 × 1200) + (2 × 200) + (100 × 10)
= 59400 + 3600 + 14400000 + 400 + 1000 = Rs 14464400 crores.

Practice Exercise 17

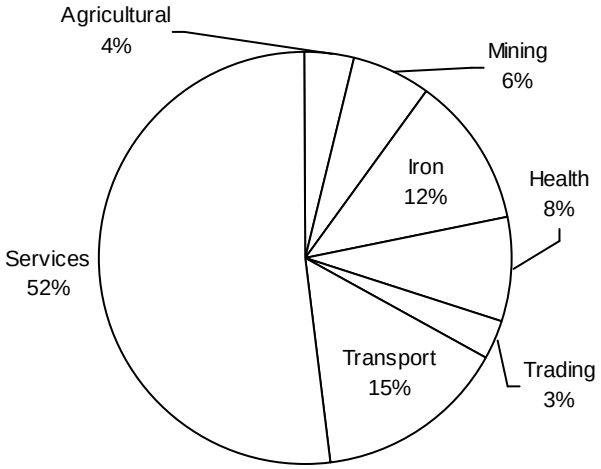
Directions (Q. 1-5): The following bar graphs shows the number of employment provided by both public and private sectors in different industries in the year 1985, 1990 and 1995. While the pie charts show the percentage of employment provided by both private and public sectors in different industries in the year 2000. Refer to the graphs to answer the questions that follow.

Figure within brackets indicate the total for the corresponding year.

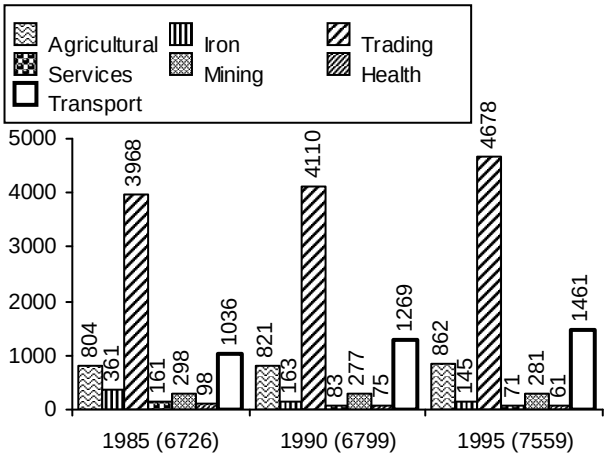
Public Sector



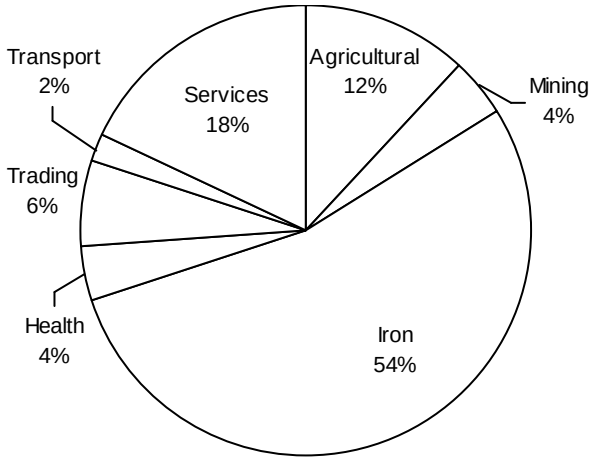
Public Sector (20000)



Private Sector



Private Sector (10000)



1. The increase in employment opportunity in the Iron industry within the public sector from 1985-95 formed what per cent of the private sector growth over the same period for the same industry?
   1) 91% 2) 560% 3) 1785% 4) 112%
2. The number of employed persons in the industry with the largest employment share in the public sector formed what per cent of the number of employed persons in the industry with the largest employment share in private sector in 2000?
   1) 146.25% 2) 54.5% 3) 183% 4) 192%
3. If 2 out of every 5 of those who were recruited in the public sector in year 2000 were graduates, how many non-graduates did the public sector's transport industry recruit in that year?
   1) 1912 2) 1664 3) 1800 4) 1572

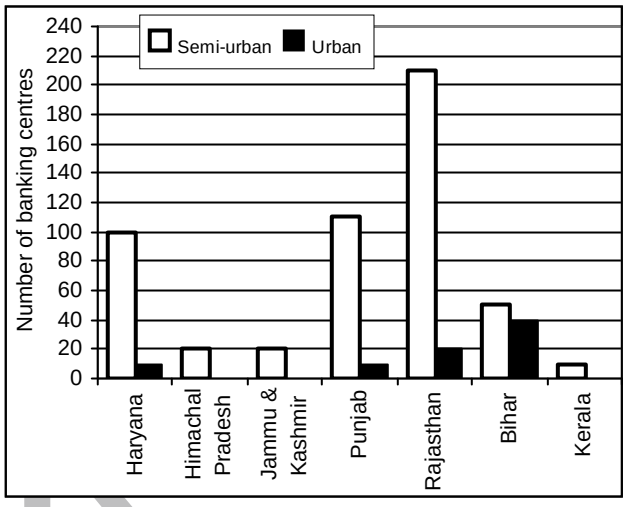
Q. 4-5: Refer to the data given below to answer the questions that follow.

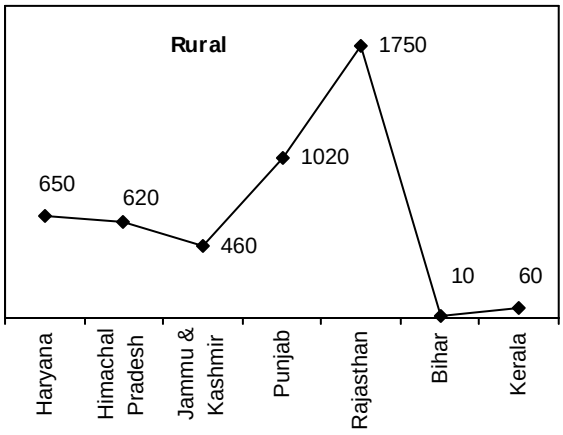
If the values in the year 2000 are taken as base = 100, then the values of Public Sector in the year 2005 are given below. The values of Private Sector are given within the brackets.

Agriculture = 115 (110) Mining = 100 (110)
Iron = 120 (110) Health = 120 (90)
Trading = 80 (105) Transport = 105 (80)
Services = 110 (120)

4. The Health industry in the Private sector has witnessed what per cent growth in employment from 1990 to 2005?
   1) 203% 2) 247% 3) 279% 4) 333%
5. The growth in employment within the services industry in the Private sector in 2005 has witnessed what per cent deviation from the growth within the Iron industry in the Public sector in 2005?
   1) -25% 2) -16.66% 3) +16.66% 4) +25%

Directions (Q. 6-11): The following line and bar graphs show the number of banking centres in urban, semi-urban and rural areas of different states in the year 1969. Refer to the graphs to answer the questions that folow.





6. If the banking centres have increased at a steady rate of 35% in all states of India, then what will be the number of banking centres in Haryana in the year 1975?
   1) 4840 2) 4600 3) 5630 4) 3990
7. If Kerala Government decided to increase banking centres in rural areas at 46% per year and in semi-urban areas at 53% per year, then what will be the total number of banking centres in Kerala in 1973?
   1) 180 2) 150 3) 328 4) 282
8. If in 1969 the average number of banking centres in rural areas of Haryana, J&K, Punjab, Rajasthan, Bihar, Kerala, Himachal Pradesh and Madhya Pradesh is 670, then the number of banking centres in rural areas of Madhya Pradesh will be:
   1) 790 2) 400 3) 820 4) 500
9. In the year 1967, the Government decided to increase the banking centres according to the population increase in that particular state. If according to 1971 census, the semi-urban population of Punjab has increased by 25% from 1969, then what will be the number of banking centres that the Government has to increase in the year 1971 in semi-urban parts of Punjab?
   1) 22 2) 28 3) 50 4) 38
10. Which of the following statements is not true?

1) The number of banking centres in semi-urban areas of Jammu & Kashmir is equal to the number of banking centres in urban areas of Rajasthan in 1969.
2) The number of banking centres in rural areas of Bihar is equal to the number of banking centres in urban areas of Haryana in the year 1969.
3) The number of banking centres in rural areas of Rajasthan is almost 2.8 times the number of banking centres in rural areas of Himachal Pradesh in the year 1969.
4) The number of banking centres in semi-urban areas of Himachal Pradesh is 4 times the number of banking centres in rural areas of Kerala in 1969.

11. In which of the following states the ratio of rural banking centres to total banking centres the second lowest?
1) Bihar 2) Punjab 3) Haryana 4) Himachal Pradesh

Directions (Q. 12-15): Refer to the charts below and answer the questions that follow.

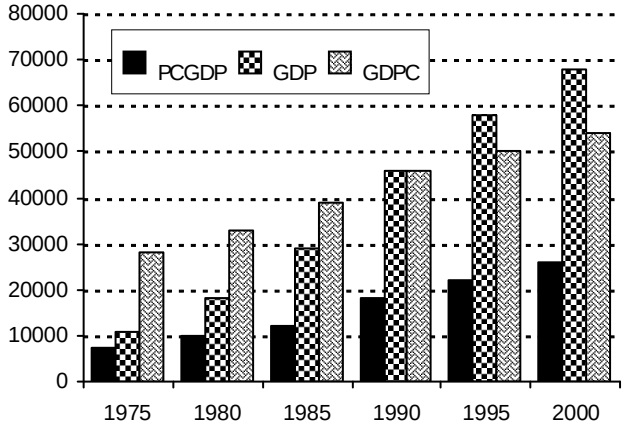
The first bar graph gives the Gross Domestic Product (GDP), the per capita Gross Domestic Product (PCGDP) and the Gross Domestic Product in constant dollar value in the year 1990 (GDPC) for the US in various years. Here, we define PCGDP for any year as follows:

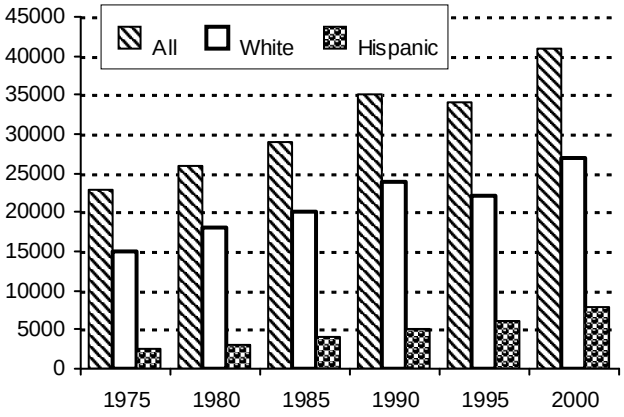
$$\text{PCGDP} = \frac{\text{GDP}}{\text{Population}}$$

To get the value of the GDP and GDPC in dollars multiply the corresponding value in the bar graph by 10^8.

The second bar graph gives the number of people below the poverty level in the US for various years. The data is given under three categories (i) All, (ii) Whites and (iii) All people of Hispanic origin. Note that people of Hispanic origin may be whites or blacks.

To get the actual numbers multiply the values in the bar graph by 1000.





12. A different calculation for the GDPC takes the base year as 1975; i.e. the value of the dollar in 1975 is taken as 1. Which of the following values will be closest to the GDPC for 2000 based on this calculation?
1) $10{,}000 \times 10^8$ dollars 2) $15{,}000 \times 10^8$ dollars 3) $20{,}000 \times 10^8$ dollars 4) $25{,}000 \times 10^8$ dollars

13. In the year 2000, what percentage of the US population was below the poverty level in the US?
1) 10% 2) 16% 3) 20% 4) 25%

Additional information for questions 14 to 15:

Given below are two statements.
S1: The number of people of Hispanic origin below the poverty level increased from 1975 to 2000.
S2: The ratio of the number of people of Hispanic origin below the poverty level to the total number of people below the poverty level increased from 1975 to 2000.

14. Which of the following is true?
    1) Only S1 is true. 2) Only S2 is true.
    3) Both S1 and S2 are true. 4) Neither S1 nor S2 is true.
15. Assume that 50% of the people of Hispanic origin below the poverty line were whites in 1995. Let x be defined as the percentage of whites not of Hispanic origin who are below the poverty line with respect to the total number of people below the poverty line. For the year 1995, which of the following values best approximates x?
    1) 65% 2) 56% 3) 47% 4) 38%

Directions (Q. 16-19): Refer to the table below and answer the questions that follow.

In the table below, data for five countries is given. The data given is about the population, the gross domestic product (GDP) and the relative purchasing power (RPP). The RPP for a country is defined as the average ratio of the amount in dollars required to buy a certain item in USA to the amount in dollars required to buy the same item in that country. Also given are the annual percentage growth rates for the population, the GDP and the RPP. The growth rates may be positive or negative. Assume the following:

1) A positive annual growth rate of 7% of a particular quantity means that the quantity will double itself in 10 years. A negative annual growth rate of 7% means that the quantity will get halved in 10 years.
2) The doubling time for positive growth rates is inversely proportional to the growth rate. A similar result holds for the halving time.
3) For all calculations involving quantities at a later time, assume that the growth rates remain constant.

Country	Population in million	Growth (Popln)%	GDP (billion dollars)	Growth (GDP)%	RPP	Growth (RPP)
USA	264	0	6950	2.33	1	0
West Germany	65	0	1476	2.33	1	0
East Germany	15	0	153	7	1.5	0
India	956	1.75	1550	7	2.5	-1.75
Indonesia	204	1.75	750	7	2.5	-1.75

16. The per capita income (PCI) in dollars of a country is the value of the GDP of the country in dollars divided by its population. If we arrange the countries in increasing order of their per capita incomes, which of the following is correct?
    1) Indonesia, West Germany, East Germany 2) India, USA, West Germany
    3) Indonesia, India, USA 4) East Germany, West Germany, USA
17. Based on the figures in the table, after how many years will the per capita income of India become equal to the per capita income of the USA? (Use data from previous question, if required.)
    1) between 20 and 40 years 2) between 40 and 60 years
    3) between 60 and 80 years 4) more than 80 years
18. Define a quantity called the modified per capita income (MPCI) in dollars as the product of the per capita income in dollars and the RPP. In how many years will the modified per capita income of India double itself?
    1) 10 years 2) 15 years 3) 20 years 4) 25 years
19. Due to the reunion of West Germany and East Germany per capita GDP of East Germany increased by
    1) 87% 2) 91% 3) 95% 4) 100%

Answers and explanations

1. 4; In the iron industry (public sector), increase in employment opportunities from 1985 to 1995 = 1590 – 795 = 795.
In the Iron industry (private sector), a similar increase = 4678 - 3968 = 710.
Thus the percentage that public sector forms of private sector $= 795 \times \frac{100}{710} \approx 112\%$.

2. 4; Services has the public sector's largest share with 52% of 20000, i.e. $52 \times \frac{20000}{100} = 10400$

Iron industry has the private sector's largest share with 54% of 10000, i.e. $54 \times \frac{10000}{100} = 5400$

So, the required percentage = $10400 \times \frac{100}{5400} = 192\%$ (approx)

3. 3; If 2 out of every 5 are graduates then 3 out of 5 are non-graduates.
Employment in transport industry of public sector = 15% of 20000 = 3000.
So, that non-graduates recruited in transport industry of public sector = 3000 × (3/5) = 1800

4. 4; Private sector's health industry figures in the year 2000 = 10000 × (4/100) = 400

In the year $2005 = 400 \times \frac{90}{100} = 360$ and in the year 1990 = 83

$\therefore$ The percentage increase = (360 - 83) × $\frac{100}{83} = 277 \times \frac{100}{83} = 333\%$ (approx).

5. 1; Since the 2005 values of the index for the private sector's service industry and the public sector's iron industry are the same (120), the 2005 percentage deviation will be the same as the deviation for the 2000 figures.
Number of employment provided in private sector = 10000 × 0.18 = 1800
and number of employment provided in public Iron sector = 20000 × 0.12 = 2400.
Since 1800 and 2400 are in the ratio 3 : 4,

$\therefore$ Required percentage deviation = $(3-4) \times \frac{100}{4} = -25\%$.

6. 2; Total banking centres in Haryana in year 1969 = 100 + 10 + 650 = 760

Hence, the total number of banking centres in Haryana in year 1975 = $760\left(1+\frac{35}{100}\right)^6 = 4600.$

7. 3; The number of banking centres in rural areas of Kerala in year 1969 = 60
$\therefore$ The number of banking centres in rural areas of Kerala in year 1973

$$= 60\left(1+\frac{46}{100}\right)^4 = 273 \text{ (approx.)}$$

The number of banking centres in semi-urban areas of Kerala in year 1969 = 10
$\therefore$ The number of banking centres in semi-urban areas of Kerala in year 1973

$$= 10\left(1+\frac{53}{100}\right)^4 = 55 \text{ (approx.)}$$

Hence, the total number of banking centres in Kerala in year 1973 = 273 + 55 = 328.

8. 1; The number of banking centres in rural areas of Madhya Pradesh
= 670 × 8 - (650 + 620 + 460 + 1020 + 1750 + 10 + 60) = 5360 - 4570 = 790.

9. 2; Because the population has increased by 25% from 1969 to 1971,
the banking centres have also increased by 25%.
$\therefore$ The number of banking centres in semi-urban parts of Pubjab in the year 1971

$$= 110 \times \frac{25}{100} = 137.5 \approx 138 .$$

$\therefore$ increase in the number of banking centres = 28.

10. 4; By visualising the graph, option (4) is not true for the graph.

11. 3; In Punjab ratio of rural banking centres is $\frac{1020}{110+10} = \frac{1020}{120} = \frac{102}{12}$

Similarly, for Haryana = $\frac{650}{110} = \frac{65}{11}$

For Jammu and Kashmir = $\frac{460}{20} = \frac{46}{2}$

For Himachal Pradesh = $\frac{620}{20} = \frac{62}{2}$

For Rajasthan = $\frac{1750}{210+20} = \frac{175}{23}$

For Kerala = $\frac{60}{10} = 6$

For Bihar = $\frac{10}{90} = \frac{1}{9}$

$\therefore$ Haryana has the second lowest ratio of the rural banking centres with respect to the total banking centres.

12. 3; Dollar value = $\frac{\text{GDPC}}{\text{GDP}}$

	X(GDP)	Y(GDPC)	D1	D2
			(Dollar Value)	(Dollar Value)
			(Base-1990)	(Base-1975)
1975	11000	28000	2.545	1
1990	46000	46000	1	0.393
2000	68000	54000	0.794	0.312

When base is changed to 1975

$D_2(1990) = \frac{1}{2.545} = 0.393$ $\qquad$ $D_2(2000) = \frac{0.794}{2.545} = 0.312$

$\therefore$ For GDPC in 2000, GDPC = 68000 × 0.312 $\approx$ 21000.

13. 2; The population of the US can be obtained from the first graph as GDP divided by PCGDP. This gives a value of $\frac{68000 \times 10^8}{26000} \approx 2.6 \times 10^8$ = 260 million to the year 2000. The number of people below the poverty level for 2000 (from second graph) is 41 million.

$\therefore$ Required percentage = $\frac{41}{260} \times 100 \approx 16\%$

14. 3; By visual inspection of the graph, S1 is true.
Ratio of the number of people of Hispanic origin below the poverty level to the total number of people below the poverty level in

$1975 = \frac{2500 \times 1000}{23000 \times 1000} \approx \frac{1}{9}$ $\quad\quad$ $2000 = \frac{8000 \times 1000}{41000 \times 1000} \approx \frac{1}{5}$

$\therefore$ The ratio is increased. This statement is also true.

15. 2; For the year 1995, we get the values 34 million, 22 million and 6 million for the total, the number of whites and the number of people of Hispanic origin below the poverty level respectively. 3 million of the people of Hispanic origin are whites. The number of whites not of Hispanic origin are, therefore, 19 million.

$\therefore$ Required percentage = x = $\frac{19}{34} \times 100 \approx 56\%$

16. 4; USA$\equiv \frac{6950}{264} \approx \frac{7000}{260} = 27$; $\quad\quad$ WG $\equiv \frac{1476}{65} \approx \frac{1400}{65} = 22$;

EG $\equiv \frac{153}{15} \approx \frac{150}{15} = 10$ $\quad\quad$ India $\equiv \frac{1550}{956} \approx \frac{155}{95} \approx 1.6$

Indonesia $\equiv \frac{750}{204} \approx 3.6$.

17. 4; The present per capita income (based on the table) is $27,000 for the USA and $1600 for India - the ratio is approximately 16. All we need for the problem is the relative rate of growth of PCI for India with respect to USA.
Growth rate for PCI (India) = 7 - 1.75 and growth rate for PCI (USA) = 2.33 - 0 = 2.33
$\therefore$ The relative percentage growth rate is [(7 – 1.75) – (2.33 – 0)] = 2.92
Now, initially the PCI of USA is 16 times that of India. We have to make it equal to 1.

The ratio is halved (PCI of USA = 8 × PCI India) in $\frac{7}{2.92}$ × 10 years = 24 years.

The ratio is further halved (PCI of USA = 4 × PCI of India) in 24 × 2 = 48 years
Similarly, the ratio is further halved (ie PCI of USA = 2 × PCI of India) in 24 × 3 = 72 years
$\therefore$ PCI of USA will be euqal to PCI of India in 24 × 4 = 96 years.

18. 3; MPCI = $\left(\frac{\text{GDP}}{\text{Population}}\right) \times \text{RPP}$.

The annual growth rate of this quantity can be very well approximated by the growth rate of GDP – growth rate of population + growth rate of RPP
= 7 – 1.75 - 1.75 = 3.5%. Hence, the doubling time will be 20 years.

19. 4; Per capita GDP of West Germany and East Germany together = $\frac{1476 + 153}{65 + 15} = \frac{1629}{80} = 20.36$

Per capita GDP of East Germany = $\frac{153}{15} = 10.2$

Required percentage increase = $\frac{20.36 - 10.2}{10.2} \times 100 \approx 100\%$

Practice Exercise 18

Directions (Q. 1-5): Answer the questions on the basis of the information given below.

In the final-year exam six students S_1, S_2, S_3, S_4, S_5 and S_6 obtained the percentage marks in five theoretical papers P_1, P_2, P_3, P_4 and P_5 and two lab papers L_1 and L_2 as shown below:

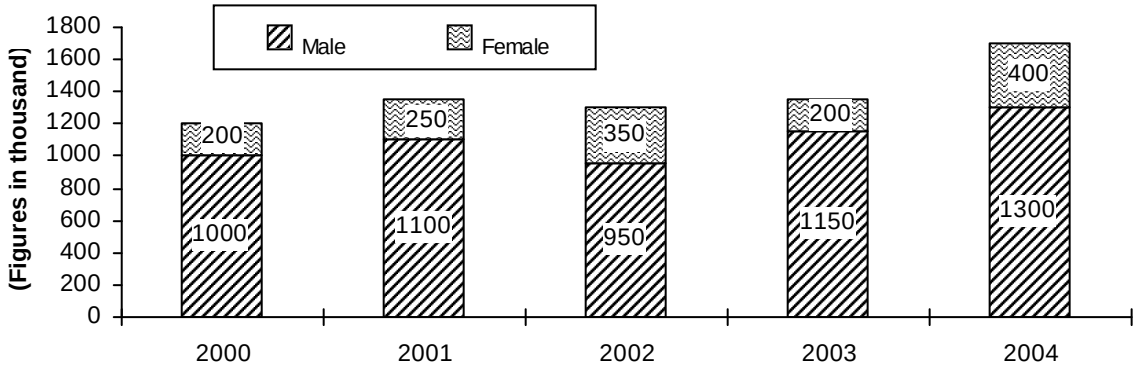
	P_1	P_2	P_3	P_4	P_5	L_1	L_2	Total
S_1	90	83	87	89	91	78	82	
S_2	98	92	59	61	50	82		
S_3	82	88	81	79	70	98	97	82.5
S_4		835	875	78	82	90	94	
S_5	65	55	83	87	70	68		70.6
S_6	71	69	73	67	90		80	73.25

The weightages associated with each of the theoretical papers P_1, P_2, P_3, P_4 and P_5 are the same. Also, the weightages given to lab papers are the same, but different from that for theoretical papers. The maximum score for all the papers P_1, P_2, P_3, P_4, P_5, L_1, L_2 **together** is 600.

1. What is the maximum score for any of the theoretical papers and that for either of the lab papers?
   1) 50 and 25 2) 100 and 50 3) 80 and 90 4) 50 and 90
2. What is S_6's percentage score in paper L_1?
   1) 59 2) 72 3) 80 4) 62
3. If S_1 has got the highest marks among all the students, what can be a possible score that S_4 can get in paper P_1?
   1) 97 2) 98 3) 99 4) 96
4. S_5's percentage score in lab paper L_2 is
   1) 29.6 2) 59.2 3) 88.8 4) 44.4
5. If S_2 and S_4 finally get the same score, what is the difference between S_4's score in paper P_1 and S_2's score in paper P_2?
   1) 20 2) 21 3) 22 4) 23

Directions (Q 6-10): Answer the questions on the basis of the information given below.

The following diagram and table give the information regarding students writing the civil service exam over the last few years.



Details of Students' Background (Figures in percentage)

Year	Arts	Pure science	Engineering	Others
2000	25.00	10.00	58.33	6.67
2001	22.22	8.80	59.25	9.73
2002	15.00	8.33	70.00	6.67
2003	18.50	5.92	71.14	4.44
2004	16.50	11.10	61.80	10.60

6. The number of students who wrote the exam saw the greatest percentage increase over the previous year in
   1) 2001 2) 2002 3) 2004 4) 2003
7. The approximate percentage change in the number of students with pure science background who wrote the exam from 2000 to 2004 is
   1) 57 2) 47 3) 51 4) 43
8. The number of female engineering graduates who wrote the exam in 2001 was approximately.
   1) 1,70,000 2) 75,000 3) 1,50,000 4) Cannot be determined
9. The number of engineering students writing the exam saw the greatest increase over the previous year in
   1) 2000 2) 2001 3) 2002 4) 2003
10. Which of the following statements is correct?
    I. The number of students who wrote the exam from engineering background has been increasing every year.
    II. The percentage of female students who wrote the exam was the highest in the year 2004.
    III. The number of students who wrote the exam from the Others category was the same in 2000 and 2002.
    1) Both II and III 2) Only II 3) Only I 4) Both I and II

Directions (Q. 11-15): Study the following table and answer the questions that follow.

The table shows the number of articles produced (P) and sold (S) by five units of a company over the years.

Year	Unit									
	I		II		III		IV		V	
	P	S	P	S	P	S	P	S	P	S
1998	29	22	39	34	56	50	42	40	53	46
1999	52	45	49	43	69	64	45	37	58	51
2000	46	42	32	31	43	32	53	50	49	42
2001	56	52	54	45	52	47	62	58	55	48
2002	49	47	28	23	77	65	64	53	61	58
2003	60	55	32	27	68	61	69	62	66	62

11. What is the **approximate** overall percentage of rejection for unit IV for all the given years?
    1) 13% 2) 21% 3) 10% 4) 17%
12. What is the average number of articles selected in the year 2002?
    1) 37 2) 51.2 3) 49.2 4) 41
13. A continuous increase in production and a continuous decrease in the number of articles sold is shown respectively by which of the following units?

1) II, IV 2) None, III 3) II, III 4) IV, None

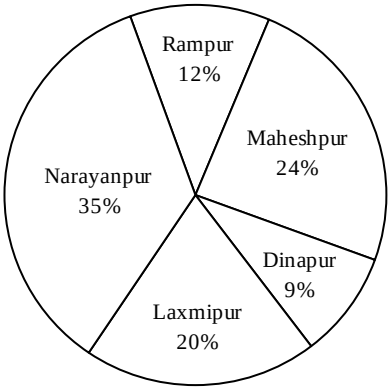
14. What is the ratio of the total number of articles sold in 1999 to that by unit IV over the years?
1) 2 : 3 2) 4 : 5 3) 6 : 7 4) 2 : 7

15. In which year was the largest percentage of articles sold out of the articles produced by unit II?
1) 2000 2) 2001 3) 1999 4) 2003

Directions (Q. 16-20): Study the following chart to answer the questions given below:

Village	% population below poverty line
Rampur	35
Maheshpur	40
Narayanpur	38
Dinapur	45
Laxmipur	32

Proportion of population of five villages in 2004



16. In 2005, the population of Rampur as well as Dinapur is increased by 12% from the year 2004. If the population of Rampur in 2004 was 4000 and the percentage of population below poverty line in 2005 remains the same as in 2004, find **approximately** the population of Dinapur below poverty line in 2005.
1) 1510 2) 1520 3) 1535 4) 1500

17. If in 2006 the population of Maheshpur is increased by 8%, the population of Narayanpur is reduced by 10% from 2004, and the population of Narayanpur in 2004 was 7000, what will be the total population of Maheshpur and Narayanpur in 2006?
1) 11,550 2) 11,484 3) 11,200 4) 12,285

18. If in 2004 the total population of five villages together was 35,000 **approximately**, what will be population of Narayanpur in that year below poverty line?
1) 4600 2) 4650 3) 4665 4) 4655

19. If the population of Laxmipur below poverty line in 2004 was 1240, what was the population of Maheshpur in 2004?
1) 4600 2) 4650 3) 4750 4) 4660

20. If the population of Narayanpur is 6300 in 2004, what will be the ratio of the population of Narayanpur below poverty line to that of Maheshpur below poverty line in that year?
1) 133 : 96 2) 122 : 95 3) 96 : 133 4) 233 : 96

Answers and explanations

1-5: Let the maximum score of each of theoretical papers be 'a' and the maximum score of either of lab papers be 'b'.

For the student S_3

$$\frac{a}{100}(82 + 88 + 81 + 79 + 70) + \frac{b}{100}(93 + 97) = (5a + 2b) \times \frac{82.5}{100}$$

$\Rightarrow$ 400a + 190 b = 412.5a + 165 b

$\Rightarrow$ 25b = 12.5 a $\Rightarrow$ 2b = a $\therefore$ a = 2b

The maximum marks for all the papers together is 600

$\Rightarrow$ 5a + 2b = 600 $\Rightarrow$ 10b + 2b = 600 $\therefore$ b = 50

So a = 100

1. 2

2. 1; S_6's score in the paper

$$L_1 = \frac{73.25 \times 600}{100} - \left[\frac{(71+69+73+67+90)}{100} \times 100 + \frac{80 \times 50}{100}\right] = 439.5 - 370 - 40 = 29.5$$

$$\therefore\ S_6\text{'s percentage score} = 29.5 \times \frac{100}{50} = 59\%$$

3. 4; Total score of $S_1 = \frac{(90+83+87+89+91) \times 100}{100} + \frac{78+82}{100} \times 50 = 440 + 80 = 520$

S_4's score without considering the score in paper P_1 is given by

$$\frac{(83.5+87.5+78+82)}{100} \times 100 + \frac{90+94}{100} \times 50 = 331 + 92 = 423$$

Hence S_4 scores less than 520 - 423 = 97 marks in the papers. So S_4 can score, say, 96. Hence choice '4'.

4. 2; S_5's score in lab paper L_2 is $\frac{70.6}{100} \times 600 - \left\{\frac{(65+55+83+87+70)}{100} \times 100 + \frac{68}{100} \times 50\right\}$

$$= 423.6 - (360 + 34) = 29.6$$

$\therefore S_5$'s percentage score in paper L_2 is $\frac{29.6}{50} \times 100 = 59.2$

5. 3; S_4's score without the paper P_1 is 423.

S_2's score without the paper $L_2 = \frac{(98+92+59+61+50)}{100} \times 100 + \frac{82}{100} \times 50 = 360 + 41 = 401$

Hence if S_2 and S_4 finally get the same score, then the difference in S_4's score in paper P_1 and S_2's score in paper L_2 is 423 – 401 = 22 marks.

6-10: Total number of students in 2000 is 12,00,000
2001 is 13,50,000
2002 is 13,00,000
2003 is 13,50,000
2004 is 17,00,000

6. 3; Clearly the greatest percentage increase in the number of students writing the exam (increase over the previous year) is in 2004.

$$\%\ \text{increase} = \frac{17,00,000 - 13,50,000}{13,50,000} \times 100 = \frac{35}{135} \times 100 = 25.92$$

7. 1; In 2000, the number (in thousand) is 1200 × 0.1 = 120
In 2004, the number (in thousand) is 1700 × 0.111 ≈ 190

$$\%\ \text{change} = \frac{70}{120} \times 100 \approx 57\%$$

8. 4; The number of females writing the exam in 2001 is given and the number of engineering students writing the exam can be calculated. But, the number of female engineering graduates writing the exam can't be calculated.

9. 2; Number of engineering students writing the exam in
2000 → 0.5833 × 1200 = 700
2001 → 0.5925 × 1350 = 800
2002 → 0.7 × 1300 = 910
2003 → 0.711 × 1350 = 960

$2004 \rightarrow 0.618 \times 1700 = 1050$

Greatest percentage increase = $\frac{100}{700} \times 100 = 14.28\%$ in 2001

10. 3; Statement I is obviously true from solution to Q. 34.

Statement II: In 2004, percentage of female students writing the exam = $\frac{400}{1700} \times 100 \cong 23.52$

In 2002, the percentage was $\frac{350}{1300} \times 100 \cong 26.92$

$\therefore$ Statement II is false.

Statement III: Students from 'Others' category writing the exam in 2000 was $\frac{6.67}{100} \times 1200$.

In 2002 the number became $\frac{6.67}{100} \times 1300$.

So statement III is false.

11. 3; The total number of articles produced by unit IV for the given years = 335
The total number of articles rejected by unit IV for all the given years = 35

$\therefore$ Required percentage rejection = $\frac{35}{335} \times 100 = 10.44\% \approx 10\%$

12. 3; Total number of articles selected in 2002 = 246

$\therefore$ Required average = $\frac{246}{5} = 49.2$

13. 4; The continuous increase in production of articles is seen in the unit IV and none of the units show continuous decrease in the number of articles sold.

14. 2; The total number of articles sold in 1999 = 240
The total number of articles sold by unit IV over the years = 300
$\therefore$ the required ratio = 240 : 300 = 4 : 5

15. 1; It is obvious from the table.

16. 1; Population of Dinapur in 2004 = $4000 \times \frac{9}{12} = 3000$

Population of Dinapur in 2005 = $3000 \times \frac{112}{100} = 3360$

$\therefore$ Population below poverty line = 45% of 3360 = $45 \times \frac{3360}{100} = 1512 \approx 1510$

17. 2; Population of Maheshpur in 2004 = $7000 \times \frac{24}{35} = 4800$

Population of Maheshpur in 2006 = $4800 \times \frac{108}{100} = 5184$

Population of Narayanpur in 2006 = $7000 \times \frac{90}{100} = 6300$

$\therefore$ Total population = 5184 + 6300 = 11484

18. 4; Population of Narayanpur below poverty line = $35000 \times \frac{35}{100} \times \frac{38}{100} = 133 \times 35 = 4655$

19. 2; Population of Maheshpur in 2004 = $1240 \times \frac{100}{32} \times \frac{24}{20} = 4650$

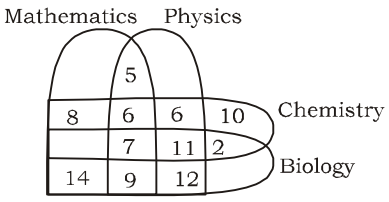
20. 1; Population of Narayanpur below poverty line $= 6300 \times \frac{38}{100} = 2394$

Population of Maheshpur below poverty line $= 6300 \times \frac{24}{35} \times \frac{40}{100} = 1728$

$\therefore$ Ratio $= \frac{2394}{1728} = 133 : 96$

Practice Exercise 19

Answer Questions 1 to 5 on the basis of the information given below:
The Venn-diagram shown below gives the number of students who study Mathematics, Physics, Chemistry and Biology.



The number of students studying the given subjects in the above given order is 64, 76, 63 and 72 respectively.

1. The number of students studying only Physics is
   1) 11 2) 20 3) 12 4) 14
2. What is the number of students who study Mathematics only?
   1) 1 2) 2 3) 3 4) Data insufficient
3. How many students study Mathematics, Biology, Physics and Chemistry?
   1) 7 2) 6 3) 12 4) 22
4. What is the total number of students who study either Physics and Mathematics or Chemistry and Biology?
   1) 67 2) 60 3) 53 4) 45
5. The ratio of the number of students who study Physics, Chemistry and Biology to that of those who study Mathematics, Chemistry and Biology is
   1) 1 : 1 2) 11 : 13 3) 15 : 17 4) 9 : 10

Answer Questions 6 to 10: Read the data carefully and answer the questions that follow:
Details of the Indian Widget Industry

Ratio	Year					
	2000	2001	2002	2003	2004	2005
Profit Margin	0.27	0.30	0.24	0.30	0.33	0.36
DS Ratio	0.70	0.75	0.90	1.00	1.10	1.20
EXIM Ratio	0.60	0.64	0.72	0.50	0.60	0.68

$$\text{Profit margin} = \frac{\text{Average selling price per widget}}{\text{Average cost price per widget}} \quad 1$$

$$\text{DS Ratio} = \frac{\text{Industry demand (by volume) for widget}}{\text{Industry supply (by volume) for widget}}$$

$$\text{EXIM Ratio} = \frac{\text{Volume of exports of widget}}{\text{Volume of imports of widget}}$$

Note: 1: (i) Industry demand = Domestic demand + Export demand
(ii) Industry supply = Domestic supply + imported supply
(iii) The average export price per widget = The average selling price per widget
(iv) The average import price per widget = The average cost price per widget

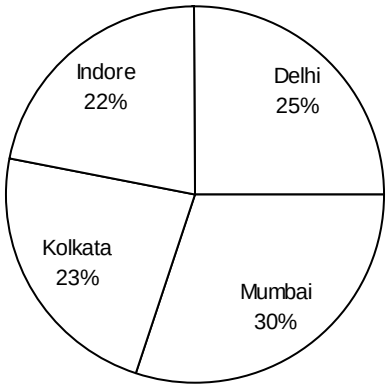
6. Find the volume of widgets exported in the year 2004 as a percentage of the industry demand for widgets in that year.
   1) 24% 2) 65% 3) 37.5% 4) Can't be determined
7. If the total values of widgets imported in the year 2003 was Rs 300 crore, then what was the total value of widgets exported in that year?
   1) 195 crore 2) 200 crore 3) 325 crore 4) Can't be determined
8. Find the ratio of domestic demand and domestic supply in the year 2001?
   1) 0.75 2) 0.30 3) 0.80 4) Can't be determined
9. If the volume of widgets imported increased by a steady 20% every year then during which of the following periods did the volume of widgets exported increase by the maximum percentage?
   1) 2000-2001 2) 2001-2002 3) 2004-2005 4) 2003-2004
10. Find the volume of the widgets imported in the year 2002 as a percentage of the industry supply for widgets in that year.
   1) 83.5% 2) $66\frac{2}{3}\%$ 3) 37½% 4) Can't be determined

Note: Questions 11 to 30 carry two marks each.

Given below is a survey conducted in four cities about people liking different film stars. The total number of people surveyed was 2000 and they were distributed as given in the chart. The table shows the percentage of people liking the film stars in that particular city. An individual can have liking for more than one star.

Film Star	Mumbai	Delhi	Kolkata	Indore
Amitabh Bachchan	62	52	44	48
Shahrukh Khan	29	32	22	27
Salman Khan	21	18	13	23
Aamir Khan	36	34	26	33
Hritik Roshan	19	26	11	29
Fardeen Khan	12	14	6	19

Percentage in 4 cities out of 2000 people surveyed.



11. Which city has maximum people liking Fardeen Khan in the given survey?
   1) Mumbai 2) Delhi 3) Kolkata 4) Indore
12. If all the fans of Aamir Khan also like Amitabh Bachchan in Mumbai, then how many people in Mumbai like Amitabh but not Aamir Khan?
   1) 172 2) 156 3) 216 4) 148
13. If Salman and Shahrukh don't have common fans then how many of the total people surveyed in

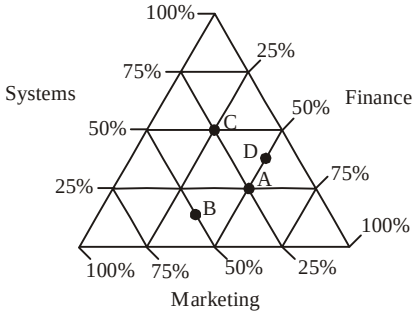
all the four cities together like neither of them?
1) 947 2) 1023 3) 1117 4) 1069

14. What can be the maximum number of people surveyed in Delhi who don't like any of the above film stars?
1) 240 2) 250 3) 269 4) 131

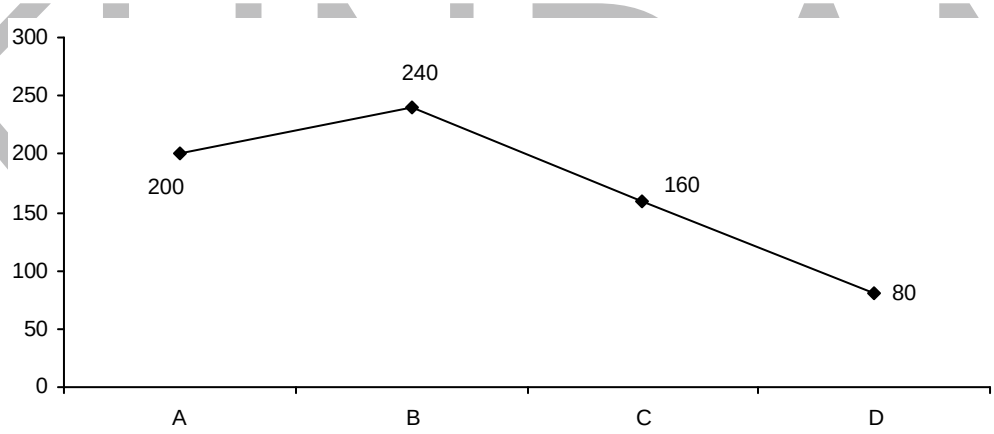
15. What can be the maximum number of people surveyed in Kolkata who like all the stars given in the table.
1) 218 2) 21 3) 27 4) 276

Directions (Q. 16-20): The following table shows the specialisation of the students in percentage at the four premier B-schools in Mumbai in the year 2004.

Code	B-School
A	MNIMS
B	BJIMS
C	JP Jain
D	KITIE



The number of students in a B-school (in 2004) is given by the following graph.



16. In which of the following B-schools have the maximum number of students opted for finance?
1) MNIMS 2) KITIE 3) JP Jain 4) BJIMS

17. The difference between the number of sudents who opted for finance in MNIMS and JP Jain is what per cent of the number of students who opted for systems in BJIMS?
1) 150% 2) 200% 3) 300% 4) 350%

18. If in 2005, at MNIMS the number of Marketing students increases by 10% and if the number of students in Systems remains the same, then find the percentage increase in Finance students if the total intake in 2005 increases by 10% at MNIMS.
1) 30% 2) 20% 3) 15% 4) 12.5%

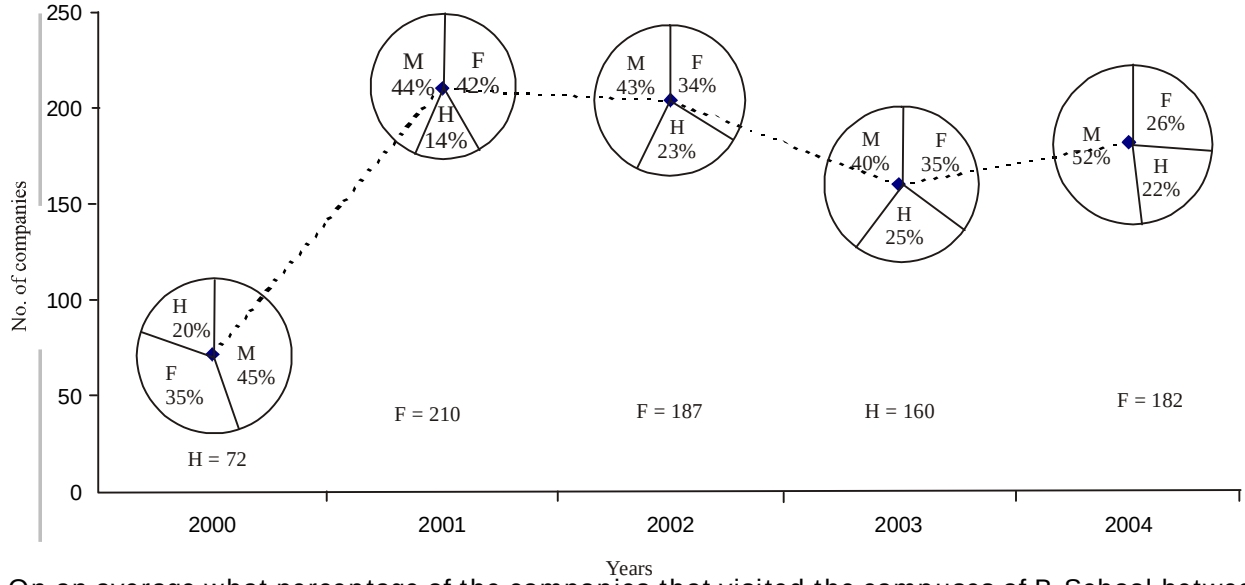
19. The total number of students in Systems at the four B-schools forms what percentage of the total

number of Finance students at these four B-schools?
1) 78.4% 2) 73.6% 3) 70.4% 4) 58.9%

20. There exists a student exchange programme between the two institutes MNIMS and JP Jain. During this programme 50% of Systems students from JP Jain go to MNIMS and continue their Systems specialisation. Then find the percentage change in the Systems students at MNIMS on account of the students' exchange programme, if no student of Systems in MNIMS goes to any other college.
1) 60% 2) 80% 3) 70% 4) 40%

Directions (Q. 21-25): The following pie-chart and the line graph represents the total number of companies visiting the campuses of B-schools in different specialisation fields from 2000 to 2004. The different fields are as following:

Code	**Field**
M	Marketing
F	Finance
H	HR



21. On an average what percentage of the companies that visited the campuses of B-School between 2000 to 2004 were HR companies?
1) 11.4% 2) 25.04% 3) 21.2% 4) Can't be determined

22. It can be said that for every three finance companies, '*x*' number of marketing companies visited the campuses of B-schools in the given five years. Then the value of *x* is
1) 2 2) 3 3) 4 4) Can't be determined

23. By what per cent on an average (compounded) is the total no. of companies visiting the campus increasing?
1) 18 2) 34 3) 29 4) 40

24. What is the difference between the number of marketing companies and that of finance companies visiting the campuses for the above five years?
1) 239 2) 309 3) 283 4) 301

25. The no. of HR companies visiting the campuses in 2002 is what per cent more as compared to that of HR companies visiting the campuses in 2001?
1) 34% 2) 95% 3) 67% 4) 80%

Directions (Q. 26-30): Study the table given below and answer the questions.

'SA RE GA MA PA' is an entertaining TV programme in which some shortlisted singers perform

once every week. After listening to the singers Indian viewers cast their votes for their favourites. The singer getting lowest no. of votes for that particular week goes out of the contest. So, next week the no. of contestants performing reduces by one. This way the contest goes on till a single winner is decided. The Indian viewers are divided into four regions called North India, West India, South India and East India. In a particular week of the contest, five singers were performing named: Hemu, Himani, Vineet, Debu and Nihira. One performance means singing one song, ie every week the remaining contestants sing one song.

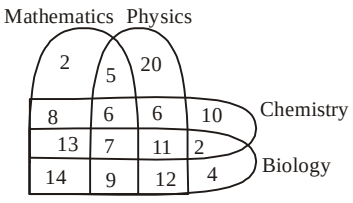
The candidatewise break-up of votes from different regions is given in the following table for that week in which the above five singers performed.

Region Candidate	North India	West India	South India	East India
Hemu	06	00	51	11
Himani	19	100	10	17
Debu	09	00	18	46
Nihira	06	00	07	11
Vineet	60	00	14	15
	100%	100%	100%	100%

26. If the single winner was decided after the performance of the 11th week from start of the competition, in total how many songs were sung by the singers in the contest?
    1) 78 2) 66 3) 77 4) 65
27. In the week when the above five contestants performed, who got the highest votes from Indian viewers?
    1) Himani 2) Hemu 3) Vineet 4) Can't be determined
28. The contestant who will not perform next week is
    1) Debu 2) Nihira 3) Hemu 4) Can't be determined
29. Among the five contestants, the one who got highest votes from the viewers of 'Mumbai' is (Mumbai is a city falling in the region of West India)
    1) Debu 2) Hemu 3) Himani 4) Can't be determined
30. If the nos. of viewers voting from North India, West India, South India and East India are in the ratio of 2 : 1 : 3 : 4, then by what percentage Vinit's vote is more than Hemu's?
    1) 6.2% 2) 5.8% 3) 7.1% 4) None of these

Answers and explanations

1-5: The complete Venn-Diagram is as given below:



1. 2; No. of students studying Physics only = 20.
2. 2; No. of students studying Mathematics only = 02.
3. 1; By observation only 7 students study all the 4 subjects.
4. 3; No. of students studying Physics & Maths = 5 + 6 + 7 + 9 = 27
   No. of students studying Chemistry & Biology = 13 + 7 + 11 + 2 = 33.
   But 7 students are common in both above.
   required no. = 27 + 33 – 7 = 53.

5. 4; Students studying Physics and Chemistry and Biology = 7 + 11 = 18
Students studying Mathematics, Chemistry & Biology = 13 + 7 = 20

required ratio = $\frac{18}{20}$ 9 : 10

6. 4; The ratio $\frac{\text{Exports}}{\text{Demand}}$ cannot be determined independent of the ratio $\frac{\text{Imports}}{\text{Supply}}$.

Therefore in 2004, we can find $\frac{\text{Supply}}{\text{Demand}}$ $\frac{\text{Exports}}{\text{Imports}}$ as $\frac{0.60}{1.10}$.

But we cannot find only $\frac{\text{Exports}}{\text{Demand}}$.

Hence the question can't be answered.

7. 1; The value of widgets imported in 2003 = Rs 300 crores.
= Average import price per widget × Volume of Imports.
= Average cost price per widget × Volume of import
Now, value of widgets exported = Average selling price per widget × Volume of exports.

Hence, $\frac{\text{Average cost price} \quad \text{Volume of imports}}{\text{Average selling price} \quad \text{Volume of exports}}$ $\frac{1}{1 \quad 0.3}$ $\frac{1}{0.5}$

Value of exports = 300 × 0.65 = Rs 195 crores

8. 4; Clearly, we can't determine the ratio of domestic demand and domestic supply.

9. 4; Since the imports increased by a steady percentage every year, to find the year in which the exports increased by the highest percentage we need to consider only EXIM ratios. By the observation of data, it is the highest from 2003 to 2004.

10. 4; Data inadequate.

11. 4; Let *x* be the percentage of total population surveyed in any city and *y* be the percentage of people surveyed in the city who like Fardeen Khan.
Then Fardeen has maximum liking in that city where '*x* × *y*' is maximum.
For Bombay = 30 × 12 = 360
Delhi = 14 × 25 = 350
Kolkata = 6 × 23 = 138
Indore = 19 × 22 = 418

12. 2; Amitabh's fans who don't like Aamir = (62 – 36)% of (30% of 2000) = 26% of 600 = 156

13. 4; In Mumbai, 100 29 21% = 50% don't like either Salman or Shahrukh.

50% of (30% of 2000) = 300
Same way: in Kolkata = 299
Delhi = 250
Indore = 220
total = 1069

14. 1; In Delhi, for calculating maximum no. of people surveyed who don't like any of the given stars, let us assume that 52% fans who like Amitabh also like the other five stars.

So those who don't like any of the above = 100 52 48% of (25% of 2000) 240

15. 3; At maximum the required no. can be 6% of 23% of 2000 = 27.6 27

16. 1;

Code	No. of students who opted for Finance
A	0.5 × 200 = 100
B	0.375 × 240 = 90
C	0.25 × 160 = 40
D	0.5 × 80 = 40

Hence, MNIMS

17. 2; From the previous question,

difference = 100 – 40 = 60
No. of students in BJIMS studying Finance = 12.5% of 240 = 30
Ans = 200%

18. 3; Specialisation 2004 2005

Marketing (MNIMS)	200 × 25% = 50	50 $\frac{110}{100}$ 55
Systems (MNIMS)	200 × 25% = 50	50
Marketing (MNIMS)	200 × 50% = 100	—
Total (MNIMS)	200	200 $\frac{110}{100}$ 220

Marketing (MNIMS) in 2005 = 220 – 50 – 55 = 115
% increase in Marketing (MNIMS) = 15%

19. 3; Total students opting for Systems
25% × 200 + 240 × 12.5% + 160 × 50% + 37.5 × 80 = 190
Total Finance students = 100 + 90 + 40 + 40 = 270

$\frac{190}{270}$ 100 70.4%

20. 2; % change = $\frac{80 \quad 50\%}{200 \quad 25\%}$ 100 $\frac{40}{50}$ 100 80%

21. 3; The answer can be determined and will be between 14% and 25%.
(Average of samples always lies between the lowest and the greatest sample.)
Alternative Method:
HR companies = 72 + 70 + 138 + 160 + 154 = 594
Total companies = 360 + 500 + 600 + 640 + 700 = 2800

$\frac{594}{2800}$ 100 21.2%

22. 3; Total no. of Marketing companies = 162 + 220 + 258 + 256 + 364 = 1260
Total finance companies = 126 + 210 + 204 + 224 + 182 = 946

$\frac{946}{1260}$ $\frac{3}{x}$

23. 1; $360\ 1\ \frac{x}{100}^{4}$ 700 x 18%

Alternative Method: Compound rate of interest is always lower than simple rate of interest.

$\frac{700 \quad 360}{360}$ 100 $\frac{1}{4}$ is less than 25%.

Answer can be only (1) since other options are more than 25%.

24. 2; From Q. No. 82, in this set it is = 1238 – 929 = 309.

25. 4; HR camp. in 2001 = $\frac{210}{42}$ 14 70

HR camp. in 2002 = $\frac{204}{34}$ 23 138

$\frac{138 \quad 70}{70}$ 95%

26. 3; The total songs = $\underbrace{2}_{\text{11th week}}$ + $\overbrace{3}^{\text{10th week}}$ + $\underbrace{4}_{\text{9th week}}$ + ... + $\underbrace{12}_{\text{first week}}$ = $\frac{12 \quad 13}{2}$ 1 77

27. 4; We can't determine the answer because we don't know the weightage of different regions in total votes and the data is too messed up to point out a single singer with highest no. of votes.
28. 2; Whatever be the weightage of different regions, Nihira has got lowest % of votes from all the four regions.
So she must be getting lowest votes overall from the Indian viewers and will be out of the context next week.
29. 3; Himani has got 100% votes of West India
She has got 100% votes from Mumbai viewers also.
30. 1; Required % = $\frac{60 \quad 2 \quad 0 \quad 1 \quad 14 \quad 3 \quad 15 \quad 4 \quad 6 \quad 2 \quad 0 \quad 1 \quad 3 \quad 51 \quad 11 \quad 4}{6 \quad 2 \quad 0 \quad 1 \quad 3 \quad 51 \quad 11 \quad 4}$

$= \frac{222 \quad 209}{209} \quad 100 \quad \frac{1300}{209} \quad 6.2\%$

Practice Exercise 20

Direction (Q. 1-6): Following table shows the assets and liabilities of the Reserve Bank of India for the given years. Make use of data from previous questions if required.

ASSETS AND LIABILITIES OF RESERVE BANK OF INDIA

(All figures in Rs crore)

	2000	1999	1998	1991	1981
Liabilities					
Notes in circulation	192483	172541	148520	53784	13733
Govt deposits	541	68	453	94	789
Deposits of banks	80460	65359	59427	33829	4162
Other deposits	5551	6330	5239	4619	1570
Assets					
Gold coin and bullion	12973	12624	13412	6654	226
Foreign assets	25294	12116	10038	14208	4320
Rupee securities	140967	145583	125956	46924	1110
Investments	3916	2916	2767	40286	1593
Loan and advances	37890	19876	13963	18516	3504
Other assets	5467	4398	6133	4103	4630

1. In the year 1999, 20% of investments of the government was in 'Golden forest scheme' and the same amount was expected to be invested in the year 2000. What was the share of investment for 'Golden forest scheme' in 2000?
   1) 13% 2) 20% 3) 14.90% 4) 12.8%
2. If the percentage increase in 2001 over the previous decade is the same as that of 1991 over the year 1981, the percentage increase in the foreign assets in 2001 over the previous year is
   1) 22% 2) 15% 3) 9% 4) None of these
3. From year 1981 to year 2000, in how many years was there an increase in the number of notes in circulation with respect to previous year?
   1) 3 2) 2 3) 4 4) Indeterminable
4. Net liability (percentage) is defined as the percentage of net liabilities over total assets, and net liabilities is the difference between total liabilities and total assets. In which year, out of those mentioned above, is Net liability (%) the maximum?
   1) 1999 2) 1998 3) 2000 4) None of these
5. What is the rate of average annual compound growth rate of total assets for the decade 1981-91?
   1) 20% 2) 24% 3) 18% 4) 16%
6. Textile units, steel-producing units and many manufacturing units are under Government's Other assets. Some of these public sectors are declared as sick units of NPA (Non-performing assets). NPA are the government undertaking units which are running at a loss. 20% of other assets in 1999 are NPA, and in 2000 one more steel-producing unit of assets equal to 120 crores is declared as NPA. What is the percentage of NPA in 2000 with respect to the Other assets?
   1) 20% 2) 15% 3) 18% 4) Indeterminable

Directions (Q. 7-11): Following table shows the indices (index numbers) of major industrial production in a country. All the information is tabulated taking production in 1993-94 = 100.

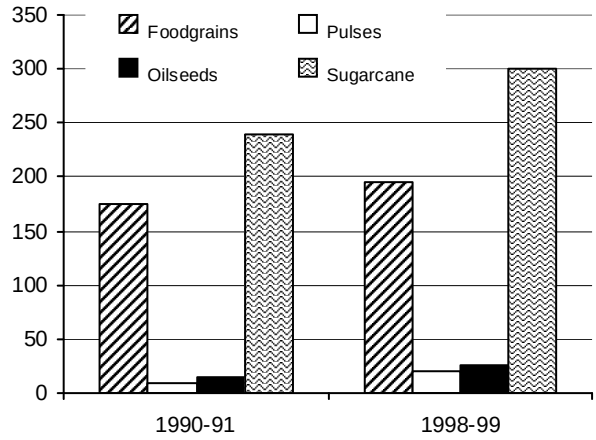
Index numbers of industrial production (1993-94 = 100)						
	Weight	**1998-99**	**1997-98**	**1996-97**	**1995-96**	**1994-95**
General index	100.0	143.1	137.6	129.1	122.3	108.4
Mining & quarrying	10.5	120.3	122.4	115.6	117.9	107.6
Electricity	10.2	138.4	130.0	122.0	117.3	108.5
Manufacturing	79.4	146.7	140.6	131.8	123.5	108.5
Food	9.1	134.7	133.8	134.3	129.8	121.6
Beverages etc	2.4	178.5	158.1	132.4	116.7	103.0
Cotton textiles etc	5.5	115.9	125.6	122.7	109.5	99.1
Jute textile etc	0.6	106.0	114.3	97.8	102.4	95.1
Textile products including garments	2.5	153.8	158.7	146.3	133.7	98.5
Wood and products	2.7	121.0	128.5	131.9	123.2	99.3
Paper and products	2.7	169.8	146.4	136.9	125.5	108.6
Leather and products	1.1	119.9	110.8	108.4	99.1	86.8
Rubber, plastic & petroleum products	5.7	138.7	124.6	118.4	116.1	107.7
Chemicals and products	14.0	149.8	140.5	122.7	117.2	105.3
Non-metallic mineral products	4.4	174.6	161.4	141.8	131.7	108.0
Basic metal and alloys	7.5	139.9	143.5	139.8	131.0	113.1
Metal products	2.8	141.6	120.2	110.9	100.6	104.7
Electrical machinery etc	9.6	152.1	149.6	141.7	134.7	112.8
Transport equipment	4.0	177.9	153.8	149.9	132.8	113.2
Other products	2.6	128.4	120.4	123.8	117.7	104.4

7. Of the following data, in how many categories in 1994-95 is the industrial production more than the production in 1993-94?
   1) 15 2) 13 3) 12 4) 14
8. How many categories have shown a consistent increase in production every year in the given period of time?
   1) 10 2) 11 3) 12 4) 13
9. How many categories have shown an increase of more than 50% in production in the period of 1994-99?
   1) 8 2) 7 3) 5 4) None of these
10. The 'Average index number' of any category is defined as the summation of index number divided by number of years. Which category has minimum average index number?
    1) Cotton textiles 2) Paper and products 3) Mining and quarrying 4) Jute textile etc

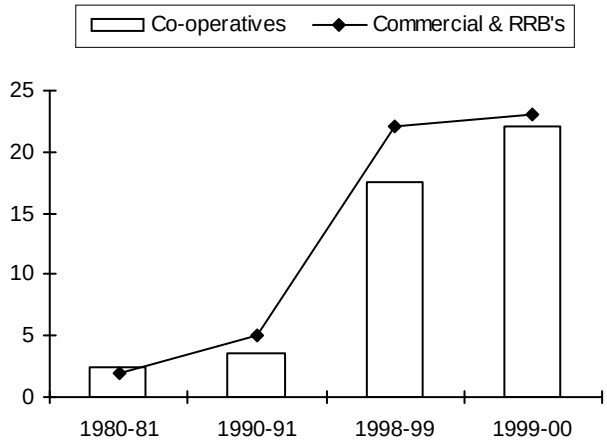
11. In the given categories, which categories have an average index number of more than 120 points?
1) Mining & quarrying and Electricity 2) Transport equipment and Electrical machinery
3) Manufacturing and Other products 4) All of these

Directions (Q. 12-17): Study the graphs given below carefully and answer the questions that follow. Use information given in previous question if required.

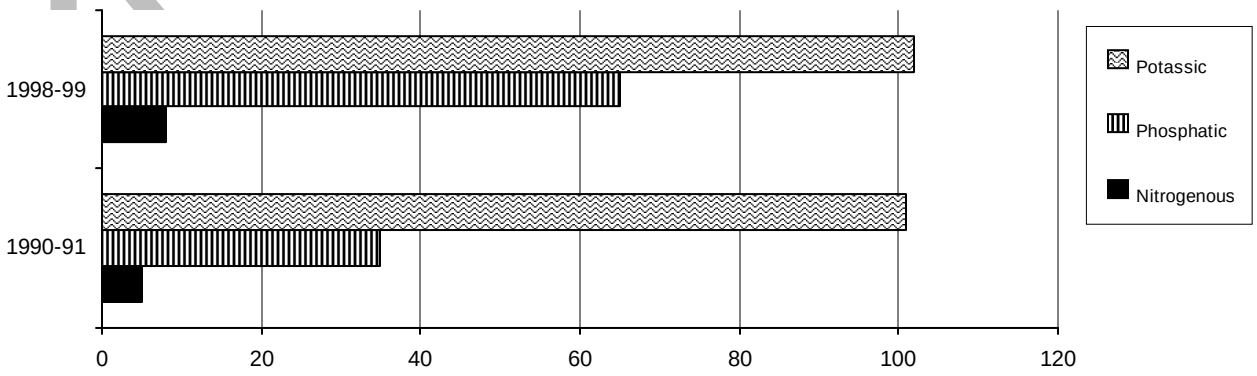
Production of selected commodities (million tonnes)



Flow of institutional credit to agriculture (Rs crores × 1000)



Import as percentage of gross fertiliser availability (%)



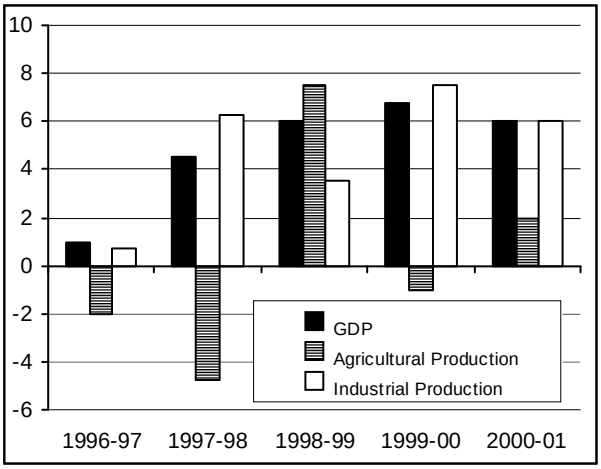
12. Per capita net availability of foodgrain ( ) is defined as: Total foodgrain production (kg)/Population. If in 1998-99 value of was registered as 360 and in 1999-2000 it became 400, then the percentage increase in the population of India in the year 1999-2000 over the previous year was
1) 16.66% 2) 20% 3) 25% 4) Indeterminable
13. In the year 2000-01 value of was 420 and the foodgrain production was 250 m tonnes. What was the increase in the population in year 2000-01 over 1990-91 (assuming that in 1998-99 was the same as it was in 1990-91)?
1) 11 billion 2) 11 million 3) 110 million 4) Indeterminable
14. If in 1990-91, 20% of co-operative credit was sanctioned for sugarcane production then the yield of sugarcane per 100 rupees of co-operative credit for the year 1990-91 was
1) 35 kg 2) 350 kg 3) 3500 kg 4) Indeterminable
15. Gross fertiliser consumption was registered as 150 tonnes, 200 tonnes and 250 tonnes of Nitrogenous, Phosphatic and Potassic respectively for the year 1998-99. Assuming that the import of fertiliser was taken into consideration in order to fulfil the total consumption, then what was the total fertiliser imported in 1998-99?
1) 200 tonnes 2) 250 tonnes 3) 215 tonnes 4) 260 tonnes

16. If in 1990-91 the total production of agricultural products accounts for 52% of Gross Domestic Product, then the Gross Domestic Product in 1990-91 was equivalent to the agricultural production of _____. (In million tonnes)
1) 800 2) 850 3) 900 4) indeterminable

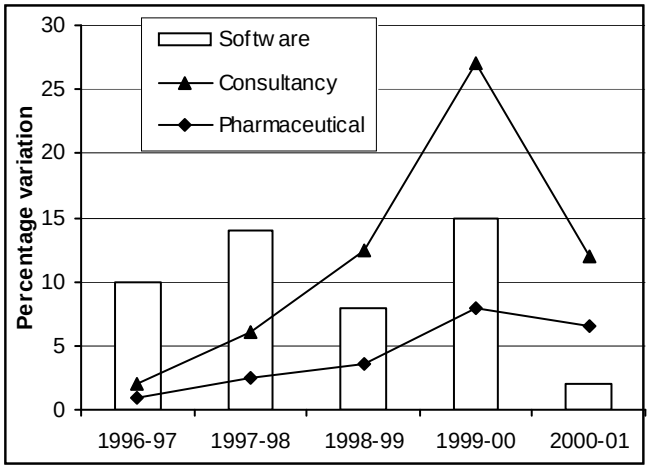
17. 30% of sugarcane was exported in 1990-91 and 33.33% yearly increase in the export of sugarcane was reported next year. (Export rate was $ 89 per tonne). What was the change in the percentage of the revenue generated from the export of sugarcane in 1991-92?
1) 30% 2) 33.33% 3) 25% 4) indeterminable

Directions (Q. 18-22): Figures given below show the percentage change in the key economic indicators and major industrial growth for the period of 1996-97 to 2000-01, over the previous year. Use data from previous questions if required.

KEY ECONOMIC INDICATORS



MAJOR INDUSTRIAL GROWTH



18. Which of the following is/are true?
I) Growth of Software industries is the key contributor to the growth of Industrial production.
II) In 1998-99 Agricultural production has shown maximum change in percentage over the previous year.
III) GDP has shown consistent increase every year over the period 1996-01.
1) Only I 2) I and III only 3) I, II and III 4) II and III only

19. If index of GDP is considered as 100 in 1995-96, then how many years have GDP more than the average GDP in the given period?
1) 2 2) 3 3) 1 4) None of these

20. If in 2000-01 Software contributed 15% to the total Industrial production and 10% growth was registered in total Industrial growth next year, what should be the index for total Industrial production in 2001-02 (considering index for Software in 1995-96 as 100)?
1) 1080 2) 1520 3) 1160 4) indeterminable

21. 80% of the Software production in 1996-97 was for international projects and this share reduced to 70% in the year 1999-00. Percentage change in Software production for the international projects in the given period
1) Decreased by 22% 2) Increased by 24% 3) Decreased by 30% 4) Increased by 30%

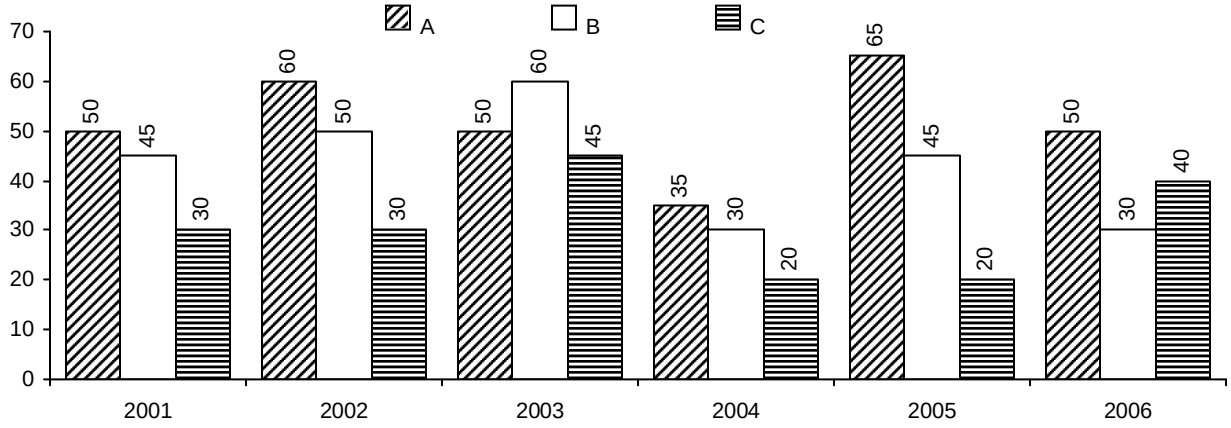
22. Which of the following statements are false?
I) Software production is the only sector which has shown continuous growth.
II) In all Industrial production over the mentioned period, the percentage change in growth is maximum for Consultancy industry.
III) Software, Consultancy and Pharmaceutical industries contribute more than half of the total Industrial production.

IV) Software, Consultancy and Pharmaceutical industries have shown consistent increase in their production.

1) I & II only 2) II & III only 3) I, II and III only 4) I, II, III and IV

Directions (Q. 23-27): Study the following graph carefully to answer the questions given below it.

Production of paper (in lakh tonnes) by three different companies A, B & C over the years



23. What is the difference (in tonnes) between the production of company C in 2001 and that of company A in 2004?
1) 500000 2) 5000000 3) 50000 4) 50000000
24. What is the percentage increase in production of company A from 2004 to 2005?
1) 85.71 2) 46.15 3) 84.23 4) 45.25
25. For which of the following years the percentage of rise / fall in production from the previous year is the maximum for company B?
1) 2002 2) 2003 3) 2004 & 2005 4) 2005
26. The total production of company C in 2002 and 2006 is what percentage of the total production of company C in 2004 and 2005?
1) 170 2) 175 3) 178 4) 180
27. What is the difference (in lakh tonnes) between the average production per year of the company with highest average production and that of the company with the lowest average production?
1) 20.83 2) 28.3 3) 21.38 4) 22.32

Answers and explanations

1. 3; In 1999 total investment was 2916 crores. Investment in "Golden forest" scheme = 0.2 ×2916 = 583.2 crores. Next year same amount is (583.2 / 3916)×100 = 14.89%.
2. 4; % increase in the foreign assets (1981 to 1991) = [(14208 - 4320) / 4320] × 100 230% approx.
Expected foreign assets in 2001 = 3.3 × 14208 = 46886.4 crores.
Percentage increase in 2001 over previous year = 46886.4 - 25294 / 25294) × 100 = 85.3%.
3. 4; In the given information, increase in circulation of notes over previous year cannot be calculated as the number of notes in circulation in 1982 is not known.
4. 4; From the given table we can calculate the net liabilities(%):

	1981	1991	1998	1999	2000
Total liabilities	20254	92326	213639	237968	279037
Total assets	15383	130691	172269	197513	226507
Net liabilities	4871	---	41370	40455	5528
Net liability (%)	31.66%	---	24%	20.5%	23.29%

5. 2; From the above calculation, if R is the rate of average annual growth, then $130691 = 15383\,(1 + R/100)^n$, where n = 10. R = 24% approx.

6. 3; NPA in 1999 = 20% of 4398 = 880 crores.
NPA in 2000 = 880 + 120 = 1000 crores.

$$\% \text{ of NPA with respect to Other assets} = \frac{1000}{5467} \times 100 = 18\% \text{ approx.}$$

7. 4; Number of categories can be calculated directly from the table itself.

8. 1; 10 categories of the given have shown to have consistent increase in production.

9. 3; Beverages, Textile products including garments, Paper and products, Non-metallic mineral products and Transport equipment are the categories out of the given, which have shown increase of more than 50% in the period 1994-99.

10. 4; In these types of problem we can directly add the index and check for the minimum value. No need to actually calculate the value of 'Average index number' as the base is 5 for all the cases.
(1) Cotton textile = 115.9 + 125.6 + 122.7 + 109. 5 + 99.1 = 572.8
(2) Paper and products = 169.8 + 146.4 + 136.9 + 125.5 + 108.6 = 687.2
(3) Mining and quarrying = 120.3 + 122.4 + 115.6 + 117.9 + 107.6 = 583.8
(4) Jute textile etc = 106.0 + 114.3 + 97.8 + 102.4 + 95.1 = 515.6

11. 2; In all categories given in the answer options, average index number is more than 120 points for (2), that is Transport equipment = 145 and electrical machinery = 138.2.

12. 4; As the foodgrain production in 1999-2000 is not known, we cannot calculate population in 1999-2000.

13. 3;

Year		Foodgrain production in million tonnes	Population in million
1990-91	360	175	486.1
2000-01	420	250	595.2

Hence increase in the population was 110 million (approx).

14. 3 Sugarcane production in 1990-91 was 240 m tonnes.
Loan = 20% of 3500 crores = 700 crores

Production of sugarcane per 100 Rs of loan = $\frac{240 \text{ m tonnes}}{700 \text{ crore}}$ 100 3428 kg

15. 4;

Year	Nitrogenous	Phosphatic	Potassic
1998-99 (Consumption)	150 tonnes	200 tonnes	250 tonnes
Import (% of gross fertilisers available)	8	65	102
Import (tonnes)	11.11	78.8	126.24

I = import, C = consumption, A = Availability

For Nitrogenous, $\frac{I}{A}$ 8% .08 and Availability = Consumption – Import

Thus, $\frac{I}{C \quad I}$ 0.08 I 150 $\frac{0.08}{1.08}$ 11.11 tonnes.

Similarly, we can calculate import for other fertilizers.
Total import = 11.11 + 78.8 + 126.26 = 216.15 tonnes.

16. 4; We do not know the total of agricultural production in 1990-91.

17. 4; As the export rate for the year 1991-92 is not given, so it cannot be calculated.

18. 4; Statement I is not true as the percentage contribution by Software to the total industrial production is not given.
Statement II is true. As per the given information, agricultural production has shown maximum percentage increase over previous year in 1998-99 = {(100.1-93.1)/93.1} × 100 = 8.6%.
Statement III is also correct as GDP has shown consistent increase in the given period of time.

19. 1; Considering GDP for the year 1995-96 = 100 points,

1995-96	1996-97	1997-98	1998-99	1999-00	2000-01
100	101	105.5	111.5	118.25	124.25

And average GDP = $\frac{560.5}{5}$ 112.1

20. 3; In 2000-01 index for software was 100 (1.10) (1.14) (1.08) (1.15) (1.02) = 159.
15% of (Total industrial growth) = 162 points.
Thus total industrial growth = (162/15) × 100 = 1060 points
In the year 2001-02, 10% growth was registered.
Total industrial growth in 2001-02 = (1080 × 110) / 100 = 1166 approx.

21. 2; In 1996-97, 80% of 110 = 88 points.
In 1999-00, 70% of 156 = 109 points approx.
% change = [(109 – 88)/88] × 100 = 24% increase approx.

22. 3; Only statement IV is a true statement.

23. 1

24. 1; Percentage increase of A from 2004 to 2005 $\frac{65 \quad 35}{35}$ 100 85.71

25. 3; Percentage rise/fall in production for B

2002	2003	2004	2005	2006
11.11	20	50	50	33.33

26. 2; Percentage production = $\frac{70}{40}$ 100 175

27. 1; Average production of A = 51.66
Average production of B = 43.33
Average production of C = 30.83
Difference of production = 51.66 - 30.83 = 20.83