IAS 100

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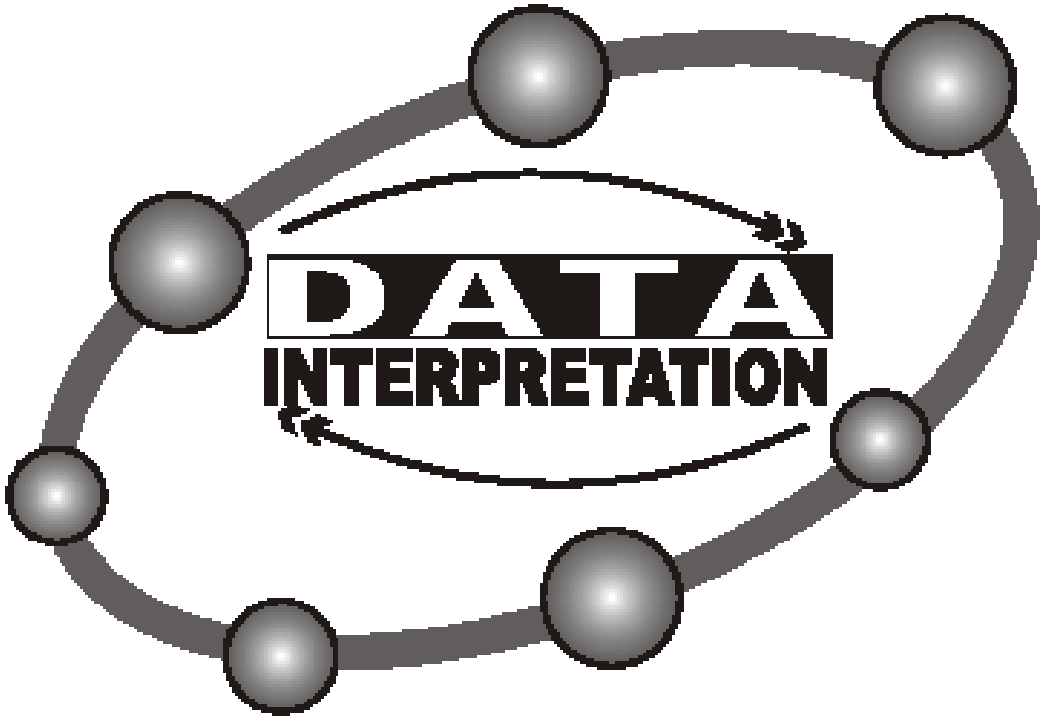

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1 VEDIC MATHEMATICS

Most of the students consider mathematics to be a very difficult subject and especially calculations are considered to be even a tougher job. In this chapter, we will learn certain tricks about how to ease our calculations and how one can solve some of the tough looking calculations without even using pen and paper. But just like any other art, even this art of faster calculation requires certain pre-requisites and lots of practice. There is a well known saying that if you want to excel in mathematics, practice it as much as you can. In calculations, this saying is even more critical. But the prerequisite for faster calculation is that one should remember all the below mentioned numbers by heart and treat this as also your homework before you actually start your preparation.

- Tables till 30.
- Cubes till 30.
- Reciprocals till 30.
- Squares till 30.

There is a table at the back of the book which will provide you all these numbers. In this chapter, we will try to minimize calculations using short-cuts for

- Subtraction.
- Multiplication.
- Division.
- Squaring.
- Cubing.
- Some common techniques.

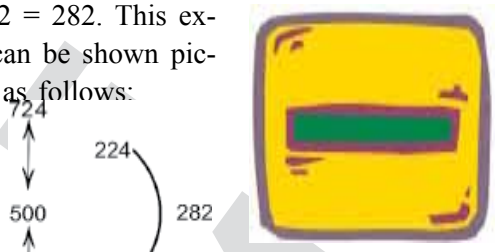
Key Objectives of this chapter are:

- Approximation of the calculations without using calculator.
- Removing phobia for calculation and making you comfortable with the calculations.
- One should start doing calculations mentally and avoid using pen and paper after going through this chapter.

It is hoped that the student fraternity would find vedic maths not only interesting but also an effective mathematical system.

SUBTRACTION

Addition is the easiest of all the calculations and division is the toughest of all the calculations. So, to ease a subtraction, we should break our subtraction into addition. For example: if one need to subtract 442 from 724, then one should look for a number in between these two numbers (say base) which is easy to calculate with and then check the difference of these two numbers from the base and then add these two differences. In this particular example, let us take 500. Now, difference of 500 from 442 is 58 and difference of 500 from 724 is 224. So, we will add 58 to 224 which will come out to be 282. Thus 724 - 442 = 282. This example can be shown pictorially as follows:



This method generally saves lots of calculation time and efforts and thus is very helpful.

MULTIPLICATION

In Multiplication, we will learn two types of multiplications which are

- Base method of multiplication
- Cross method of multiplication

Base method of multiplication

In base method of multiplication, whenever we need to multiply two numbers close to each other and also close to some power of 10 like 10, 100, 1000 and so on…., we can use base method of multiplication. We will try to understand this with the help of a given example.

Example: Calculate 106×102

Step 1: Take a close friendly number as base which is close to the pair of numbers to be multiplied. In this particular case, base of this multiplication will be 100.

Step 2: Check the difference of the given numbers from the base. In this particular case these differences of the numbers are +6 and +2.

Step 3: Add the two given differences and write it in as many digits as zeros in your base and this will be preceded by 1 to make the first part of the number. For example in the given case, sum of differences comes out to be 8. So, first part of the product will be 108.

Step 4: Last part of the product will be formed by multiplying the two differences in as many digits as zeros in our base. For example in the given example, product of the differences will come out to be 12. And this needs to follow 108.

So, our product will come out to be 10812.

In a similar way, we can multiply any two numbers close to some power of 10. For example: if we need to multiply 1004 and 1008, it will take our base as 1000 and the difference of the numbers will come out to be 4 and 8. Now sum of these two differences will be 12 and product will be 32. Moreover, since our base contains three zeros so these numbers need to be written in three digits. Thus $1004 \times 1008 = 1012032$

But, if these two differences come out to be negative number then, then our summation will come out to be a negative number and hence

should be subtracted from the base. Although, our product will still be a positive number. For example: if we need to multiply 94 and 92, differences of the two numbers from the base will come out to be -6 and -8. Sum of these two numbers come out to be -14 and product of these two numbers come out to be 48. So, first part of the product will come out to be 100-14=86 and this number need to be written in two digits whereas the second part of the product will be 48 and hence the final product will be 8648.

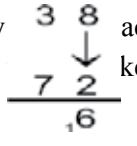
Now, if we need to multiply two numbers wherein the product of the differences comes out to be a number which contains more digits than the number of zeros, then we will have to take carry forwards. For example: if we need to multiply 112 and 113, then differences from the base will come out to be 12 and 13 which will add to 25 and they will multiply to 156. Thus, first part of the product will be 125 and second part will be 156, but we have only two places for the second part. So, hundred's place of the second part will be carried over and will be added to first part making it 126 and second part will become 56. Hence product of 112 and 113 will be 12656.

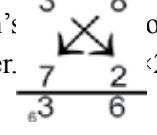
But if we need to multiply two numbers, one of which is more than the base and the other is smaller than the base, then the problem arises as the product of the differences will come out to be a negative number. For example if we need to multiply 998 and 1003, then the differences will come out to be -2 and +3 which will add to +1 and they will multiply to -6. Now adding this difference to the base which is 1000 in this case will give us 1001 and this need to be followed by product in three digits which is -006. Now, we will take a carry back-ward from the first part to convert this negative number to a positive number and then we need to subtract 1 from the leading part and hence our product will come out to be 1000994. First part is obtained by subtracting 1 from the first part and second part is procured by subtracting 6 from 1000.

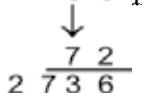
Cross Method of Multiplication

In this section of Vedic mathematics, we will try to learn the tricks of faster multiplication which is also known as cross method of multiplication. This is something very similar to what we have been doing since our childhood but herein, we will try to learn doing those tricks mentally instead of doing those tricks manually on papers. Here we will learn about how to multiply two numbers of same or different numbers of digits without getting into forming a big long table. Unlike most of the Vedic Mathematics methods, wherein two numbers need to be close or need to satisfy some or the other conditions, here even if two numbers are far apart and do not satisfy any conditions, even then these numbers can be multiplied.

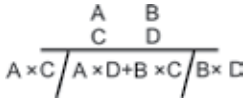
Let us try to learn the method first. Assume, we have to multiply two two-digit numbers. Let us try to multiply 38 and 72. Firstly, we will multiply unit's place of both the numbers to get the unit's place. In this case, we will multiply 8 and 2 which comes out to be 16. Now we will put 6 on the unit's place and will take 1 as a carry over to ten's place. For ten's place we will multiply unit's place of both the numbers with ten's place and then we will add them and then we add the carry over. For example in this case, we will multiply 3 with 2 and 8 with 7 and then add both of them along with the carry 1. This will give us 63 which means that 3 will be there at the ten's place and 6 will be taken as carry over. Now for the hundred's place, we need to multiply ten's place of both the numbers and add it to carry over. In this case, for hundred's place, we will multiply 3 and 7 which gives 21 and then 6 will be added in the form of carry over to make it 27 as hundred's place. Thus product of 38 and 72 comes out to be 2736. This method can be represented in pictorial form as follows

Step.1: Multiply  ace to get unit's place and other digits ken as carry over

Step. 2: Multiply unit's place of both the numbers with ten's other numbers and add the carry over.  2+7×8+1=63.

Step. 3: For hundred's place, multiply ten's places of both the  and add it to carry over. 3×7+6=27.

In other words, we can summarize this complete process as follows

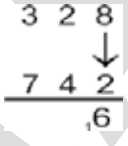


Now, in a similar way, if we have to multiply two three-digit numbers, then again we will do it in a similar fashion.

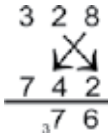
Let us try to understand this with the help of an example.

Suppose if we have to multiply 328 and 742. Then for unit's place, we will multiply unit's place of both the numbers which in this case comes out to be 8 and 2. Product of 8 and 2 is 16. Which means 6 will be unit's place and 1 will be taken as carry over. For ten's place, we need to multiply unit's place of both the numbers with ten's place of the other number and then these numbers will be added to carry over. So, in this case 2 will be multiplied to 2 and 8 will be multiplied with 4 and then 1 i.e. the carry over need to be added. Thus, ten's place will be 37, wherein ten's place will be 7 and 3 will be taken as carry over. Now, for hundred's place, unit's place of both the numbers are to be multiplied with hundred's place of the other number and ten's place need to be multiplied and then these numbers are to be added to carry over. In this case, 8 and 7 will multiply to give 56, 3 and 2 will multiply to give 6 and 2 and 4 will multiply to give 8. Now, adding 56, 6, 8 and 3, we get 73, wherein 3 will be the hundred's place and 7 will be taken as carry forward. For thousand's place, we need to multiply ten's place of both the numbers with hundred's place of the other numbers. Thus 3 and 4 will multiply to give 12 and 7 and 2 will multiply to give 14, now adding, 12, 14 and 7, we get 33. Which means that thousand's place will be 3 and 3 will be taken as carry over. Now, for the ten thousand's place, we need to multiply hundred's digit of both the numbers and then carry over will be added. Multiplying 3 and 7 will give us 21 and after adding 3, we will get next place as 24. Thus, product of 328 and 742 comes out to be 243376 These steps are explained pictorially as follows:

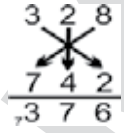
Step 1: Multiply the unit's place of both the numbers i.e. 8×2=16



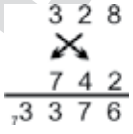
Step 2: Multiply unit's place of both the numbers with ten's place of the other number and add it to carry over. i.e. 2×2+8×4+1=37



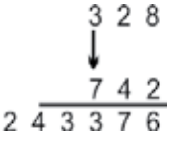
Step 3: Multiply hundred's place of each number with unit's place of the other number and add it to the product of ten's places and carry over. i.e. 3×2+2×4+8×7+3=73



Step 4: Multiply ten's place of both the numbers with hundred's place of the other numbers and carry over. i.e. 3×4+2×7+7=33



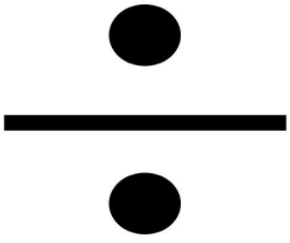
Step 5: Multiply the hundred's place and add it to the carry over. i.e. 3×7+3=24



This multiplication can also be presented alphanumerically as follows:

	A	B	C
×	D	E	F
A×D	A×E+B×D	A×F+B×E+C×D	B×F+C×E	C×F

DIVISION



As discussed earlier, we know that division is the toughest of all the calculations and for obvious reasons; it is also the most hated one. Very often after seeing a tough division exercise, we tend to approximate with rounding off either numerator or denominator. First thing over here, for easing calculation, we need a friendly number in denominator and not in numerator. In simpler words, it is denominator which makes our calculation easy or difficult and not numerator. So, we should actually round off only denominator to improve accuracy.

In division, we will discuss ways of rounding off our division, so as to have an easier calculation. If, we add or subtract some number in our denominator then a similar number should be added or subtracted from numerator as well to obtain the same value.

For example if we need to calculate $\frac{42}{91}$, we will face lot of problems as denominator is 91, but had the denominator been 100, it would have been a much simpler calculation.

So, we should add 9 to our denominator. But adding 9 to the denominator will change the ratio, hence we should add a number in the denominator which has the same ratio. Now since 9 is roughly one tenth of the 91, we will add one tenth of the numerator to it as well thus

$$\frac{42}{91} = \frac{42+4.2}{91+9} = \frac{46.2}{100} = 0.462$$

In the same way, if we need to calculate any fraction, we just need to approximate our denominator to a close friendly number and then we need to add or subtract from denominator and finally we will get our answer.

Let us take the example of $\frac{145}{369}$.

Step 1: Close friendly number to 369 is 300, so subtract 69 from denominator.

Step 2: Since 69 is roughly 20% of 369, subtract 20% from the numerator as well. Thus numerator will become $116 \cdot 29 = 116$.

Step 3: Calculate $\frac{116}{300}$ which comes to be 0.386.

This method of division does not give the exact value of the the fraction but helps a lot in getting the exact option of all the given options and at the end of the day, we are only concerned with the right option and not the exact value of the calculation.

SQUARING

Whenever, we need to calculate square of a number close to 50, we need to follow the following steps:

Step 1: Check the difference of the number from 50.

Step 2: Add this difference to 25 if the number is more than 50 and subtract this from 25 if the number is less than 50. And this will form the first part of the square.

Step 3: Calculate the square of the difference and this will form the second part of the square. In second part of the square, we need to write the square in exactly two digits. Thus if this square comes out to be a three digit number hundred's part will be carried over and if it is a single digit number then zero will be prefixed to it to make it a two digit number.

Example: Calculate 47^2.

Step 1: 47 is 3 less than 50.

Step 2: 25-3=22. Hence first part of the square will be 22.

Step 3: Square of 3 comes out to be 9. So, second part of the square will be 09

Hence $47^2 = 2209$

Example: Calculate 62^2

Step 1: 62 is 12 more than 50.

Step 2: 25+12=37. Hence first part of the square will be 37.

Step 3: Square of 12 is 144. So, second part of the square will be 44 and 1 will be carried over to first part. And thus first part will be 38.

Hence $62^2 = 3844$.

In a similar way, if we need to calculate square of a number which is close to 100, then, we will follow the following steps.

Step 1: Check the difference of the number from 100.

Step 2: If the number is more than 100, add double of the difference to 100 and if the number is less than 100 then subtract double of the difference from 100. And this will form the first part of the square.

Step 3: Calculate the square of the difference and this will be the second part of the square. Second part of the square will contain only two digits. Thus if this square is a single digit number then a zero need to be prefixed to make it a two digit number and if this number is a three digit number then hundred's part will be taken as a carry over.

Example: Calculate 104^2.

Step 1: 104 is 4 more than 100.

Step 2: Twice of 4 is 8 and thus 8 needs to be added to 100 to make it 108. So, first part of the square will be 108.

Step 3: Square of 4 will be 16. So, second part of the square will be 16

Hence, $104^2 = 10816$.

Example: Calculate 88^2.

Step 1: 88 is 12 less than 100.

Step 2: Twice of 12 is 24 and thus it needs to be subtracted from 100 to get the first part. So, first part of the square will be 76.

Step 3: Square of 12 will be 144. So, second part of the square will be 44 and 1 will be carried to first part and thus first part will become 77.

Hence, $88^2 = 7744$.

Thus, if we remember all the squares from 1 to 30, then we can easily calculate all the squares from 31 till 80 using a base of 50 and all the squares from 80 to 130 using a base of 100. Thus, we can calculate all the squares from 1 to 130 using some or the other base provided; we know all the squares from 1 to 30.

CUBING

There are certain short-cuts for calculating cubes of certain numbers. One of these ways will be discussed here which is most commonly used. This is a typical way for calculating cube of a number which is close to some power of 10. We will try to learn this method with the help of an example.

Example: Calculate 102^3.

Step 1: Check a base which should be some power of 10 and check the difference of the number from base. In this case our base will be 100 and difference of the number from the base is +2.

Step 2: Triple the difference and add it to the base and this will form the first part of the cube. In this case, 6 will be added to 100 to make it 106. Thus, first part of the cube will be 106.

Step 3: Multiply square of the difference with 3 and this need to be written in as many digits as zero in the base and this will form the second part of the cube. For example, since our base contains two zeros, we will write 3×2^2 in two digits as 12.

Step 4: Third part of the cube will consist of cube of the difference. And this cube need to be written in as many digits as zeros in the base. In this case, third part of the cube will be 08.

Hence, $102^3 = 1061208$.

Example: Calculate 105^3.

Step 1: In this case, base for the calculation will be 100 and the difference will be +5.

Step 2: 5 when multiplied with 3 will give us 15 and adding it to 100 will give us 115. So, first part of the cube will be 115.

Step 3: $5^2 = 25$ and $25\times 3 = 75$. So, second part of the cube will be 75.

Step 4: $5^3 = 125$, so 25 will be the third part of the cube and 1 will be carry over and thus will be added to 75. So, second part will be 76 and third part will be 25.

Hence, $105^3 = 1157625$.

Example: Calculate 1006^3

Step 1: In this case, base will be taken as 1000 and the difference will be 6. So, each and every part of the calculation will assume three digits.

Step 2: 6 when multiplied with 3 will give us 18 and adding it to 1000 will give us 1018. So, first part of the cube will be 1018.

Step 3: $6^2 = 36$ and $36\times 3 = 108$ So, second part of the cube will be 108.

Step 4: $6^3 = 216$, so 216 will be the third part of the cube.

Hence, $1006^3 = 1018108216$.

Example: 99^3.

Step 1: In this case, base will be taken as 100 and the difference will be -1. So, each and every part of the calculation will assume two digits.

Step 2: -1 when multiplied with 3 will give us -3 and adding it to 100 will give us 97. So, first part of the cube will be 97.

Step 3: $(-1)^2 = 1$ and $1\times 3 = 3$. So, second part of the cube will be 03.

Step 4: $(-1)^3 = -1$, but since cube can take a negative number in between, +1 will be taken as a carry backward from the second part and thus we will subtract 1 from the second part and will add 100 to the third part. Thus, second part will be 02 and third part will be 99.

Hence, $99^3 = 970299$.

SOME COMMON TECHNIQUES

- If we need to multiply two numbers whose digits are same except the units place and the units place digits adds upto to 10, then the product will be the product of common number and next number followed by product of unit's places in two digits.

Example: $128 \times 122 = 12 \times (12+1) \,|\, 2 \times 8 = 15616$

$71 \times 79 = 7 \times (7+1) \,|\, 1 \times 9 = 5609$

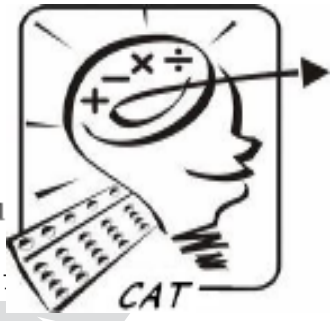
- If we have a number whose units digit is 5 then its square will be product of all the digits except its unit's place and the next number followed by 25.

Example: $75^2 = 7 \times (7+1) \,|\, 25 = 5625$

$105^2 = 10 \times (10+1) \,|\, 25 = 11025$

- $99^2 = 9801$
- $999^2 = 998001$
- $9999^2 = 99980001$
- $99999^2 = 9999800001$
- $999999^2 = 999998000001$

- $11^2 = 121$
- $101^2 = 10201$
- $1001^2 = 1002001$
- $10001^2 = 100020001$
- $(n+1)^2 - n^2 = (n+1$



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This means that difference between squares of any two consecutive numbers is the summation of these two numbers. Thus, if we need to calculate square of a number which is either one more or one less than an easy number then we just need to add or subtract the sum of those two numbers.

Example:

$71^2 = 70^2 + 71 + 70 = 4900 + 141 = 5041$

$69^2 = 70^2 - (69 + 70) = 4900 - 139 = 4761$

Questions for Practice

Calculate the squares of following numbers:

1. 59
2. 45
3. 38
4. 61
5. 88
6. 105
7. 116
8. 554
9. 999
10. 1002
11. 1009
12. 9900
13. 181
14. 135
15. 29

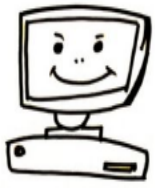
Calculate the cubes of following numbers:

16. 999
17. 995
18. 1006
19. 1003
20. 97
21. 108
22. 105
23. 106
24. 93
25. 180

Do the following calculations:

26. $\frac{352}{456}$
27. $\frac{2008}{20008}$
28. $\frac{5}{95}$
29. $\frac{562}{98}$
30. $\frac{546}{562}$
31. $\frac{52}{869}$
32. $\frac{12345}{54321}$
33. $\frac{69}{6542}$
34. $\frac{428}{9481}$
35. $\frac{857}{4582}$
36. 57% *of* 452
37. 42.5% *of* 845
38. 572% *of* 5422
39. 12.5% *of* 4528
40. 34.5% *of* 2030

2 Data Tables



Data Tables are the simplest way of representing data. And this is the most convenient way of representing data. As a matter of fact, each and every data is primarily compiled in the table format and then it is converted into some other pictorial form. A tabular representation can provide lots of information in form of numbers which can ask for lots of analytical and logical reasoning along with lots of calculation.

Data tables can be of a number of types. They can be of a single – table variety or combination of tables. While a tabular data can offer a lot of information, it lacks a pictorial representation and may demand some time (and calculation) to give an idea of the overall scenario.

Advantages:

- Tables present data logically.
- Tables give a bird's eye view of that data in a concise and a compact manner thereby saving time and space.
- The columns and the rows that constitute any table facilitate data comparison.
- Tables also facilitate analysis and informed decision making.

For example:

Following table presents sales (in revenue) of different types of liquor for 5 consecutive years.

Annual Sales of different alcoholic drinks (in Rs. 10,000) for years 2006 to 2010

	2006	2007	2008	2009	2010
Whiskey	670	720	810	890	990
Vodka	850	910	890	930	970
Rum	640	730	790	810	750
Wine	1010	1120	1400	1360	1410
Beer	1340	1370	1380	1390	1410
Total	4510	4850	5270	5380	5530

Now looking into this table, we can infer lot of data and predictions.

For example:

- Whiskey is the drink with maximum percentage increase across all the years and thus in future, we can expect Whiskey sales to grow even faster.
- Whereas the sales of beer were increasing across all the years but the increase in sales was very low, which may mean that sales of beer has saturated.
- Moreover sales of vodka rum and wine have decreased one time each. There was no other decrease across all the years.

Example 1:

Means of transport used by various public & private sector employees in NCR region

Year	Bike	Car	Company Bus	Transport Buses	Metro	Total
2004	45000	20000	80000	120000	200000	465000
2005	50000	32000	78000	130000	210000	500000
2006	55000	38000	90000	162000	240000	585000
2007	71000	58000	92000	149000	241000	611000
2008	76000	59500	83000	161000	272000	651500
2009	90000	80000	90000	130000	293000	683000
2010	111000	96000	78000	98000	376000	759000

Note: All figures are fictitious.

From the above table we can deduce the following:

- Rate of growth by each mode of transport in successive years, as well as cumulative annual growth.
- Rate of growth of total employees, using different modes of transport.
- Contribution by each mode of transport to the total in any given year.
- Trends of growth over time for various modes of transport.
- Finding out the mode of transportation in any given year that forms the largest part.
- Comparison between different modes of transport for the given years.
- Various other information.

Example 2:

Loan disbursed by five banks in Rs. crore is given in the table below.

Banks	Years				
	1990	1991	1992	1993	1994
A	18	23	45	30	70
B	27	33	18	41	37
C	29	29	22	17	11
D	31	16	28	32	43
E	13	19	27	34	42

1. In which year was the distribution of loans of all banks put together least compared to the average disbursement of loans over the years?
   (a) 1990 (b) 1991
   (c) 1992 (d) 1994

Solution: Choice [a]

Total loan over the years

1990	1991	1992	1993	1994
118	120	140	154	203

Hence average was least in 1990

2. What was the percentage increase of disbursement of loans of all banks together from 1992 to 1993?
   (a) 110% (b) 14%
   (c) 10% (d) 11%

Solution: Choice [c]

Disbursement in 1992 = 140

Disbursement of all banks in 1993 = 154

Hence % increase = $\frac{154-140}{140}\times 100$ = 10%

3. In which year was the disbursement of loans of banks A and B exactly equal to the total disbursement of banks D and E?
   (a) 1991 (b) 1992
   (c) 1994 (d) None of these

Solution: Choice [d]

4. If the minimum target in the succeeding year was 120% of the total disbursement of loans, how many banks reached the target in 1991?
   (a) 1 (b) 2
   (c) 3 (d) 4

Solution: Choice [c]

Banks A, B and E reached the target.

5. In which bank was the loan disbursement more than 25% of the disbursement of all the banks in 1994?
   (a) A (b) B
   (c) C (d) D

Solution: Choice [a]

Disbursement of all banks in 1994 = 203

25% of 203 = 50.75

A's share is 70 i.e. more than 25%.

6. By what per cent did the loan disbursement increase from 1990 to 1994?
   (a) 72 (b) 82
   (c) 94 (d) 91

Solution: Choice [a]

Loan disbursement in 1990 = 118 and in 1994 = 203%

increase = $\frac{203-118}{118}\times 100$ =72%

PRACTICE QUESTIONS

Directions for questions 1 to 4: *The following table gives the quarterly output of three production units of a machine manufacturing company. Analyze the table and answer the following questions.*

Year	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter		
Unit	1	2	3	1	2	3	1	2	3	1	2	3
1998	30	34	38	40	44	42	36	37	39	34	35	37
1999	34	45	42	52	54	56	50	49	48	44	45	48
2000	35	45	43	58	53	58	54	56	56	48	49	43
2001	54	58	57	76	77	79	68	69	70	62	64	66
2002	80	82	87	92	97	93	86	88	87	82	84	83

1. Which of the following statements is correct?
   (a) The performance of Unit 1 has been the lowest during the 5 year period.
   (b) The performance of Unit 2 has been the highest during the 5 year period.
   (c) The performance of Unit 3 has been the lowest during the 5 year period.
   (d) The performance of Unit 2 has been the lowest during the 5 year period.

2. Incentives based on production are given on quarterly basis. In which quarter would the workers get maximum incentive?
   (a) 1st quarter (b) 2nd quarter
   (c) 3rd quarter (d) 4th quarter

3. Which unit has shown the least growth in production during the period 1998–2002?
   (a) Unit 1 (b) Unit 2
   (c) Unit 3 (d) Cannot say

4. During 1998–2002, the highest quarterly production has been achieved by Unit..... in.....Quarter of 2002.
   (a) 1, 1st (b) 2, 2nd
   (c) 3, 3rd (d) 2, 4th

Directions for questions 5 to 7: *Refer to the table given below and answer these questions.*

Age Structure of India's Population 1980–1996 (Percentage of Total Population)

AgeGroup	1980	1985	1990	1996
0–4	14.08	12.91	11.96	11.18
5–14	25.59	24.33	22.78	21.32
15–59	54.85	56.92	58.94	60.59
Over 60		5.48	5.84	6.32
~~6.91~~				
Total	100.00	100.00	100.00	100.00

5. One can summarize that the decline in the 0–4 age group population from 1980 to 1996 could be due to
   (a) better health facilities.
   (b) better education for women
   (c) family planning programmes
   (d) All of them.

6. In the decade from 1980 to 1990, population in the age group 15 to 59 roughly increased by
   (a) over 8% (b) over 9%
   (c) over 10% (d) 11%

7. If the same trend in percentage change in population for each age group continues, then which of the following conclusions will be more valid for the year 2002?
   (a) The percentage of population in the 0–4 age group will shoot up
   (b) There will be more elderly person (over 60 years)
   (c) The number of teenagers will decline
   (d) All of the above.

Directions for questions 8 to 10: *Study the following table and answer the questions.*

Distribution of Work Hours in a Factory	
Number of Workers	**No. of Hours Worked**
20	45–50
15	40–44
25	35–39
16	30–34
4	0–29
Total 80	**3,100**

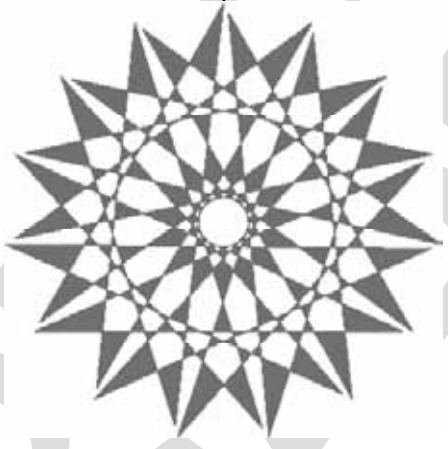
8. What percentage of workers worked 40 or

more hours?

(a) 18.75 (b) 25
(c) 40 (d) 43.75

9. The number of workers who work from 40 to 44 hours is x times the number who worked up to 29 hours, where x is
(a) 15/16 (b) 5
(c) $3\frac{3}{4}$ (d) 4

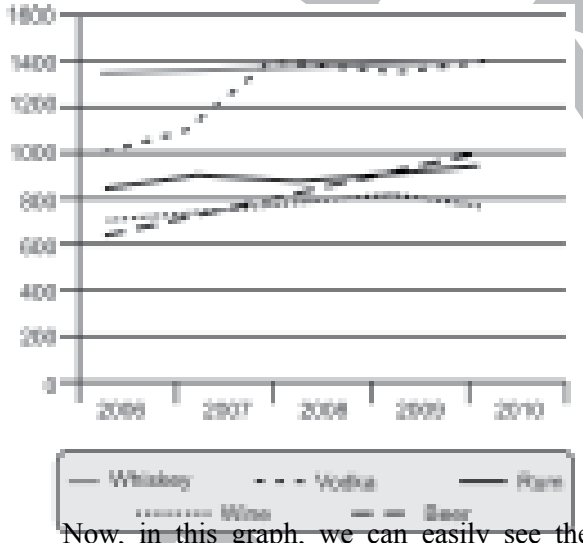
10. Which of the following statements can be inferred from the table?
(A) The average number of hours worked per worker is less than 40.
(B) At least 3 workers worked more than 48 hours.
(C) More than half of all the workers worked more than 40 hours.
(a) A only (b) B only
(c) A and B only (d) C only



3 Line Graphs

The line graph is a pictorial representation of data and helps determine trends and rate of changes. The slope of the graph helps in computing data magnitude of change between two consecutive points. The benefit of line graph over a table is that it is a pictorial representation and hence can give an immediate overall picture. What is lost out in the process is the accuracy as one would have to ascertain the value of any point by looking at the scale of the Y – axis. In spite of these differences any minute information that could be calculated using the data in table or the same data in form of a line graph remain the same as the underlying data is same. Thus all questions that could have been asked for a tabular data can also be asked on this form of representation.

For example the example of sales of alcoholic drinks in the previous chapter (Data Tables) can be presented in form of line graph as shown in the figure below:

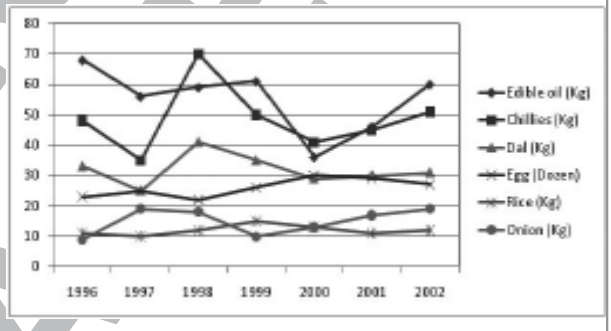


Now, in this graph, we can easily see the increase in sales of rum from the year 2007 to 2008. Similarly, we can even realize that difference between sales of whiskey and sales of beer is reducing. From this figure, we can even realize the growth rate of each and every liquor more precisely. And that is the beauty of line graph. Line graph makes a lot of things more visible than they are in tables.

Example 1:

Directions: *Answer the questions on the basis of the data presented in the figure below:*

Mid – year Prices of Essential Commodities



1. During 1996 – 2002, the number of commodities that exhibited a net overall increase and net overall decrease, respectively, were
   (a) 3 and 3 (b) 2 and 4
   (c) 4 and 2 (d) 5 and 1

Solution:

Increase: Chillies, Egg, Rice & Onion

Decrease: Edible oil & Dal.

Choice (c)

2. The number of commodities that experienced a price decline for two or more consecutive years is:
   (a) 2 (b) 3
   (c) 4 (d) 5

Solution:

Chillies: year 1999 and 2000

Dal: year 1999 and 2000

Egg: year 2001 and 2002

Rice: year 2000 and 2001

Onion: year 1998 & 1999

Hence 5 commodities show decrease for 2 consecutive years. Choice (d)

3. For which commodities did the price increase immediately following a price decline only once in this period?
   (a) Rice, edible oil & dal
   (b) Egg & dal
   (c) Onion only
   (d) Egg and onion

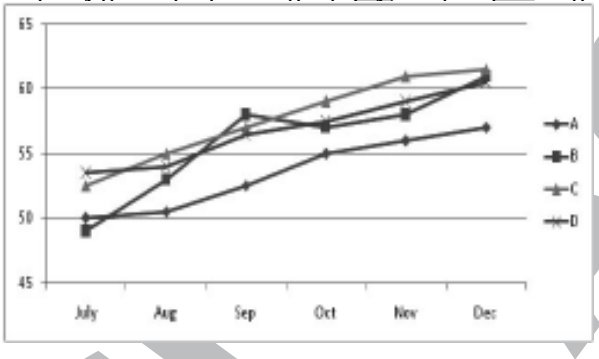
Solution:

Choice (c)

Example 2:

Directions: *Answer the questions on the basis of the information given below:*

Anant invested 4 different amounts of money in 4 different mutual funds schemes A, B, C and D respectively in the month of July. The figure below shows the amount invested and growth chart of the amount in 4 different funds in the first five months.(The amount given are in thousands of rupees.)



started to decline?
(a) September (b) October
(c) November (d) Never

Solution:

It is evident from the graph A's growth rate decreased from October as this is the first time slope has decreased.

Choice (b)

2. Which mutual fund grew at fastest rate in the first two months?
   (a) B (b) A
   (c) C (d) D

Solution:

B grew at the fastest rate in the first two months (the slope of the line in this period is steepest for B)

Choice (a)

3. The rate of growth during the third month was the lowest for:
   (a) B (b) A
   (c) C (d) D

Solution:

B's rate of growth was least for the third month (September to October)

Choice (a)

4. Among the four mutual fund schemes, which one grew the least in the first five months?
   (a) B (b) A
   (c) C (d) D

Solution:

A has increased 7 on 50 and D has increased 7 on 53.5.

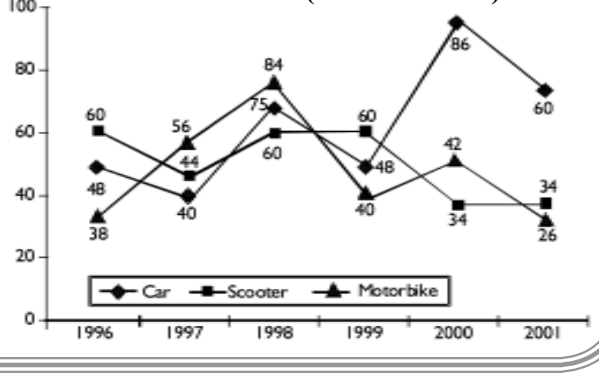
Hence D grew the least.

Choice (d)

Practice Questions

Directions for questions 1 to 5: Study the following line graphs which show the production (in '0000 units) and percentage exported of scooters, motorbikes and cars respectively over the years.

Production (in '0000 units)



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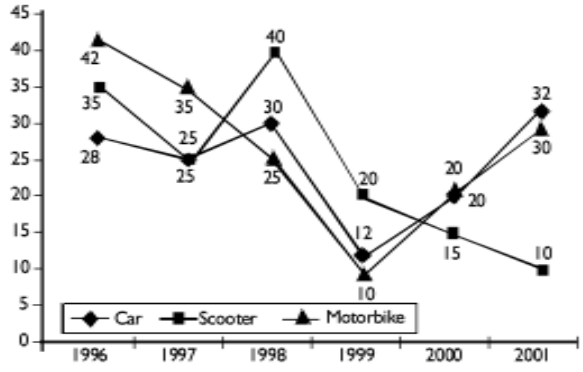


1. In which of the following years was the production of cars more than 50% of the total production?
   (a) 2000 (b) 2001
   (c) 1998 (d) 1996

2. Find the total number of automobiles exported in the year 1999.
   (a) 227600 (b) 207600
   (c) 217600 (d) 220000

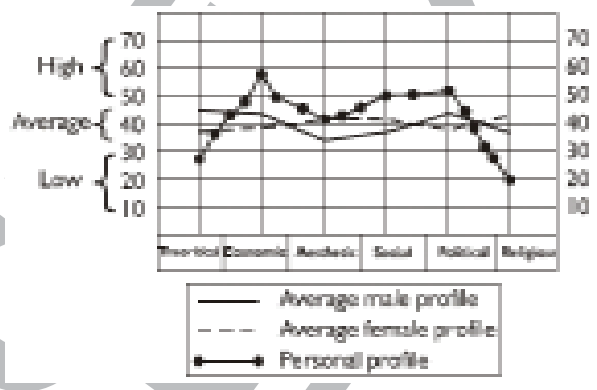
3. Find the ratio of cars, scooters and motorbikes exported in 1996.
   (a) 25 : 16 : 19 (b) 16 : 25 : 19
   (c) 19 : 16 : 25 (d) 6 : 5 : 1

4. If the ratio of export prices of a car, scooter and motorbike was 2 : 1 : 1.5 in 1998, what was the proportion of their export earnings ?
   (a) 4: 2: 3 (b) 6: 1: 21
   (c) 30: 16: 12
   (d) Cannot be determined

5. In which of the following years was the production of motorbikes is exactly 40% of the total production of automobiles in that year?
   (a) 1997 (b) 2000
   (c) 1999 (d) 1996

Directions for questions 6 to 10: Use the graph given below to answer these questions.

Given in the graph is the profile of values of a college student marked as personal profile. The normative profiles are given as average male profile and average female profile.



6. Compare the three and state which of the given values is the highest in the personal profile of the student.
   (a) Theoretical (b) Religious
   (c) Social (d) Economic

7. In the given personal profile, which is the value with the lowest score?
   (a) Theoretical (b) Religious
   (c) Social (d) Aesthetic

8. In which value score does there exist maximum difference between average profiles and personal profiles?
   (a) Theoretical (b) Religious
   (c) Economic (d) Political

9. In which value score does there exist convergence between personal profile and average female profile?
   (a) Theoretical (b) Social
   (c) Aesthetic (d) None of these

10. In which value score does there exist a no difference state between the personal profile and average male profile?
    (a) Economic (b) Social
    (c) Aesthetic
    (d) None of these Solutions

4

Bar Charts

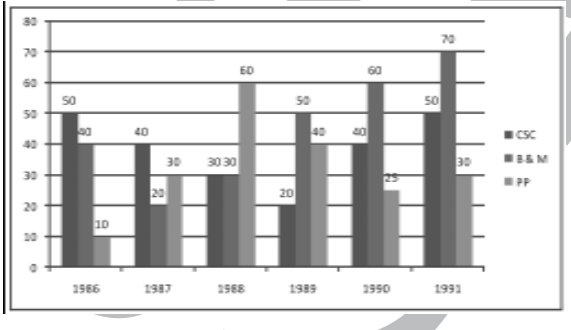
In this method of representation, data are plotted on the axis as bars (horizontal and / or vertical). This type of graph is more correctly called a column chart rather than a bar chart. The data plotted in bar graphs are discrete data. Bar graphs are single, clustered and stacked types. Usually data are taken from tables and charted as bars for visual estimation. As the underlying data is exactly the same as the tabular data and the line graph, there is no information lost and any of the three representations can be used interchangeably.

In such a graph, it is only the height of the bar that matters and the width of the bar does not hold any significance.

Example 1:

The following graph shows the number of units (× 1000) of three magazines Civil Services Chronicle (CSC), Business & Management (B & M) and Pratham Pravakta (PP) sold by Chronicle publication in six consecutive years. Study the graph to answer the questions that follow:

Annual sales of 3 magazines (in thousands) by Chronicle Publications



1. In which of the following years was the sale of all magazines the lowest?
   (a) 1986 (b) 1987
   (c) 1989 (d) 1988

Solution:

The total sales were the lowest in 1987 = 90000 magazines.

Choice (b)

2. In which of the following years were the sales of CSC and B & M the same?
   (a) 1986 (b) 1987
   (c) 1988 (d) 1989

Solution:

In the year 1988, the sales of CSC and B & M were exactly the same, viz. 30000 copies each.

Choice (c)

3. For which of the following magazines is the ratio of the highest annual sales figure to the lowest annual sales figure is highest?
   (a) CSC (b) B & M
   (c) PP
   (d) Both B & M and PP

Solution:

For CSC = 50/ 20 = 5/2 = 2.5

For B & M = 70/20 = 7/2 = 3.5

For PP = 60/10 = 6

Clearly, for PP it is the highest.

Choice (c)

4. For the period shown (1986 – 91), B & M has registered an overall growth of:
   (a) 30 % (b) 40 %
   (c) 70 % (d) 75 %

Solution:

For the period shown, the overall growth of sale for B & M is = [(70 – 40)/40] × 100 = 75 %

Choice (d)

5. For the period shown (1986 – 91), the percentage increase in the cumulative sales figure of the three magazines is:
   (a) 100 % (b) 50 %
   (c) 30 % (d) 25 %

Solution:

The total sales of all 3 magazines taken together in 1986 = 100

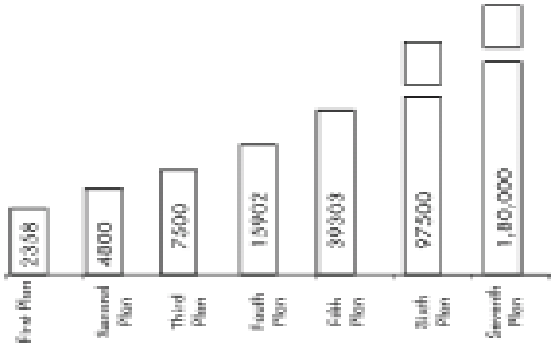
The total sales of all 3 magazines taken together in 1991 = 150

Hence overall growth = [(150 – 100) /100] × 100 = 50 %

Choice (b)

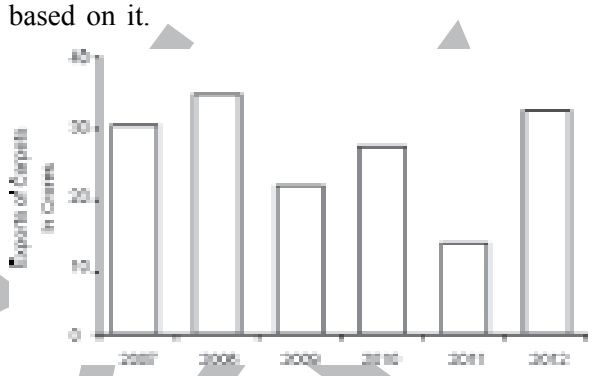
Practice Questions

Directions for questions 1 to 5: Refer to the bar graph and answer the questions.



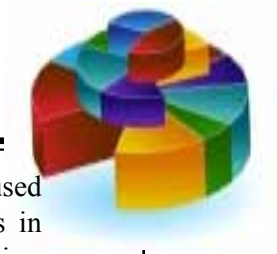
1. Percentage–wise maximum increase in outlay in each plan in comparison with its preceding plan took place in:
   (a) Second & Third Plan.
   (b) Fourth & Fifth Plan.
   (c) Fifth & Sixth Plan.
   (d) Sixth & Seventh Plan.
2. The Fourth Plan outlay was:
   (a) as much as the total of the first three Plans.
   (b) more than the total of the first three Plans.
   (c) less than the total of the first three Plans.
   (d) None of the above.
3. Percentage–wise increase in outlay from Sixth to Seventh Plan is nearly same as:
   (a) from First to Second
   (b) from Second to Third
   (c) from Third to Fourth
   (d) from Fourth to Fifth.
4. Compared with the total outlay of all the previous plans, the Sixth Plan outlay shared an increase of approximately
   (a) 10% (b) 20%
   (c) 30% (d) 40%
5. The outlay in the First Plan approximates .....per cent of the outlay in the Seventh Plan
   (a) 5 (b) 3
   (c) 1.25 (d) 1

Directions for questions 6 to 10: Read the following graph and answer the following questions based on it.



6. The percentage increase in Export of carpets from 2011 to 2012 was
   (a) 33.32% (b) 66.66%
   (c) 50% (d) 100%
7. The sum of export of carpets in the years 2009 and 2011 is equal to that in
   (a) 2010 (b) 2008
   (c) 2007 (d) 2012
8. The two years between which the rate of change of export of carpets is minimum are
   (a) 2007 & 2008 (b) 2011 & 2012
   (c) 2005 & 2006 (d) 2003 & 2004
9. The difference of export of carpets for the years 2008 and 2012 is
   (a) 50 crores (b) 10 crores
   (c) 15 crores (d) 100 crores
10. Which year has the minimum percent change in export of carpets?
   (a) 2008 (b) 2009
   (c) 2010 (d) 2011

5 Stacked Bar-Graphs



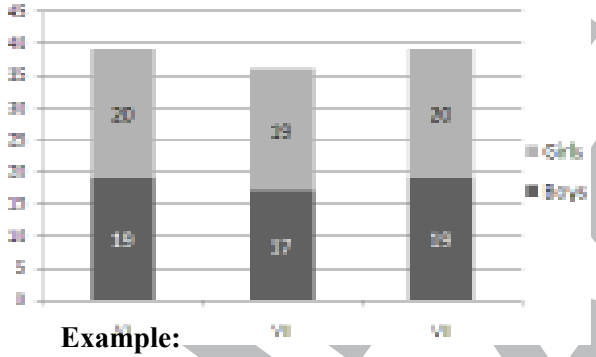
Stacked bar graph is a graph that is used to compare the parts to the whole. The bars in a stacked bar graph are divided into categories. Each bar represents a total.

In the following example, each bar of the stacked bar graph is divided into two categories: girls and boys. Each of the three bars represents a whole.

The table shows the maximum marks scored by grade VI, VII, and VIII students in mathematics.

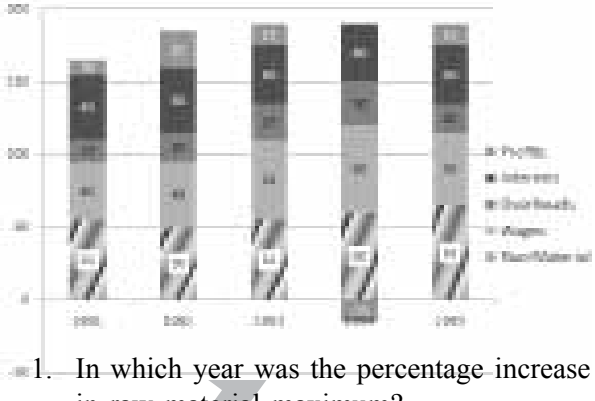
Grade	Boys	Girls
VI	19	20
VII	17	19
VII	19	20

A stacked Bar - Chart for the above table is drawn in the following figure:



Example:

Answer the questions on the basis of the following charts:



1. In which year was the percentage increase in raw material maximum?
   (a) 1992 (b) 1993
   (c) 1994 (d) 1995

Solution: (b)
The increase in raw material is maximum for the year 1993 = (5/50) × 100 = 10 %

2. In which year was the change in profit maximum?
   (a) 1991 - 92 (b) 1993 - 94
   (c) 1994 - 95 (d) Both (b) and (c)

Solution: (d)
In 1993 - 94 the change in profit is 15 to -15 = 30
In 1994 - 95 the change in profit is - 15 to 15 = 30
So, options (b) & (c) both are correct.

3. Which component of the cost production has remained more or less constant over the period?
   (a) Interests (b) Overheads
   (c) Wages (d) Raw material

Solution: (a)
It is very clear from the graph that interest component remained more or less constant over the given period.

4. In which year the overheads, as a percentage of the raw material, maximum?
   (a) 1995 (b) 1994
   (c) 1992 (d) 1993

Solution: (b)
In 1992, overheads as a percentage of raw material = (20/50) × 100 = 40 %
In 1993, overheads as a percentage of raw material = (25/55) × 100 = 45 %
In 1994, overheads as a percentage of raw material = (30/60) × 100 = 50 %
In 1995, overheads as a percentage of raw material = (20/65) × 100 = 30 %

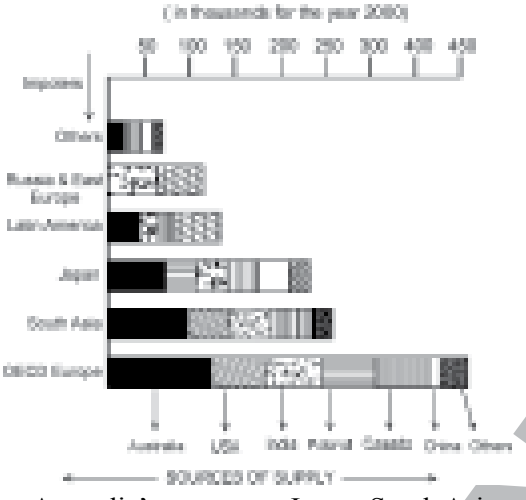
5. What per cent of the costs did the profits form over the period?
   (a) 5 % (b) 5.2 %
   (c) 5.8 % (d) 7 %

Solution: (c)
Total profit over the period = 10 + 25 + 15 - 15 + 15 = 50
Total cost over the period = 155 + 160 + 175 + 180 + 175 = 845
Required percentage = (50/845) × 100 = 5.84 %

Practice Questions

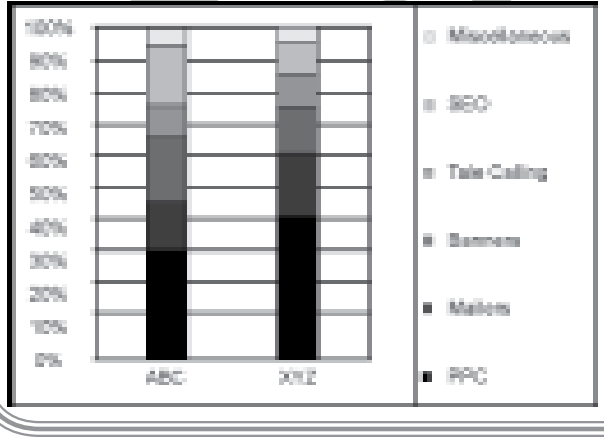
Directions for questions 1 and 2: Refer to the following bar chart to answer these questions.

Electronic Goods: How much required and where acquired



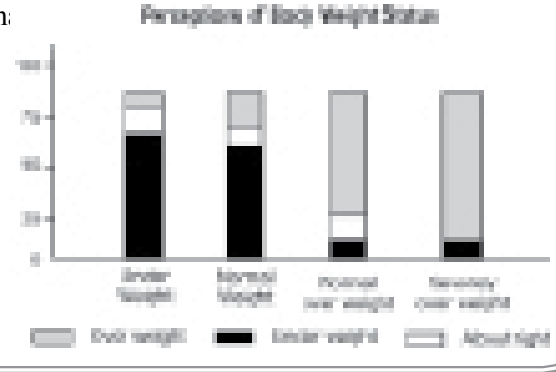
1. Australia's exports to Japan, South Asia and Russia in 2000 are approximately ..... thousands.
   (a) 160 (b) 185
   (c) 270
   (d) Cannot be determined
2. The given year, total domestic demand of Russia and East Europe is..... thousand.
   (a) More than 50 (b) 50
   (c) Less than 50 (d) Cannot be determined

Direction Fore Question 3 to 8: The following bar digrams shows the monthly expenditure on sales promotion of two companies ABCD & XYZ on PPC, Mailers, Banners, Tele calling, SEO and miscellaneous (in percentage).
Study the diagram and answer the following questions.



3. What fraction of the total is spent on tele calling by company ABC ?
   (a) $\frac{13}{20}$ (b) $\frac{2}{3}$
   (c) $\frac{9}{13}$ (d) None of the above
4. If the total expenditure of company XYZ is Rs.100,000 then money spent on mailers is ?
   (a) Rs. 80000 (b) Rs.12000
   (c) Rs. 20000 (d) Rs. 6000
5. It the total expenditure of company ABC is Rs. 300,000, then money spent on PPC, mailers & SEO is?
   (a) Rs. 150,000 (b) Rs.180,000
   (c) Rs. 200,000 (d) Rs. 175,000
6. If both the companies have the same expenditure, which one would spend more on Tele calling and miscellaneous together?
   (a) XYZ (b) ABC
   (c) Both spend equal (d) None of these
7. Which company has higher ratio of expenditure on mailers to miscellaneous?
   (a) ABC (b) XYZ
   (c) Both have same ratio
   (d) Cannot be determined
8. Total expenditure of company ABC is 200000 then what amout is spent on PPC and mailers by it.
   (a) 55000 (b) 90000
   (c) 45000 (d) Cannot be determined

Directions for questions 9 and 10: Study the following bar graph and answer the questions th



9. What per cent of underweight adult females perceive themselves to be underweight?
   (a) 5% (b) 22%
   (c) 38% (d) 50%
   (e) Cannot be determined

10. The members of which of the four groups had the least accurate perception about their body weight?
   (a) Underweight (b) Normal weight
   (c) Normal overweight
   (d) Severely overweight
   (e) It cannot be determined from the information given.

6 Pie Charts

Pie Chart is probably the simplest of all pictorial forms of data representation. It is the break up of complete data on a circular chart. Here, total quantity to be shown is distributed over one complete circle or 360 degrees. In this format, we cannot represent a big data but at the same time. With the help of pie chart, we can only represent break up of certain number of things for a certain period. In pie - charts, data is essentially presented with respect to only one parameter. This form essentially presents shares of various elements as proportion or percentage of the total quantity.

For example:

The sales of different alcoholic drinks for the year 2006 can be represented in the following figure:

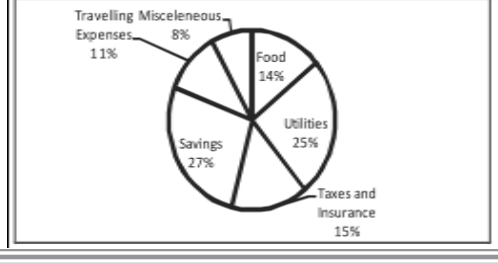
From pie chart, it is pretty easy to compare two or more brands but at the same time, it is not easy to compare data of one particular year with data of another year even if pie chart of both the years is provided to us.

Let us take another example:

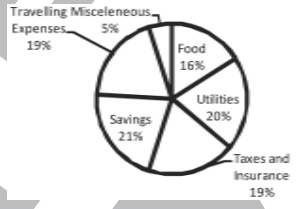
Example 1:

A person's expenditure as a percentage of his / her Gross annual income:

Expenditure as percentage of total for the year 2009



Expenditure as percentage of total for the year 2010



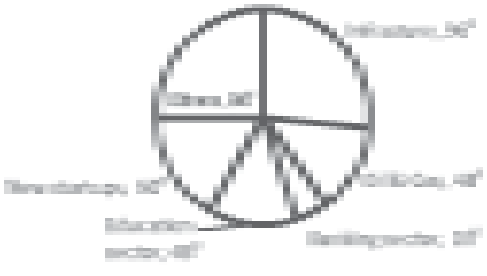
The following information can be interpreted from the pie charts give above:

- Absolute value of expenditure and savings for the given period if total expenditure is given.
- Percentage change in values over the given years.
- Angle subtended by each of the items at the center.
- In a pie chart 360^{o} = 100 %, hence $1^{o} = \frac{100}{360} = \frac{5}{18}\%$ and similarly 1 % = $\left(\frac{18}{5}\right)^{o}$

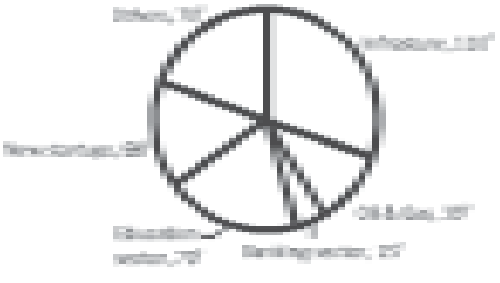
Example 2:6

The following pie - charts show the break - up (in degrees) of the total income of two big companies through investment in different sectors. Refer to the pie - charts to answer the questions that follow.

Total expenses A = Rs. 4800 crore



Total expenses B = Rs. 7200 crore



1. If the total expenditure of the two companies is respectively doubled, then the difference of incomes (in Rs. crore) from "banking sector" of the two companies would be:
   (a) 120 (b) 60
   (c) 180 (d) 140

   Solution: (a)
   Company A's income through investment in Banking sector = (18/360) × 9600 = Rs. 480 crore
   And Company B's income through investment in Banking sector = (15/360) × 14400 = Rs. 600 crore.
   Hence required difference = 600 - 480 = Rs. 120 crore.

2. Which of the following statements is true?
   (a) Total expenditure of A and B form a ratio 3: 2
   (b) Company A's income from 'Others' is greater than that of B
   (c) Company A's income from 'Oil & Gas' sector is Rs. 640 crore.
   (d) Company B's income from Banking sector is less than that of company A.

   Solution: (c)
   Income of company A from Oil and Gas sector = (48/360) × 4800 = Rs. 640 crore.

3. Assuming proportionate increase, if the income of company B increases threefold, the income from Education Sector would be:
   (a) 20 % (b) 28 %
   (c) 2 times (d) 3 times

   Solution: (d)

4. If the total income of company A doubles but break - up does not change, then the difference between the income of the two companies from 'Others' would be:
   (a) Rs. 100 crore
   (b) Rs. 1000 crore
   (c) Twice as it is now
   (d) None of these

   Solution: (b)
   Company A's income from 'Others' = (90/360) × 9600 = Rs. 2400 crore
   Company B's income 'Others' = (70/360) × 7200 = Rs. 1400 crore

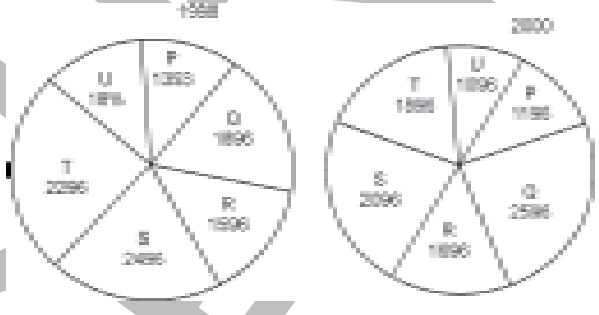
   Hence, required difference = Rs. 1000 crore.

5. The ratio of income (in Rs. crore) from 'New startups' of company A and company B is:
   (a) 5: 7 (b) 4: 7
   (c) 7: 4 (d) 7: 5

   Solution: (a)
   Required ratio = 4800 × 60: 7200 × 56 = 5: 7

Practice Questions

Directions questions 1 to 4: Study the following graphs which show the number of workers of different categories of a factory for two different years. The total number of workers in the year 1998 was 2000 and in 2000 was 2400.



1. In which of the categories is the number of workers same in both the years ?
   (a) P (b) S
   (c) R (d) T

2. Find the percentage increase in the number of workers in category U in 2000.
   (a) 25% (b) $33\frac{1}{3}\%$
   (c) 50% (d) $66\frac{2}{3}\%$

3. What is the total number of increased workers for the categories in which the number of workers has been increased?
   (a) 468 (b) 382
   (c) 408 (d) 168

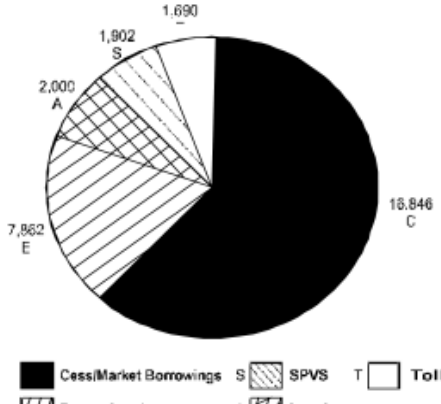
4. Find the maximum difference between the number of workers of any two categories taken together for any one year and that of any two for the other year.
   (a) 660 (b) 416
   (c) 636 (d) 502

Directions for questions 5 to 7: The pie chart given below shows the funding arrangements for National Highways Development Projects - Phase - 1. Study the chart carefully to answer these

questions.

Funding arrangements for NHDP-I

(total cost: Rs. 30300 crores)



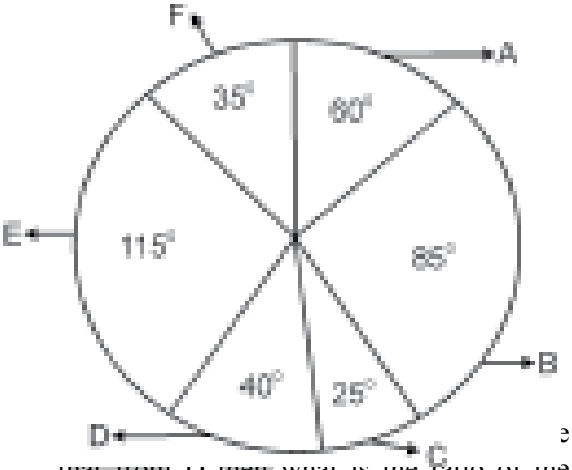
5. ...agement is through:
   (a) External assistance
   (b) Cess/Market borrowing
   (c) Annuity (d) SPVS

6. The angle of the segment formed at the centre of the pie chart, representing Cess/ Market Borrowings is approximately
   (a) 100^o (b) 90^o
   (c) 80^o (d) 200^o

7. If the toll is to be collected through an outsourced agency by allowing a maximum of 10% commission, how much amount should be permitted to be collected by the outsourced agency, so that the project is supported with Rs. 1,690 Crores?
   (a) Rs. 1,859 Crores
   (b) Rs.1,690 Crores
   (c) Rs. 16,900 Crores
   (d) Inadequate data

Directions for questions 8 to 10: These questions are based on the following pie chart, which represents the portion of the revenue from different heads in state. Study this pie chart and answer the questions given below.

Revenue of a state from different heads



...e that from D then what is the ratio of the total revenue from these heads?
   (a) 3 : 4 (b) 4 : 5
   (c) 3 : 5 (d) 5 : 4

9. If the total revenue from E is twice that from D then what is the ratio of average revenue from these heads?
   (a) 16 : 23 (b) 23 : 16
   (c) 16 : 21 (d) 23 : 21

10. If the total number of revenue provider increase by 10% and the number of revenue provider engaged in E by 15% in the next year, the approx. central angle of E in a pie chart for that year will be
   (a) 120^0 (b) 150^0
   (c) 175^0 (d) 135^0

7

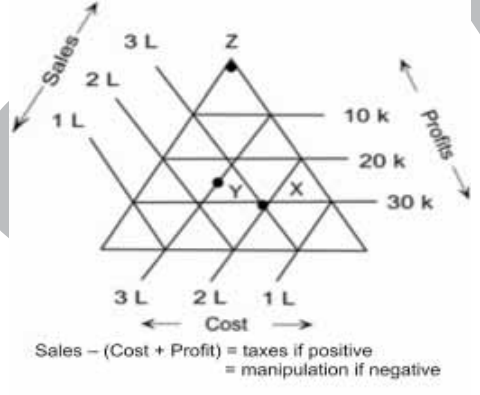
There are certain more types of graphs which have appeared in different competitions which cannot be claimed to be either of the given data structure that we have discussed in the previous chapters. Some of these graphs are as follows

- Triangular Graphs
- Web Graph
- Network Diagram
- Scattered plots

In this chapter, we will try to focus on all these graphs and we will try to learn about the same in details.

Triangular Graph

In an X-Y graph, we can compare something only on two parameters and qualities. But with the help of a triangular graph, we can compare same thing set of things on three parameters. As in case of a triangular graph, number of parameters can be increased to three which will be presented by three sides of the triangle. The shortcoming of a triangular graph is that either of the three axis cannot be increased beyond a certain point because of the side of the triangle which can be done in a X-Y graph. Let us try to understand what a triangular graph is with the help of the given diagram.

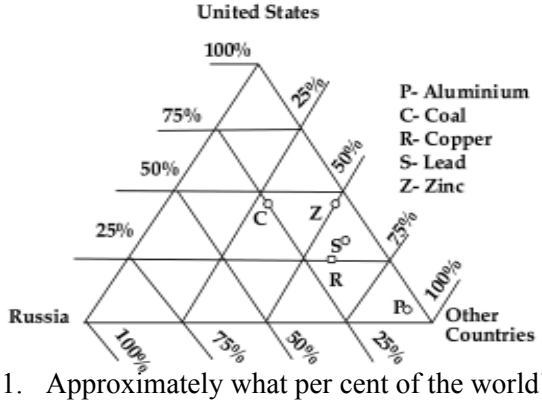


In the given figure, sales, cost and profit of different products of a company are shown. As per the figure, one axis is showing sales, other is showing cost and the last one is showing profits. And difference of sales and cost + profit is either taxes or manipulation. Now, if we look at the product X, sales of the product are 3,00,000 as shown by one of the sides of the triangle, costs are 2,00,000 and profits are 30,000 as shown by the third side. So, accordingly company has paid taxes of Rs. 70,000 for their product X. Similarly, if we look at the product Y, company's sales were Rs 2,50,000 and cost were Rs 3,00,000, whereas the profits were Rs. 25,000. Thus company did a manipulation of Rs. 75,000. Whereas, in case of product Z, costs were Rs 4,00,000, sales were Rs 4,00,000 and the profits were zero. Hence, there was neither any taxes nor any manipulation.

There have been good number of questions on this type of graph in many exams over the last few years.

Solved examples:

Directions: The triangular bar given below compares the percentages of five mineral resources in the United States, Russia, and the other countries of the world. The letters represent particular mineral resources. Each of the vertices of the major triangle represent 100 per cent, and each of the opposite bases represent 0 per cent. Refer to the diagram and answer the questions.



1. Approximately what per cent of the world's lead resources is found in the United States?
   (a) 60% (b) 35%
   (c) 25% (d) 10%

   Sol.: From the graph it is clear that 35% of the Lead resources is found in United States. Hence, (b)

2. Which mineral is found in approximately equal quantities in the United States and Russia?
   (a) Aluminium (b) Coal
   (c) Copper (d) Lead

   Sol.: Aluminium is found in approximately equal quantities in United States and Russia.
   Hence, (a)

3. Of the following, which is the best approximation of the ratio of the lead resources found in Russia to the lead resources found in the United States?
   (a) 2/7 (b) 1/2
   (c) 2/1 (d) 7/1

   Sol.: Lead Resources in Russia = 10% and in United States = 35%. So, ratio = 2/7.
   Hence,(a)

4. The United States and Russia together have approximately 40% of the world supply of which minerals?
   (a) Copper only (b) Lead only
   (c) Zinc only (d) Copper and lead

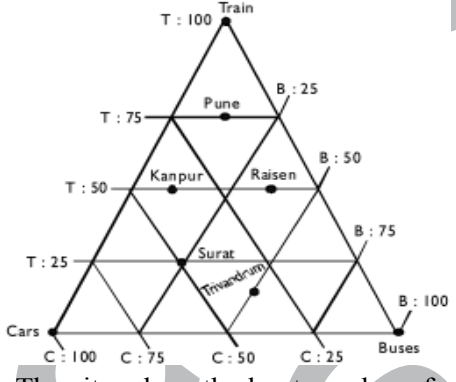
   Sol.: The United States and Russia together have approximately 40% of the world supply of Copper and Lead.
   Hence, (d)

5. Which mineral is found more abundantly in the United States than in all other countries combined including Russia?
   (a) Coal (b) Lead
   (b) Zinc (d) No mineral

   Sol.: There is no such mineral which is found more abundantly in the United States than in all other country combined including Russia.
   Hence, (d)

Practice Questions

Directions for questions 1 to 5: A survey was conducted in five cities viz. Pune, Kanpur, Raisen, Surat and Trivandrum, for the percentage of people using T (trains), B (buses), C (cars) as modes of transport number of persons surveyed in the cities Pune, Kanpur, Raisen, Surat and Trivandrum are 2000, 4000, 6000, 3000 and 8000 respectively. Refer to the data in the triangular bar diagram to answer the question that follow.



1. The city where the least number of persons use buses is:
   (a) Surat (b) Raisen
   (c) Kanpur (d) Pune

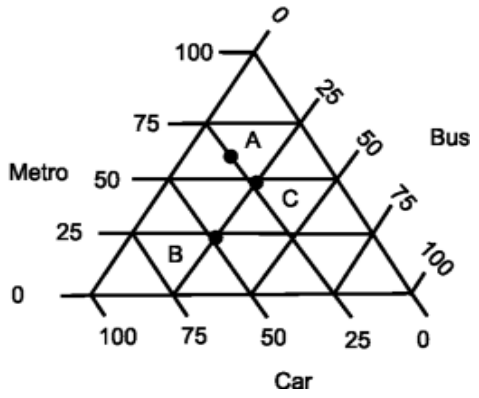
2. The average number of persons using trains for transportation in Pune, Kanpur, Raisen, and Trivandrum is:
   (a) 1880 (b) 1750
   (c) 1950 (d) None of these

3. The mode of transport used by the least number of persons in all the given cities is
   (a) trains (b) buses
   (c) cars (d) cars and buses

4. Among the given five cities, the cities where less than 30% of the people use cars in transport are:
   (a) Kanpur and Trivandrum
   (b) Pune, Kanpur and Raisen
   (c) Pune and Raisen
   (d) None of these

5. Which of the following statements is not true?
   (a) 50% of the people use trains for transport in the cities Kanpur and Raisen.
   (b) In City Trivandrum, more than 50% of the people use cars for transport.
   (c) More percentage of people use buses for transport in the city Surat than in the city Pune.
   (d) In city Raisen, there is more percentage of people using trains for transport than buses.

Directions for questions 6 to 10: The following triangular graph shows the modes of transport used by the people of cities A, B and C. Assume that there are only three modes and everyone uses only one of the mode of transportation available. The population of cities A is 1,00,000 and of B is 1,50,000 and that of C is 1,25,000. Analyse



6. What percentage of total people use Metro in all the cities combined?
   (a) 46% (b) 55%
   (c) 28% (d) 35%

7. Which is the most common mode of transportation in these cities?
   (a) Bus (b) Car
   (c) Metro
   (d) Cannot be determined.

8. How many people used Car to travel in these cities?
   (a) 100000 (b) 112500
   (c) 125000 (d) 135000

9. How many people used the least common mode to travel in these cities?
   (a) 76250 (b) 78550
   (c) 68500 (d) 75000

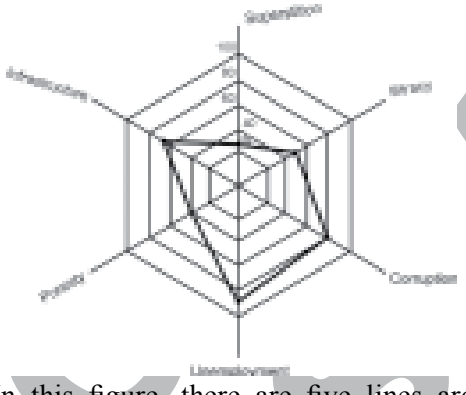
10. By what per cent the most common mode more than that of the least common mode?
    (a) 20% (b) 26%
    (c) 56% (d) 52%

Web Graph

This particular graph has achieved lot of importance in last few years because of the more number of questions that appear from this topic each and every year and more importantly this graph looks pretty scary on the face of it. As the name suggests, this graph consist of a web like figure with as many parameters as possible presented on the same.

A web graph is generally consisting of six parameters and all the observations are presented on these six parameters. Although as a rule it can be any number of sides in the web. We will try to understand how to read a web graph with the help of the given graph.

Example: A survey was conducted regarding the biggest challenges in front of the government to improve the social picture of India. All the participants were given six options and they could have chosen any number of these as the biggest challenges. The results of the survey are presented in the web-diagram shown below. The line in bold presents the percentage of people who have assumed the given challange as one of the biggest challenges.

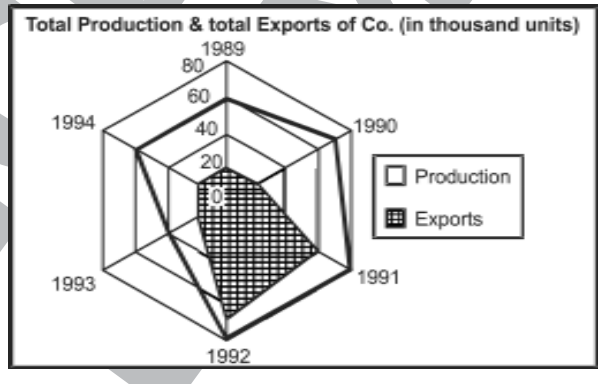


In this figure, there are five lines around a point which reads as 20 %, 40 %, 60 %, 80 % and 100 % and then there are six parameters through which the bold line is passing showing the exact percentage of the people choosing a particular parameter.

Thus in this particular case, 90% think that unemployment is one of the biggest challenges, 80% think that corruption is one of the biggest challenges, 50% think that illiteracy is one of the biggest challenges, 20% think that superstition is one of the biggest challenges, 60% think that infrastructure is one of the biggest challenges and 38% think that poverty is one of the biggest challenges.

Solved Example

DIRECTIONS for questions The following graph shows the total production and the total exports of a company over the years. Study the graph to answer the questions given below it.



1. For all the given years, what was the approximate per cent of total exports to that of total productions?
   (a) 30 (b) 97
   (c) 40 (d) 56

   Sol: (d)

$$\frac{\text{TotalExport}}{\text{Totalproduction}}\times 100=\frac{20+30+60+70+20+20}{60+70+80+80+40+60}\times 100$$

$$=\frac{220}{390}\times 100=56.4\%$$

2. What was the per cent increase in exports in 1992 from 1989?
   (a) 250 (b) 350
   (c) 500 (d) 34

   Sol: (a) % increase = $\frac{70-20}{20}\times 100$

   $=\frac{50}{20}\times 100=25\%.$

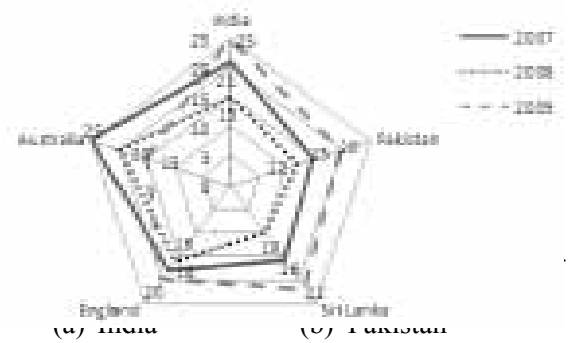
3. In which year was the ratio of exports to production maximum?
   (a) 1993 (b) 1991
   (c) 1992 (d) 1989

   Sol: (c) In 1992 ratio = $\frac{70}{80}=\frac{7}{8}$ which is maximum.

Practice Questions

Directions for questions 1 to 4: Answer the questions based on the following Web Graph.

Cricket matches won by the teams



(c) Australia (d) England

2. Which country won the least number of matches in the three years?
   (a) Sri Lanka (b) Pakistan
   (c) England
   (d) Both Sri Lanka and Pakistan

3. If each country played 30 matches every year, then what is the winning percentage of Sri Lanka in 2008?
   (a) 30% (b) 33.33%
   (c) 66.66% (d) 50%

4. If we rank the countries according to the number of matches won in decreasing order, then which country will be followed by Sri Lanka in the ranking?
   (a) England (b) Australia
   (c) Pakistan (d) India

5. In which year Pakistan and England win equal number of matches?
   (a) 2007 (b) 2008
   (c) 2009 (d) cannot be determind

Directions for question 6-10 answer the question based on following graph.

Strength of various branches of an Engineering College

ear

(c) 125 (d) 129

7. What was the total strength of the college?
   (a) 440 (b) 445
   (c) 448 (d) 450

8. Which branch had the maximum number of students overall?
   (a) CS (b) EC
   (c) IT (d) Mechanical

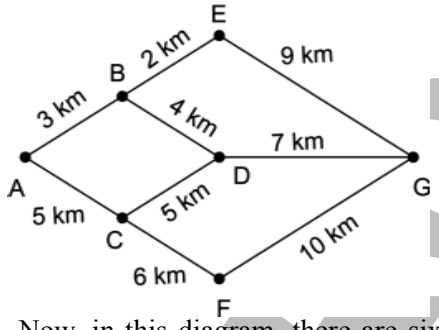
9. Which branch had the least number of students overall?
   (a) IT (b) Electrical
   (c) Mechanical (d) CS

10. Which year had the maximum number of students?
    (a) 1st year (b) 2nd year
    (c) 3rd year (d) 4th year

Network Diagram

This is another typical type of question which has appeared in all the competitions at some time or the other. And currently this is one of the favourite topics of all the question setters because of its uniqueness. These diagrams generally show the flow of any job which can be traffic, water flow, job flow etc. Questions on these caselets are generally based on the bottle neck in the flow wherein certain job cannot be done because of the previous job not done in time. And in these questions basically students are expected to obtain a situation where in maximum flow can happen with least possible resources or time.

Let us understand a flow diagram in the given case. Following diagram presents road map of a particular city wherein there are certain check points where certain toll-taxes are to be paid. Generally, all the travellers prefer the route which is the most economical of all for all their travelling. Cost of travelling on road is Rs 2 per Km.



Now, in this diagram, there are six ways to go from A to G which are as follows:

- A-B-E-G
- A-B-D-G
- A-B-D-C-F-G
- A-C-D-B-E-G
- A-C-D-G
- A-C-F-G

Now, out of these six routes A-B-D-C-F-G and A-C-D-B-E-G should be the least preferred route as cost of travelling on these routes will always be more than A-B-D-G and A-C-D-G respectively. Although the cost of travelling on other routes can be equated by giving certain values to toll tax paid at B, C, D, E and F. Now cost of travelling across any of these routes will be as follows:

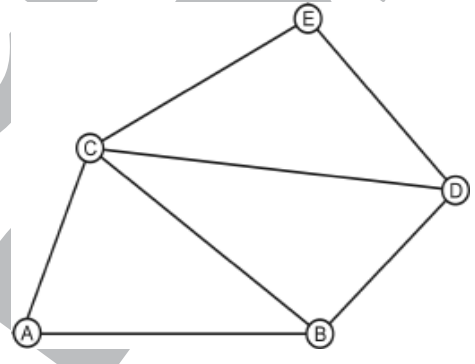
- A-B-E-G = $(3+2+9)\times 2+B+E=28+B+E$
- A-B-D-G = $(3+4+7)\times 2+B+D=28+B+D$
- A-C-D-G= $(5+5+7)\times 2+C+D=34+C+D$
- A-C-F-G= $(5+6+10)\times 2+C+F=42+C+F$

Where B, C, D, E and F are the toll taxes paid at check post B, C, D, E and F respectively.

Now, depending upon the requirements of each and every question, values of B, C, D, E and F can be fixed to gain the answers.

Solved example

Answer the question on the basis of the following information. Shown below is the layout of major streets in a city.



Two days (Thursday and Friday) are left for campaigning before a major election, and the city administration has received requests from five political parties for talking out their processions along the following routes.

Congress: A-C-D-E
BJP: A-B-D-E
SP: A-B-C-E
BSP: B-C-E
CPM: A-C-D

Street B-D cannot be used for a political procession on Thursday due to a religious procession. The district administration has policy of not allowing more than one procession to pass along the same street on the same day. However, the administration must allow all parties to take out their processions during these two days.

1. Congress procession can be allowed:
   (a) only on Thursday. (b) only on Friday.
   (c) on either day.
   (d) only if the religious procession is cancelled.

Sol: (c) Since, the Congress procession route does not pass through the street B-D, hence they can be allowed on either of the two days.

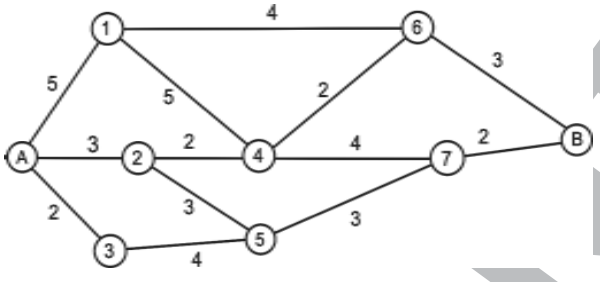
2. Which of the following is not true?
   (a) Congress and SP can take out their processions on the same day.
   (b) The CPM procession cannot be allowed on Thursday.

(c) The BJP procession can only take place on Friday.
(d) Congress and BSP can take out their processions on the same day.

Sol: All the statements except the statement (b) is true. Hence, statement (b) is not true.

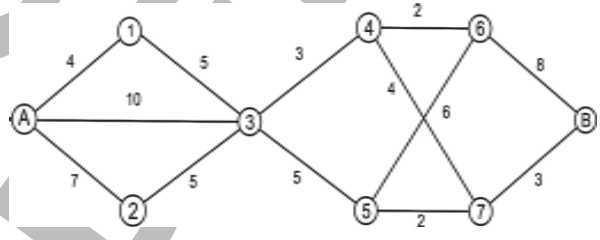
Practice Questions

Directions for questions 1 to 5: The following network diagram shows the routes between cities A and B via cities 1 to 7. The figures marked on the edges represent the distance between the two cities via that road. All the roads are unidirectional from Left to Right. Analyse the figure and answer the questions that follow:



1. How many routes are possible from A to B?
   (a) 5 (b) 6
   (c) 7 (d) 8
2. What is the length of the shortest route from A to B?
   (a) 9 (b) 10
   (c) 11 (d) 12
3. What is the length of the longest route from A to B?
   (a) 14 (b) 15
   (c) 16 (d) 18
4. If Chaman has some work in city 7, then which route will he prefer so as he won't have to travel much?
   (a) A247B (b) A247B
   (c) A357B (d) Any of the above
5. If suman has to visit 6 and 7 then what is the distance would she travel?
   (a) 12 (b) 11
   (c) 20 (d) Not possible

Directions for questions 6 to 10: The following network diagram shows the routes between cities A and B via cities 1 to 7. The figures marked on the edges represent the time taken to travel between the two cities via that road. All the roads are unidirectional from Left to Right. Analyse the figure and answer the questions that follow:

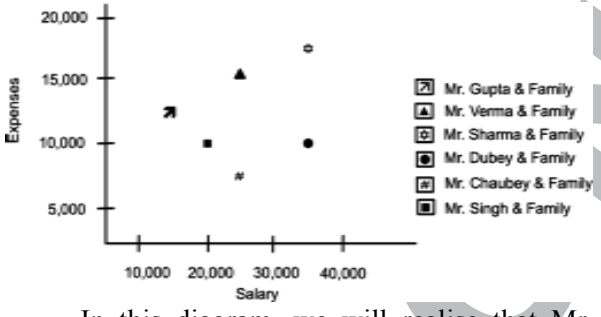


6. How many routes are possible from A to B?
   (a) 7 (b) 10
   (c) 12 (d) 15
7. What is the minimum time required to travel from city A to B?
   (a) 18 (b) 19
   (c) 20 (d) 21
8. What can be the maximum time to travel from city A to B if no one stops anywhere in between?
   (a) 31 (b) 32
   (c) 30 (d) 28
9. If Raman has some work in city 4, then which route will he prefer so as to save time?
   (a) A347B (b) A1347B
   (c) A2346B (d) A2347B
10. If '1' is blocked then what is the minimum time taken in which one can reach to B?
    (a) 20 min (b) 21 min
    (c) 22 min (d) 24 min

Scatter Diagram

This is a pretty old traditional graph which used to appear in all the management entrance examinations for a good time in some good numbers, but of late, we have not seen much of these graphs in any of these competitions. But never the less, you can always expect some questions from this topic as well in any of these examinations. Moreover, these questions are pretty simple and seem very similar to a typical X-Y graph.

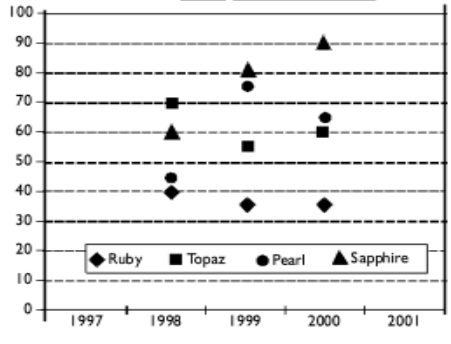
In a typical scatter diagram, we have two parameters which are given on X-axis and Y-axis of a graph and there are different points which are used to compare different data on those two parameters. For example in the given graph, monthly salary and monthly expenses of six different families of a society are given. Go through the given graph.



In this diagram, we will realise that Mr. Gupta and family has a monthly income of Rs 14,000 and they spend Rs. 12,000 per month. At the same time, Mr. Verma and family are earning Rs 28,00 per month and are spending Rs 16,000 per month. Mr. Sharma and family are earning Rs 36,000 per month and are spending Rs 17,000 per month and so on and so forth. On the basis of all this data, any number of questions can be asked and solved as well.

Solved Examples

Directions for questions 1 to 5: The scatter diagram shows the number of students passing in the High School examination in the given years from the four houses of a Public School.



1. The average number of students for each house who have passed in the given years is:
   (a) 59 (b) 52
   (c) 63 (d) 56

$$=\frac{70+60+45+40+80+75+55+35+90+65+35+60}{4\times 3}=59$$

2. The performance of which of the following houses is the best?
   (a) Pearl (b) Ruby
   (c) Topaz (d) Sapphire

   Sol.: (d) From the graph it is clear that the performance of Sapphire is the best.

3. For which of the following houses is the percentage change in the results maximum for any year over the previous year?
   (a) Topaz (b) Pearl
   (c) Sapphire (d) Ruby

   Sol.: (b) Percentage increase in pearl for 1999 $=\frac{75-45}{45}\times 100=66.66\%$

4. If the trend observed between 1999 and 2000 continues in the next year, what will be the number of students passing the exam in 2001?
   (a) 245 (b) 237
   (c) 263 (d) 255

   Sol.: (d) Total no. of students passed in 1999 and 2000 were 245 and 250 respectively. If the trend continues the no. of students passed in 2001 would be 255.

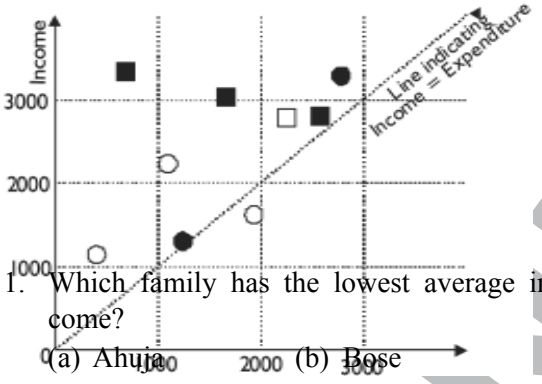
5. The number of students keeps on increasing by 50 every year. In 1998, there were 250 students. For which of the following years is the performance best in the school?
   (a) 1998 (b) 2000
   (c) 1999
   (d) Cannot be determined.

   Sol.: (a) No. of students in 1998 = 250
   No. of students passed in 1998 = 215
   × % success $=\frac{215-100}{250}\times 86\%$
   No. of students in 1999 = 300
   No. of students passed in 1999 = 245
   × % success $=\frac{245\times 100}{300}=81.66\%$
   No. of students in 2000 = 350
   No. of studer $=\frac{250\times 100}{350}=71.42$ = 250
   × % success

Practice Questions

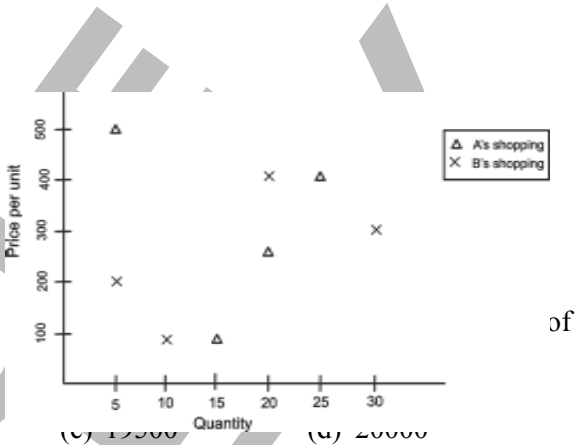
Directions for questions 1 to 5: Answer the questions on the basis of the information given below. The data points in the figure below represent monthly income and expenditure data of individual members of the Ahuja family ( ), the Bose family ( ), the Coomar family (●), and the Dubey family ( ). For these questions, savings is defined as■

Savings = Income – Expenditure



1. Which family has the lowest average income?
   (a) Ahuja (b) Bose
   (c) Coomar (d) Dubey
2. Which family has the highest average expenditure?
   (a) Ahuja (b) Bose
   (c) Coomar (d) Dubey
3. Which family has the lowest average savings?
   (a) Ahuja (b) Bose
   (c) Coomar (d) Dubey
4. The highest amount of savings accrues to a members of which family?
   (a) Ahuja (b) Bose
   (c) Coomar (d) Dubey
5. Which family has least number of members in family
   (a) Coomar (b) Dubey
   (c) Ahuja (d) Cannot be determined

Directions for questions 6 to 10: The following scatter plot graph shows the shopping done by A and B in a shopping mall. Each plot shows the price per unit and the quantity purchased. Analyze the figure and answer the questions that follow:



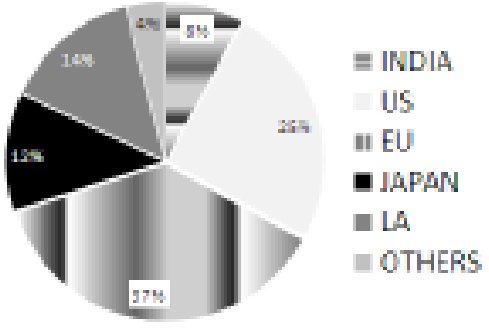
of

6. What was the total bill of A?
   (a) 19000 (b) 20000
   (c) 19500 (d) 20000
7. Who between the two did the maximum shopping in terms of quantity?
   (a) A (b) B
   (c) Both A and B did the same shopping
   (d) Cannot be determined
8. What was the total bill of A and B combined?
   (a) 19000 (b) 28000
   (c) 39000 (d) 38000
9. The prices of how many commodities were more than the average price of all the commodities bought by them. (Do not include the quantity)
   (a) 2 (b) 3
   (c) 4 (d) 5
10. What is the ratio of least quality purchased by A to highest quantity purchased by B.
    (a) 2 : 5 (b) 1 : 5
    (c) 1 : 2 (d) Cannot be determined

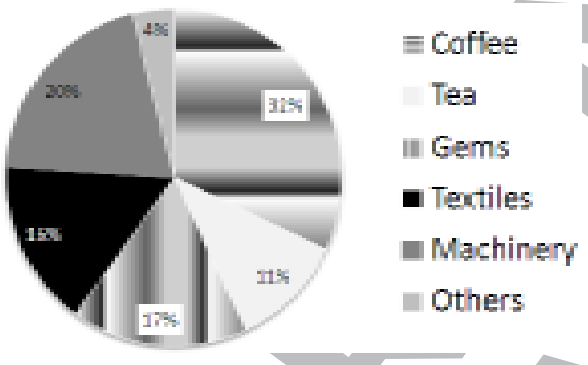
Mixed Graphs

Directions for questions 1 to 5: Please refer to the following figures:

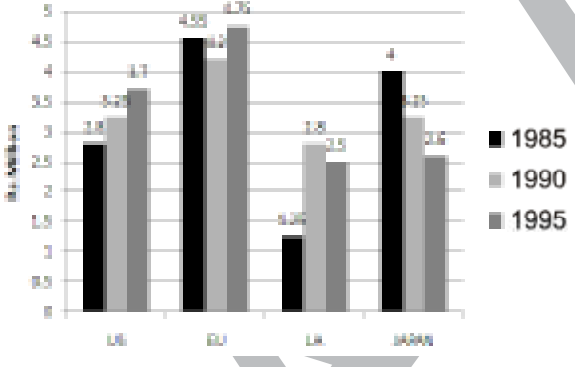
World Coffee Imports (% Break up in Year 1985) Total Value = Rs. 250 million



% Break up of India's Exports (Data for 1990)



Destination of India's Exports



1. Find the percentage growth rate of India's exports to Japan during the period 1985-95
   (a) 24.45 (b) 34.70
   (c) 53.84 (d) 79.20

2. Assuming the rate of annual growth of total coffee exported by India was 2%, find the ratio of coffee exported by India in 1985 to that in 1990.
   (a) 1 : 1.3 (b) 2 : 1.3
   (c) 2 : 1.7 (d) 2 : 2.208

3. Find the ratio of total coffee imported by the EU in 1985 to that of India in 1985
   (a) 8 : 37 (b) 35 : 2
   (c) 37 : 8 (d) 38 : 12

4. If the US imported 70% of the gems exported by India in 1990, find the value of Gems imported by US from India.
   (a) Rs. 0.38 million (b) Rs. 0.46 million
   (c) Rs. 0.58 million (d) Rs. 0.26 million

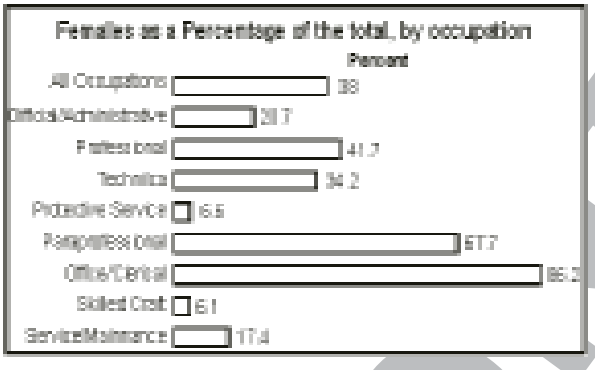
5. What percentage of the total export done by India in the year 1995 was received by EU?
   (a) 30% (b) 35%
   (c) 38% (d) 42%

DIRECTIONS for questions 6 to 10: Study the following pie-chart, table and bar diagram and answer the questions that follow. The data related to the median salary is also given corresponding to the same categories given in the bar diagram.

STATE AND LOCAL GOVERNMENT EMPLOYMENT AND SALARY BY OCCUPATION AND SEX, 1977

Median Annual Salary

	Male $	Female $
All occupation	12,390	9,093
Official /Administrative		18,723
14,066		
Professional	15,740	12,650
Technical	12,885	9,445
Protective service	13,622	9,827
Paraprofessional	9,054	7.761
Office / Clerical	9,723	8,456
Skilled Craft	11,657	8,892
Servie Maintaince	9,547	7,307



6. Approximately what percent of state and local government employees were male?
   (a) 38% (b) 52%
   (c) 58% (d) 62%

7. State and local governments employed approximately how many more office/clerical employees than skilled craft employees?
   (a) 384,000 (b) 441,500
   (c) 650,500 (d) 825,600

8. For state and local government employees, the median annual salary for males was approximately what per cent greater than that for females?
   (a) 10% (b) 20%
   (c) 25% (d) 35%

9. For state and local government employees, approximately what was the difference between the number of females employed as professionals and the number of females employed in service/maintenance occupations?
   (a) 75,000 (b) 185,000
   (c) 765,000 (d) 1,070,000

10. Which of the following statements about state and local government employees can be inferred from the data?
   (I) Fewer than 1/3 of those in paraprofessional occupations were males.
   (II) There were more than 5 times the number of females in technical occupations as in skilled craft occupations.
   (III) There were more than 6 times the number of females in professional occupations as in official/administrative occupations.
   (a) (I) only (b) (II) only
   (c) (I) and (II) only (d) (I), (II) and (III)

Directions for questions 1 to 4: The following table shows the revenue generated by W, X, Y and Z companies in 2006 and the percentage increase in the revenue from the previous year.

Company	Net Revenue in 2006	Percentage increase in revenue from the previous year			
		2007	2008	2009	2010
W	1200000	10	18	12	20
X	1800000	12	13	15	17
Y	2600000	10	12	18	20
Z	800000	20	15	17.5	22

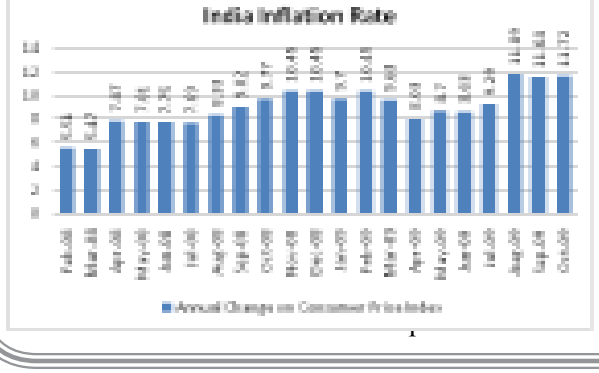
1. What was the revenue of company X in 2009?
   (a) 2619792 (b) 2070000
   (c) 2520000
   (d) Cannot be deterined

2. What is ratio of revenues of company W in 2010 to that of Y in 2009?
   (a) 6 : 13 (b) 20 : 39
   (c) 36 : 65 (d) None of these

3. What was the % increase in the total revenue of all the 4 companies in 2009 as compared to 2006?
   (a) 42.5% (b) 47.5%
   (c) 52.5%
   (d) Cannot be determined

4. Of all the companies which company showed the highest percentage increase in the net revenue at the end of 2010?
   (a) W (b) X
   (c) Y (d) Z

Directions for questions 5 to 8: The following graph shows the Inflation Rates of India for the given period.



modities the highest?
(a) Aug 08 (b) Oct 08
(c) Aug 09 (d) Oct 09

6. What is the average rate of inflation for the given time period?
   (a) 8.4% (b) 8.72%
   (c) 8.6% (d) 7.8%

7. If the price of a commodity was Rs 100 in September 09, then what will be the price of the same commodity in October 2009?
   (a) 111.72 (b) 106.29
   (c) 122.4 (d) None of these

8. Which month observed the highest percentage change in the inflation rate from its previous month?
   (a) April 09 (b) Aug 09
   (c) Feb 09 (d) April 08

Directions for questions 9 to 12: The following graph shows the run rate of a cricket match between India and England. Based on the graph, answer the questions that follow:

9. Which team scored more runs?
   (a) England (b) India
   (c) Can be either of the two
   (d) Cannot be determined

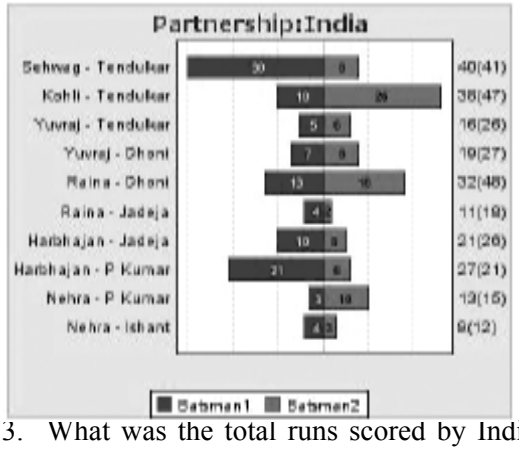
10. In how many overs did India score more runs than England?
    (a) 2 (b) 4
    (c) 6 (d) Cannot be determined

11. In which over was the maximum no. of runs scored?
    (a) 1 (b) 2
    (c) 50 (d) Cannot be determined

12. Which team won the match?
    (a) England (b) India
    (c) Can be any of the two
    (d) Cannot be determined

Directions for questions 13 to 16: The follow-

ing graph shows the partnership runs scored by team India in a cricket match. Based on the graph answer the questions that follow:



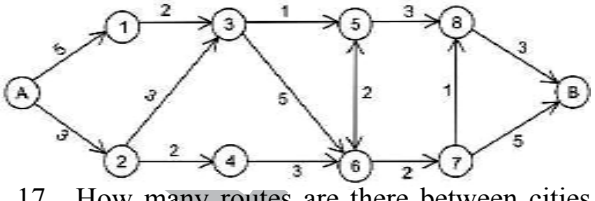
13. What was the total runs scored by India?
(a) 197 (b) 216
(c) 226
(d) Cannot be determined

14. Which batsman scored the highest runs in the innings?
(a) Harbhajan (b) Tendulkar
(c) Dhoni
(d) Cannot be determined

15. What percentage of the total runs scored by India are scored by Tendulkar and Dhoni together?
(a) 24% (b) 29%
(c) 32% (d) 38%

16. By what percentage did Tendulkar score more than Sehwag?
(a) 10% (b) 20%
(c) 25% (d) 33.33%

Direction for questions 17 to 21: The following network diagram shows the routes between cities A and B connected via nodes. The numbers on each edge shows the distance between the nodes.



17. How many routes are there between cities A and B?
(a) 12 (b) 13
(c) 14 (d) 15

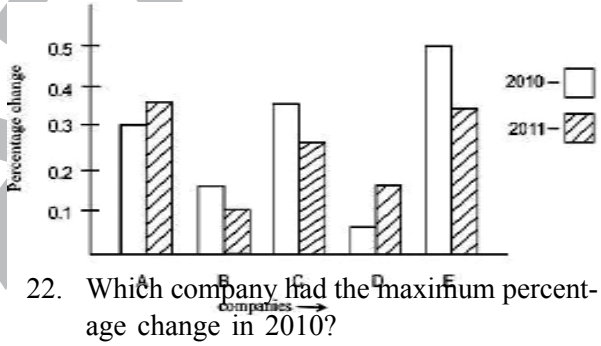
18. What is the length of the shortest route?
(a) 12 (b) 13
(c) 14 (d) 15

19. What is the length of the longest route?
(a) 20 (b) 17
(c) 18 (d) 19

20. If node 3 is closed down due to traffic and all the routes connecting node 3 are not functional, then how many routes will be there from city A to B?
(a) 3 (b) 6
(c) 9 (d) 12

21. Refer to question (20), what will be the length of the shortest route?
(a) 12 (b) 13
(c) 14 (d) 15

Direction for questions 22 to 25: The following graph shows the % change in prices of shares of the given companies in the year 2010 and 2011.



22. Which company had the maximum percentage change in 2010?
(a) A (b) D
(c) E
(d) Cannot be determined

23. Prices of which of the company increased the maximum in 2011?
(a) A (b) B
(c) E
(d) Cannot be determined

24. If price of share of E in 2010 is Rs. 150 then what is the price of the share of E in 2011?
(a) 148.5 (b) 152
(c) 13.5
(d) Cannot be determined.

25. How many companies showed a decline in the price of their shares in 2011?
(a) 1 (b) 2
(c) 3
(d) Cannot be determined

Test - 2

Directions for questions 1 to 4: The following table shows the state wise population and area of land of the country Mamamia. There are only 6 states and the area is given in thousands of square feets.

State	Area	Population
Alpachino	4235	20000
Jigaro	6385	43000
Faruka	3160	15000
Alabama	8695	60000
Delicia	3900	35000
Veganu	7995	50000

1. Which state is the most densely populated?
   (a) Jigaro (b) Alabama
   (c) Delicia (d) Veganu

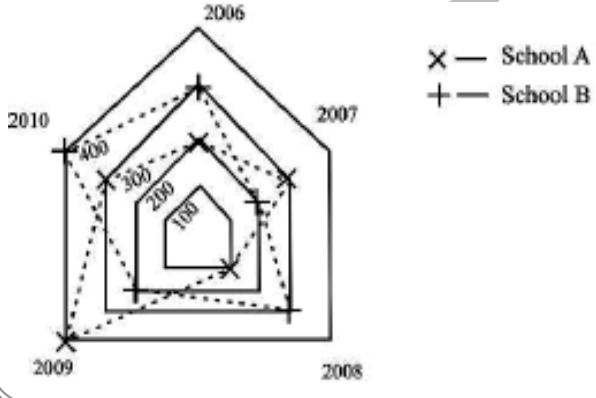
2. What is the total population of Mamamia?
   (a) 220000 (b) 223000
   (c) 221000 (d) 222300

3. By what percentage the density of Jigaro is more than that of Mamamia?
   (a) 4.2% (b) 6.8%
   (c) 3.2% (d) 3.8%

4. If there are 100000 males in Mamamia, then how many males are there in Alpachino, if the male to female ratio is same all over the country?
   (a) 10000 (b) 11032
   (c) 8968
   (d) Cannot be determined

Directions for question: 5 to 8

The following spider-web diagram shows the strength of the schools from 2006 to 2010.



5. What was the total no. of students from 2006 to 2010 in school A?
   (a) 1000 (b) 1300
   (c) 1100 (d) 1200

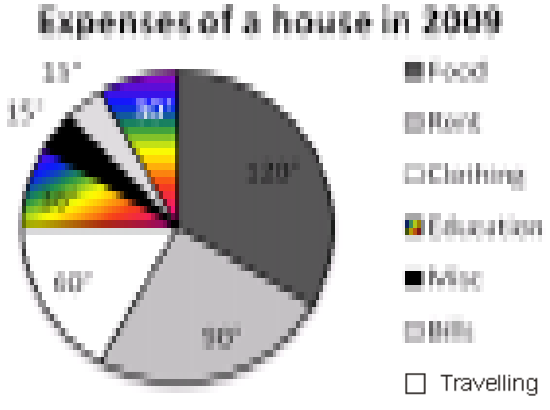
6. Which year, had the maximum no. of students in the school A and B together?
   (a) 2006 (b) 2008
   (c) 2009 (d) 2010

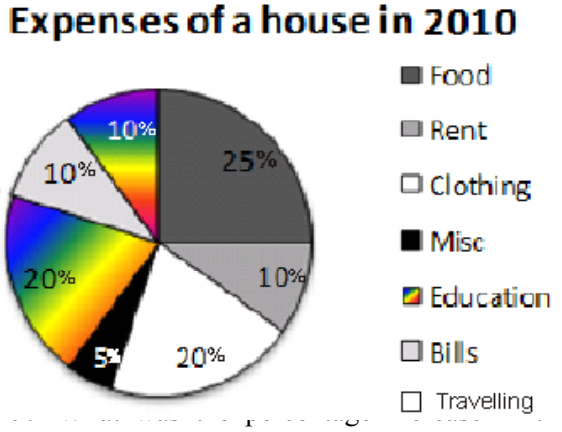
7. Which year had the maximum difference in the no. of students in school A and B?
   (a) 2008 (b) 2009
   (c) 2010
   (d) Both 2008 and 2009

8. In which year there was the least percentage change in the no. of students of school A?
   (a) 2007 (b) 2008
   (c) 2009 (d) 2010

Directions for question 9 to 12: Consider the following two pie charts.

The total expenses of house in 2009 was Rs. 5,00,000.





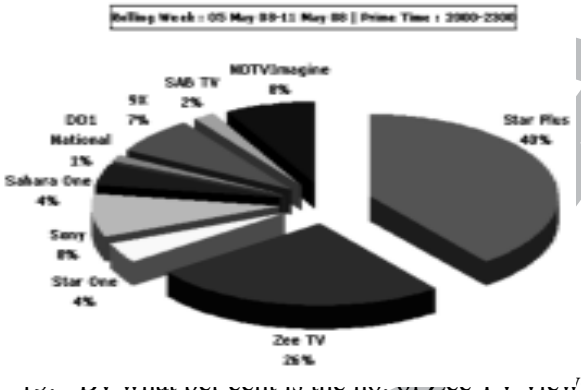
clothing expenditure in 2010 as compared to 2009?
(a) 20% (b) 200%
(c) 25%
(d) Cannot be determined

10. What is the ratio of percentage share of expenses of Education in 2009 to that of Clothing in 2010?
(a) 3 : 1 (b) 5 : 6
(c) 12 : 17
(d) Cannot be determined

11. If the total expense of house increased by 20% in 2010, what was the net increase in Bills?
(a) 108% (b) 188%
(c) 56% (d) 140%

12. Refer to previous question, in how much of the expenses, the net expenses decreased in value from 2009 to 2010.
(a) 2 (b) 3
(c) 4 (d) 5

Directions for questions 13 to 16: Analyze the bar graph of the viewership of different channels at the Prime Time in India for the given week and answer the following questions. The given data is for 2,50,000 television viewers.



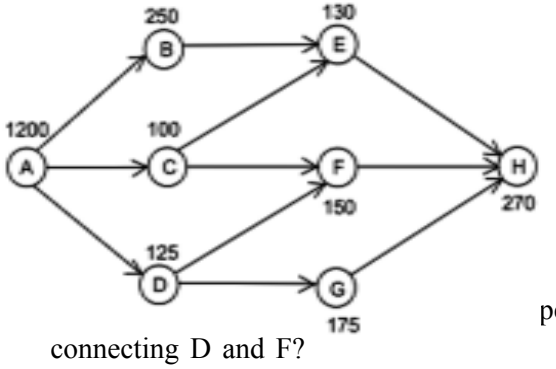
13. By what per cent is the no. of Zee TV viewers less than that of both the Star Channels (Star Plus and Star One) combined?
(a) 40.9% (b) 18%
(c) 69.8% (d) 14%

14. If SAB TV, Sahara One, 9X and Sony combine themselves in a group then by what percentage will their combined viewership be less than that of Star Channels (Star Plus and Star One)?
(a) 23% (b) 52%
(c) 102% (d) 19%

15. If the next week NDTV Imagine started four new TV shows and its viewership got increased by 20% and the viewership (in numbers) of all the other channels remained the same, then by what percentage did Star Plus lose its share in the overall viewership?
(a) 37% (b) 3%
(c) 7.4% (d) No losss

16. If a new channel started the next week and the total viewership of that channel was 20,000. Suppose the total number of viewers remained the same as in this week, then what will be the share of Zee TV in the next week?
(a) 20% (b) 22%
(c) 24% (d) 26%

Directions for questions 17 to 20: The following figure shows a Gas pipe flow diagram of various cities connected through A. The pipes connected with Station A have capacity of 400 litres each. Station A supplies 1200 litres of Gas to the city. The consumption of each of the city is given above it. The capacities of pipes, other than which connected to A, have capacities of maximum 200 liters. The Slag of a pipe is the difference between the maximum capacity and and the actual flow of the pipe.



17. What is the maximum flow in the pipe connecting D and F?
(a) 0 (b) 75
(c) 100 (d) 125

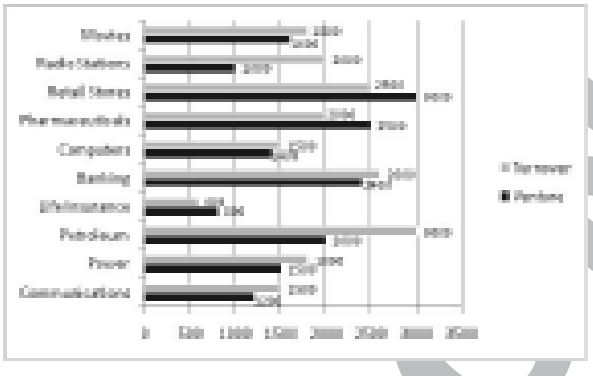
18. If the pipe connecting E and H has a slag of 50, then what is the minimum flow of pipe F and H?
(a) 60 (b) 75
(c) 90 (d) 100

19. What can be the maximum slag in any of the pipe line?

(a) 150 (b) 175
(c) 180 (d) 200

20. If city B increases its consumption by 20%, then what can be the maximum per cent increase in the slag of the pipe between B and F?
(a) 20% (b) 25%
(c) 33.33% (d) 50%

Directions for questions 21 to 25: The following bar chart shows the different ventures of a MNC in different fields and the net turnover in that field at the end of the year. Study the chart and answer the following questions. All values are in Rs. Crores. Profit = Turnover - Venture



(a) 100% (b) 66.66%
(c) 50% (d) 45%

22. What was the net over all profit?
(a) 1500 (b) 1600
(c) 1800 (d) 1900

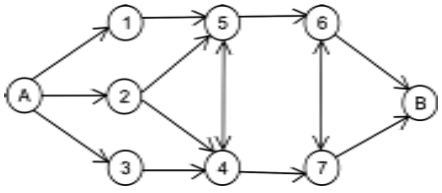
23. How many sectors had a profit of more than 10% of the Venture?
(a) 3 (b) 4
(c) 5 (d) 6

24. Which sector had the highest Venture to Turnover ratio?
(a) Radio Station (b) Petroleum
(c) Pharmaceuticals (d) Life Insurance

25. What per cent of the total venture was made in Retail stores?
(a) 15 (b) 17
(c) 20 (d) 22

Test - 3

Direction for questions: 1 to 3: The following network diagram shows the routes between cities A and B.

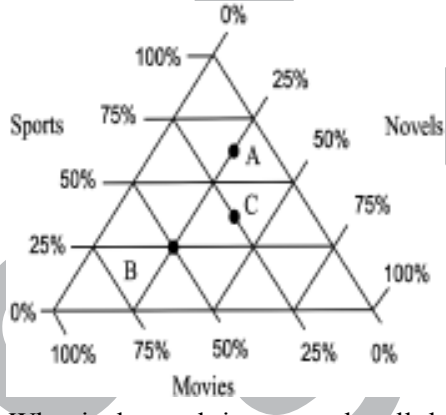


1. How many routes are there from A to B?
   (a) 20 (b) 16
   (c) 8 (d) 32

2. If the route from 2 to 5 is closed, then how many routes are there from A to B.
   (a) 16 (b) 12
   (c) 28 (d) 24

3. If the distance between each node is 1 km, then find the length of the longest route?
   (a) 8 (b) 7
   (c) 6 (d) 5

Directions for questions 4 to 8: The following chart shows the time spent in various leisure activities of A, B and C. Total time spent by A, B and C in the leisure activites per week is 15, 20 and 30 hours respectively.



4. What is the total time spent by all the three in watching movies per week?
   (a) 17 hrs (b) 18.5 hrs
   (c) 19.3 hrs (d) 20.2 hrs

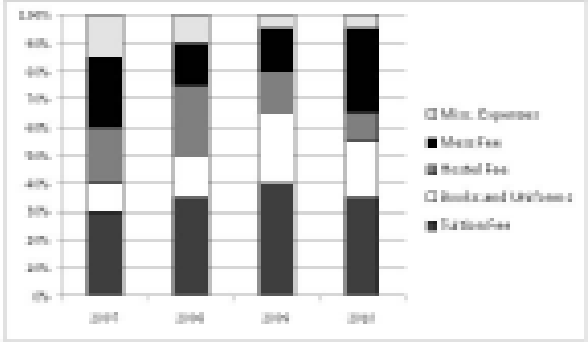
5. Which activity is given the most time by all the three students per week?
   (a) Movies (b) Sports
   (c) Novels (d) Both (b) and (c)

6. By what percentage the time spent by C in sports more than the time spent by A in watching movies?
   (a) 83.33% (b) 16.66%
   (c) 20% (d) 75%

7. What per cent of the total time spent by the three in reading novels is spent by B?
   (a) 25% (b) 21%
   (c) 18% (d) 27.5%

8. If A increased his leisure time by 10 hours, then by what percent the total time spent by the three in watching movies increases if time is distributed evenly?
   (a) 6% (b) 6.4%
   (c) 7.2% (d) 12.5%

Directions for questions 9 to 12: The following chart shows the total expense of a student. The total expense of the student in 2007 was 2,00,000. The tuition fee of the student increased Rs. 10,000 every year.



9. What were his total expenses in 2009?
   (a) Rs. 3,00,000 (b) Rs. 2,50,000
   (c) Rs. 2,00,000
   (d) Cannot be determined

10. What was his Hostel fee in 2010?
    (a) Rs. 25,700 (b) Rs. 29,600
    (c) Rs. 30,000
    (d) Cannot be determined

11. By what per cent did his Mess fee increased from 2007 till 2010?
    (a) 27% (b) 54%
    (c) 36%
    (d) Cannot be determined

12. The percentage increase of which of the following expense increased the maximum from 2007 till 2010?
    (a) Books and uniforms (b)Tuition fee
    (c) Mess
    (d) Cannot be determined

Directions for questions 13 to 17: The following table gives the data of no. of schools and various facilities available there.

Schools	Students	Teachers	Classrooms	Benches
A	500	50	10	100
B	600	40	15	150
C	800	100	20	200
D	400	30	10	300
E	900	120	25	500
F	1200	150	20	400

13. Which school had the highest teacher to student ratio?
    (a) C (b) E
    (c) F (d) Both C and F

14. Which school had the minimum number of students per classroom?
    (a) B (b) C and D
    (c) E (d) Both (a) and (b)

15. What is the average no. of students per bench for all the schools combined together?
    (a) 2 (b) 2.33
    (c) 2.66 (d) 3

16. What is the ratio of no. of students per classroom for school A to the average no. of students per classroom for all the schools?
    (a) 22/25 (b) 25/22
    (c) 27/25 (d) None of these

17. If the number of students per teacher is more than 10, then the school is said to be a B grade school. Then how many schools are B grade schools?
    (a) 1 (b) 2
    (c) 3 (d) 4

Directions for questions 18 to 21: The following spider web graph shows the price of Wheat, Rice and Sugar for the year 2010.

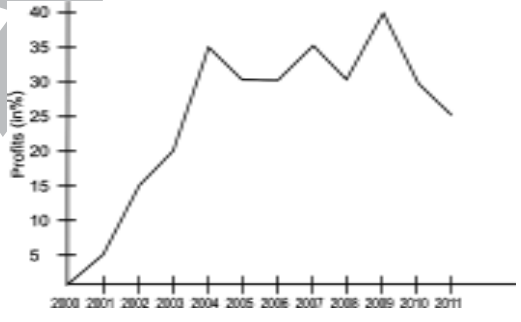
18. Which commodity among the three had the maximum % increase in the price in November from January?
    (a) Wheat (b) Rice
    (c) Sugar
    (d) Both Wheat and Sugar

19. What was the average price of Sugar of January and November?
    (a) 12 (b) 18
    (c) 13.5 (d) None of these

20. In which month was the sum of prices of all the three commodities the maximum?
    (a) March (b) May
    (c) July (d) November

21. What is the difference between the highest prices to the lowest price of the sum of all the three commodities?
    (a) 32 (b) 34
    (c) 36 (d) 38

Directions for questions 22 to 25: The following graph shows the performance Chart of the XYZ company over the given years. The Company started in 2000 and invested Rs. 1 Lakh.



22. Which year had the maximum percentage increase in profit percentage?
    (a) 2001 (b) 2003
    (c) 2004 (d) 2009

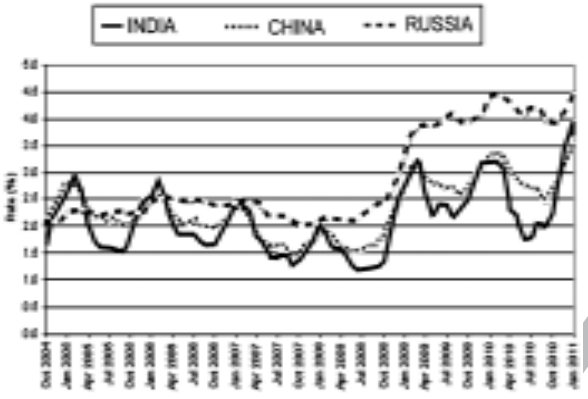
23. What was the return of the company in 2005?
    (a) 130000 (b) 300000
    (c) 230000 (d) Cannot be determined.

24. Which year had the maximum percentage decrease in the profits?
    (a) 2005 (b) 2008
    (c) 2010 (d) 2011

25. How many years showed a net profit (in Rs.) more than its previous year?
    (a) 4 (b) 2
    (c) 3 (d) Cannot be determined

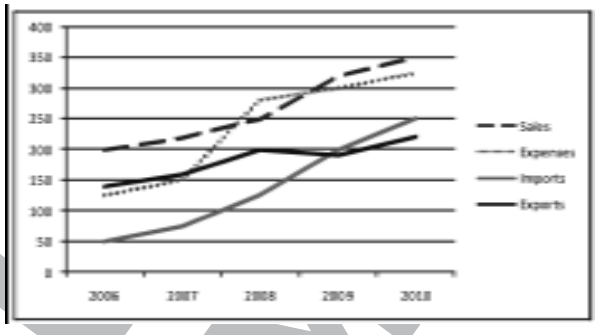
Test - 4

Directions for questions 1 to 5: Consider the following graph. The graph shows the rate of unemployment in three countries India, China and Russia for the given months. Analyze the graph and answer the following questions.



1. Which month had the highest Employment rake of all the three countries combined?
   (a) Oct 2009 (b) Jun 2011
   (c) Oct 2007 (d) None of these
2. Which month had the lowest Employment for China?
   (a) Jan 2011 (b) Jun 2010
   (c) Oct 2007` (d) None of these
3. Which country had the most number of Unemployed people in January 2011?
   (a) India (b) China
   (c) Russia
   (d) Cannot be determined
4. For how many months was the number of unemployed people in India more than that of China?
   (a) 4 (b) 8
   (c) 10
   (d) Cannot be determined
5. For how many months the rate of unemployment of Russia was less than that of India?
   (a) 4 (b) 8
   (c) 10 (d) None of these

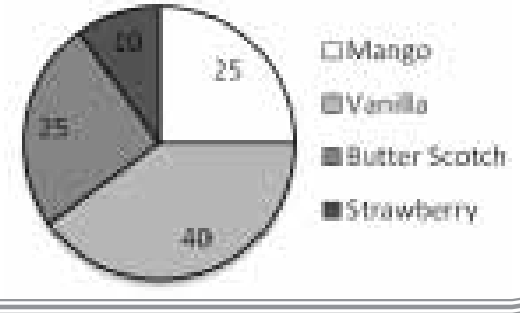
Directions for questions 6 to 9: The sales, expenses, exports and imports of ABC Corporation are given below. The Sales figure includes all the Exports and the production cost does not include Imports. Also, the Expenses include all the Imports costs. Assume there are no outstanding stocks. The figures provided are in Rs. Lacs.



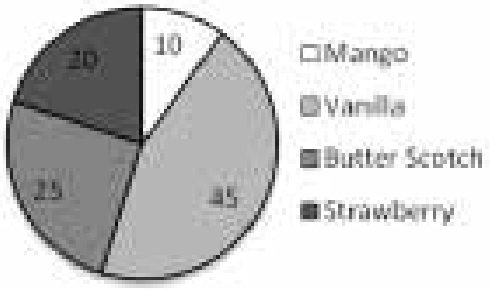
6. What was the production cost (in Rs.) in the year 2007?
   (a) 200 (b) 150
   (c) 125
   (d) Cannot be determined
7. Which year had the largest expense to the production cost ratio?
   (a) 2008 (b) 2009
   (c) 2010
   (d) Cannot be determined
8. How many years showed a decline in the net profit from the previous year?
   (a) 1 (b) 2
   (c) 3 (d) 4
9. Which year had the least Import to export ratio?
   (a) 2006 (b) 2008
   (c) 2009 (d) 2010

Directions for questions 10 to 13: The following Pie-Chart shows the distribution of market shares of different flavours of Ice-cream and the result of a survey about the different flavours liked by the children. Assume that there are no more flavours available in the market. All the values are in percentage. The number of people involved in the survey is 1000 and the no. of ice-cream bars available is 800.

Market Share of Different Ice Cream flavours



Survey of Different Flavours liked by Children



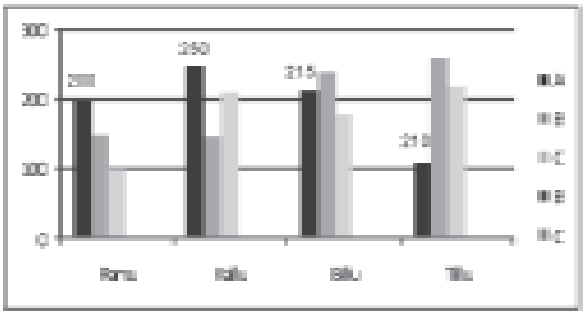
10. If number of all the persons involved in the survey like to eat their favourite ice-cream flavour. Then, how many flavours of ice-cream will not be able to satisfy its demand?
    (a) 1 (b) 2
    (c) 3 (d) 4

11. Refer, to question 10, how many of the children will not be able to get an ice-cream?
    (a) 250 (b) 300
    (c) 400 (d) 150

12. Refer question 10, Suppose if Vanilla bar is not available then Vanilla eaters can buy Strawberry bars (if available). Then, how many of the children will not be able to have an ice-cream?
    (a) 200 (b) 150
    (c) 100 (d) 300

13. Refer question 10, Suppose there is an import of 25 Butter scotch bars and 30 Vanilla bars, then what percentage of children will not be able to buy their favourite ice-creams?
    (a) 24.5% (b) 20%
    (c) 26.5% (d) 30%

Directions for questions 14 to 17: Ramu, Kallu, Billu and Tillu are four friends. Each of them have have three mobile phones of three Companies A, B and C. The Graph shows the Bills of each of the mobile phones in Rupees.



14. Which among three companies has the largest overall bill?
    (a) A (b) B
    (c) C
    (d) Cannot be determined

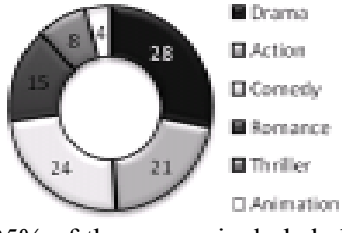
15. Who among the four has the largest expense in mobile bills?.
    (a) Ramu (b) Kallu
    (c) Billu (d) Tillu

16. By how much percentage, A mobile bill of Kallu more than that of C mobile bill of Ramu?
    (a) 44% (b) 56%
    (c) 16% (d) 4%

17. If Ramu exchanged his mobile A bill with Kallu and Billu exchanged his mobile B bill with Kallu, then by what percentage the expenses of Kallu change?
    (a) 2.4% (b) 6.2%
    (c) 5.6% (d) 8.5%

Directions for Questions 18 to 21: In a survey conducted by Amar Jagran news channel about their favourite type of movie, the following graph resulted. The survey is conducted among 400 people of all age groups.

Survey on type of Movies liked



18. If 25% of the survey included children and none of them liked Drama movies, then what percentage of adults liked Drama movies?
    (a) 9% (b) 37%
    (c) 33% (d) 28%

19. If 50% of the survey included ladies and none of the lady voted for Action movies, then what is the least percentage of ladies who liked Comedy or Romance movies?
    (a) 10% (b) 22%
    (c) 5% (d) 0%

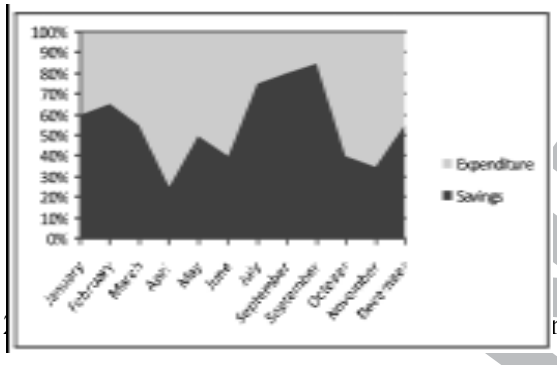
20. What is the ratio of no. of people liking Comedy to those not liking drama movies?
    (a) 1 : 3 (b) 6 : 7
    (c) 1 : 2 (d) 3 : 4

21. If 100 people were more included in the

survey and 50% of them voted for Thriller movies and the remaining voted for Romance movies, and a new graph is made, then what will be the share of Action movies in that graph?

(a) 21% (b) 19.2%
(c) 16.8%
(d) Cannot be determined

Directions for questions 22 to 25: The graph below shows the savings and expenditure of Monu's pocket-money. His pocket money was Rs. 100 in January and got increased by Rs. 10 every month.



collectively?

(a) 110 (b) 160
(c) 90 (d) 130

23. What is the ratio of his savings in April and his expenditure in July?

(a) 1 : 1 (b) 1 : 3
(c) 13 : 16 (d) 13 : 10

24. In which month did he spend the most?

(a) April (b) September
(c) October (d) November

25. In which month did he have the highest percentage increase in savings?

(a) March (b) April
(c) September (d) July

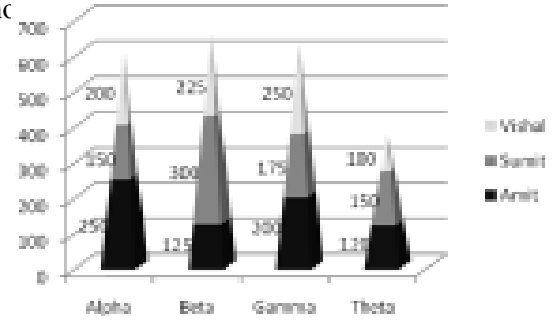
Test - 5

Directions for questions 1 to 6: The following table shows the in and out time of 5 employees for a week. The office timings are from 9:30 to 18:00. If anyone is late or leaves more than 10 minutes before office timings then, it is considered a short leave. If anybody comes after two hours or leaves before two hours, then it is considered a half day. If anyone works less than 4 hours, then it is considered a leave. Analyze the table and answer the following questions.

Name	Day	In-Time	Out-Time
Anuj	Monday	9:15	18:05
	Tuesday	9:16	18:01
	Wednesday	9:21	18:00
	Thursday	9:32	17:55
	Friday	9:35	18:00
	Saturday	9:24	14:55
Amit	Monday	9:30	16:01
	Tuesday	9:32	15:23
	Wednesday	9:35	18:40
	Thursday	9:45	17:59
	Friday	9:50	18:25
	Saturday	10:01	18:15
Arvind	Monday	9:12	18:08
	Tuesday	9:00	18:06
	Wednesday	9:20	18:00
	Thursday	9:30	18:03
	Friday	9:22	18:42
	Saturday	9:41	17:58
Ashish	Monday	9:22	18:01
	Tuesday	9:41	18:06
	Wednesday	9:32	18:08
	Thursday	9:31	18:20
	Friday	9:25	18:30
	Saturday	9:44	16:03
Ankur	Monday	9:45	18:45
	Tuesday	9:52	13:59
	Wednesday	9:21	16:06
	Thursday	10:35	18:06
	Friday	11:00	18:08
	Saturday	9:29	18:50
Ankit	Monday	9:22	18:09
	Tuesday	9:41	18:11
	Wednesday	9:22	15:23
	Thursday	9:41	18:15
	Friday	9:24	18:17
	Saturday	9:30	14:12
Anshul	Monday	9:55	12:21
	Tuesday	9:12	15:41
	Wednesday	8:59	16:53
	Thursday	9:11	18:59
	Friday	9:12	19:25
	Saturday	9:22	19:09

1. A total of how many short leaves were taken by them in the week?
   (a) 10 (b) 13
   (c) 15 (d) 18
2. How many persons took more than two short leaves?
   (a) 1 (b) 2
   (c) 3 (d) 5
3. Who worked for the maximum time in a single day during the whole week?
   (a) Anshul (b) Ankur
   (c) Arvind (d) Ashish
4. How many half days were taken by them altogether?
   (a) 5 (b) 6
   (c) 7 (d) 8
5. If the employee having the least short leaves and half days is to be selected as the Employee of the week, then who will be selected?
   (a) Anuj (b) Arvind
   (c) Ankit (d) Anshul
6. If a pay cut of 20% of the salary is done for a short leave and 50% for a half day, then who among them received the least amount?
   (a) Ankur (b) Ankit
   (c) Arvind
   (d) Cannot be determined

Directions for questions 7 to 11: There are three brothers Amit, Sumit and Vishal holding shares of four companies Alpha, Beta, Gamma and Theta. The following graph shows the share of each them ho



7. Who has the maximum no. of shares overall?
   (a) Amit (b) Sumit
   (c) Vishal
   (d) Both Sumit and Vishal
8. What is the ratio of no. of shares of Alpha by Amit to the no. of shares of Theta by Sumit?

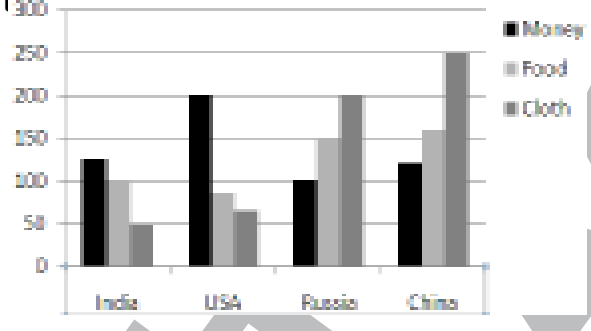
(a) 3 : 5 (b) 1 : 3
(c) 5 : 3 (d) 2 : 3

9. If the cost per share of Theta is Rs. 10 which is double the price of shares of each of the other companies, then who among them has the highest amount of Shares (in Rupees)?
(a) Amit (b) Sumit
(c) Vishal
(d) Both Sumit and Vishal

10. Refer to question 9, what is the total value of shares of Beta held by Amit?
(a) 625 (b) 650
(c) 1250
(d) Cannot be determined

11. Refer to question 9, if Amit sold 50 of his Alpha shares to Vishal, then what is the percentage increase in the amount of shares of Vishal (in Rupees)?
(a) 6.8 (b) 5.7
(c) 5.4 (d) 4.8

Directions for questions 12 to 16: The following bar-graph shows the amount donated by the given countries in the form of Money, Food and Cloth to the victims of Japan's earthquake. **All**



12. Which country donated the highest amount, including Food, Cloth and Money?
(a) India (b) USA
(c) Russia (d) China

13. If India donated 500 crore Rupees in the form of Money, then how much amount did USA donate in the form of Cloth (in Rupees)?
(a) 65 (b) 240
(c) 280
(d) Cannot be determined

Question of Previous

14. How much money (overall) did Indian and China together donated to Japan (in Rupees)?
(a) 805 (b) 3220
(c) 225 (d) Cannot be determined

15. If one Indian Rupee is equal to 1.8 Japanese Yen and India donated a total of Rs. 825 crores, then how much amount is received by Japan from all the four countries (in Japanese Yen)?
(a) 8667 (b) 4815
(c) 1605
(d) Cannot be determined

16. Refer to question 15, 1 US $ is equal to how many Japanese Yen?
(a) 0.6 (b) 5.4
(c) 80.95
(d) Cannot be determined

Directions for questions 17 to 20: The following table shows the no. of students in four years of a college and the branch they selected.

	Mechanical	Electrical	Computer Science	IT	Electronics
First year	24	13	25	45	16
Second year	26	15	32	23	15
Third year	35	18	21	12	32
Fourth year	15	34	34	16	12

17. Which year had the maximum number of students?
(a) First (b) Second
(c) Third (d) Fourth

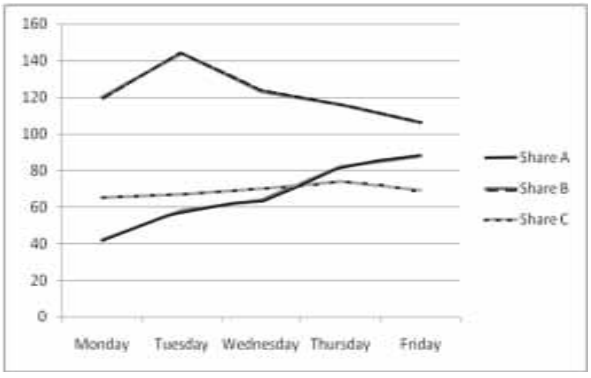
18. Which branch had the least no. of students?
(a) Electrical (b) IT
(c) Electronics (d) Mechanical

19. By what percentage the no. students of third year mechanical students more than the no. of students of first year Computer science students?
(a) 25% (b) 28%
(c) 40% (d) 19%

20. What percentage of the college strength consists of Mechanical first year students?
(a) 26% (b) 5%
(c) 7% (d) 9%

Directions for question 21 to 25: Go through the given data and answer the questions that follow.

Given graph presents fluctuations of share prices of three different companies (i.e. A, B and C)



21. Find the percentage increase in the price of Share A from Monday to Friday?
(a) 15 % (b) 62 %
(c) 110 % (d) 210 %

22. Find the percentage decrease in the price of share B from Monday to Friday?
(a) 0.5 % (b) 12 %
(c) 42 % (d) 67 %

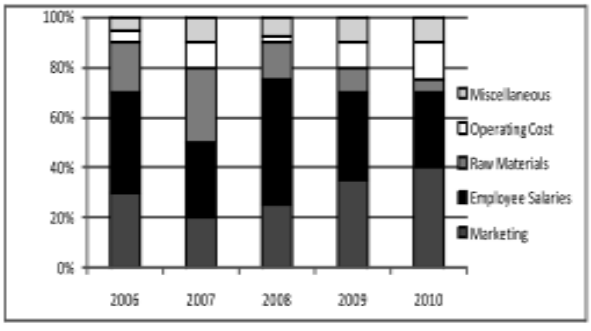
23. Find the difference between the prices of A and B from Monday to Friday?
(a) 52 (b) 62
(c) 73 (d) 83

24. If a person has decided on the strategy of buying a share on Monday and selling it on Thursday then which of these shares will give him maximum percentage return on his investments?
(a) Share A (b) Share B
(c) Share C (d) Cannot be determined

25. If the strategy of a person is to sell a share on Tuesday and then purchase the same on Friday, he should deal in which of the given shares?
(a) Share A (b) Share B
(c) Share C (d) Cannot be determined

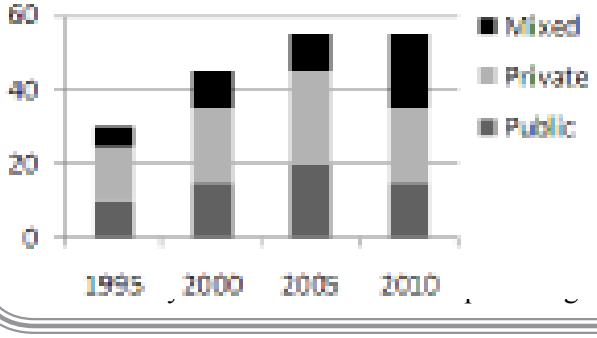
Test - 6

Directions for questions 1 to 4: The following stacked bar shows the expenses of company ABC from 2006 to 2010.



1. In which year, the percentage increase in the expense in Employee Salaries the highest?
   (a) 2007 (b) 2008
   (c) 2009 (d) 2010
2. In which year the money spent in Marketing is highest?
   (a) 2006 (b) 2009
   (c) 2010
   (d) Cannot be determined
3. Percentage share of which of the expense varied the least over the given period?
   (a) Miscellaneous (b) Operating Cost
   (c) Raw Materials (d) Marketing
4. If the total expense of the company increased by 10% every year, then what is the ratio of expense in Marketing in 2007 to that of Raw Materials in 2008?
   (a) 20:9 (b) 20:11
   (c) 11:9
   (d) Cannot be determined

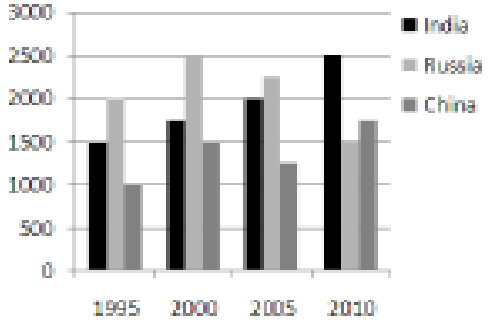
Directions for questions 5 to 8: The following graph shows the numbers (in thousands) of Public, Private and Mixed sector companies for the given years.

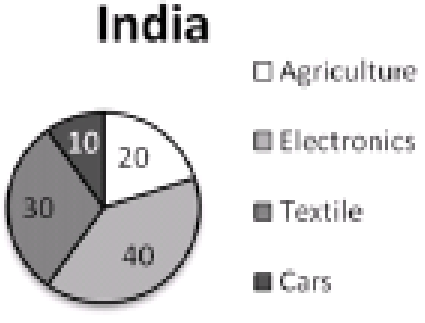


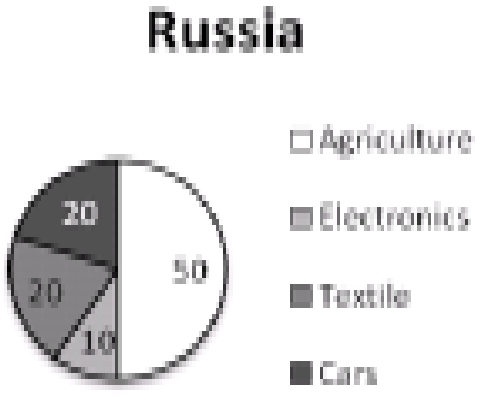
increase in the total no. of companies?
(a) 1995 (b) 2000
(c) 2005 (d) 2010

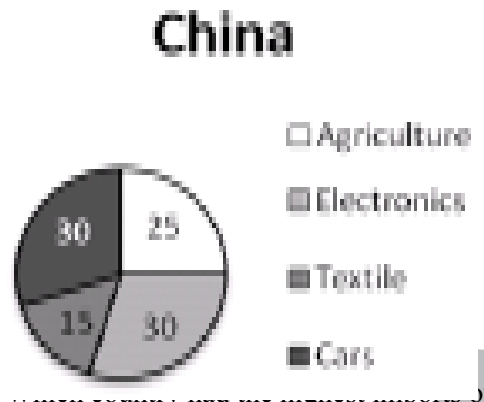
6. Which year had the least percentage increase in the Mixed Sector companies?
   (a) 2000 (b) 2005
   (c) 2010
   (d) Cannot be determined
7. What is the ratio of number of Private companies in 2000 to that of Public companies in 2010?
   (a) 3 : 4 (b) 4 : 3
   (c) 4 : 5 (d) 5 : 6
8. What is the highest ratio of Private to Public sector companies across the years?
   (a) 2 : 3 (b) 4 : 3
   (c) 5 : 4 (d) 3 : 2

Directions for questions 9 to 12: The following bar diagram shows the Imports of the three countries in (Rs. Crores) for the given years. The pie-charts shows the distribution of goods imported by the country which remains same for all the given years.









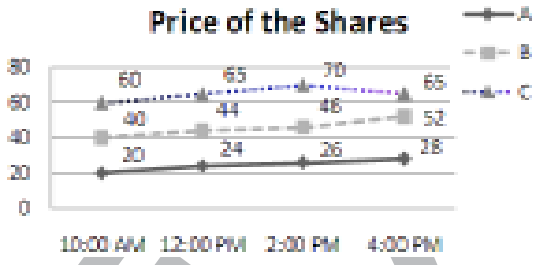
9. When country had the highest import over all the years?
   (a) India (b) Russia
   (c) China
   (d) Both India and China

10. Which country imported the least Textile goods over all the years?
   (a) India (b) China
   (c) Russia
   (d) Cannot be determined

11. Of what amount did China import Cars over all the years?
   (a) 1600 (b) 1650
   (c) 1500
   (d) Cannot be determined

12. Which of the given years had the highest import in Agricultural goods?
   (a) 1995 (b) 2000
   (c) 2005 (d) 2010

Directions for questions 13 to 16: The following graph shows the prices of the shares during the day. Analyse the graph and answer the following questions:



13. At what time were the price of the shares maximum?
   (a) 10 AM (b) 12 PM
   (c) 2 PM (d) 4 PM

14. Which share had the highest percentage increase in the price at the end of the day?
   (a) A (b) B
   (c) C
   (d) Cannot be determined

15. At what time, there was the highest increase in the price of the shares?
   (a) 10 AM (b) 12 PM
   (c) 2 PM (d) 4 PM

16. Find the ratio of percentage increase of price of Share A at 2:00 PM to that of percentage increase of Price C at 12:00 PM.
   (a) 13 : 12 (b) 2 : 5
   (c) 12 : 13 (d) 3 : 5

Directions for questions 17 to 19: Go through the table about prices of different two-wheelers in India given below and answer the questions that follow.

Year	Splender	Kakasaki	Charisma	Merser
2001	42,000	34,300	78,000	50,000
2002	42,300	34,600	79,800	50,100
2003	42,600	34,500	80,000	50,200
2004	44,100	34,800	81,800	50,400
2005	44,200	34,900	82,000	50,800
2006	44,200	35,000	81,300	50,900
2007	45,000	35,200	82,300	51,000
2008	45,000	35,300	82,800	51,200
2009	45,500	35,500	82,600	51,400
2010	45,800	35,500	83,500	51,500

17. How many times across these years, there was a decrease in the price of any of the two wheelers?
   (a) 1 (b) 2

(c) 3 (d) 4

18. In which of the following cases, percentage increase in price was maximum?
(a) Splender in 2004
(b) Charisma in 2002
(c) Charisma in 2004
(d) Charisma in 2010

19. In which of the following cases percentage decrease in price is minimum?
(a) Kakasaki in 2003
(b) Charisma in 2006
(c) Charisma in 2009
(d) Splender in 2008

Directions for questions 20 to 21: Sales for these four two wheelers company in the year 2010 was as follows

Two wheeler	Sales in year 2010
Splender	40,000
Kakasaki	60,000
Charisma	25,000
Merser	35,000

And moreover sales of all of these two wheelers increased at a rate of 10 % per annum.

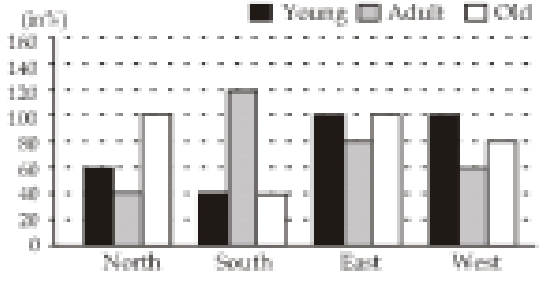
20. Which of these two wheelers accounted for maximum revenue for the year 2008?
(a) Splender (b) Kakasaki
(c) Charisma (d) Merser

21. If cost of production per two-wheeler of Charisma was 20% higher than that of splender then find by how much per cent, profit percentage of Charisma is higher than that of Splender.
(a) 10 (b) 20
(c) 30 (d) Cannot be determined

Directions 22 to 25: Answer the questions on the basis of the following Charts.

Some population and health

Regionwise population growth rates in three demographic segments for the century 1901-2001



Population segment	Population in 1901 (in million)	Per Capita expenditure on health in 1901 (in Rs.)	Percentage growth in per capita health expenditure during the century
Young	5	20	100
Adult	6	15	60
Old	4	25	80

Percentage of regional distribution of population in 1901

Population Segment	Region North	South	East	West
Young	30	20	20	30
Adult	20	30	30	20
Old	20	20	30	30

22. What is government's health bill on account of old people in the North in 2001, in rupees million?
(a) 36 (b) 72
(c) 108 (d) Indeterminate

23. In 2001, the adult population in the northern region is:
(a) 1.52 m (b) 7.2 m
(c) 8.4 m (d) 1.68 m

24. What is the government's health expenditure, in rupees million, on young people in the south in 2001?
(a) 48 (b) 51
(c) 56 (d) Cannot say

25. The population of old people in 2001, expressed in millions, is approximately:
(a) 7.3 (b) 7.8
(c) 8 (d) Cannot say

Test - 7

Directions for questions 1 to 5: Following table gives a detailed analysis of Quantity of different crops produced as well as the area utilized for the production of the same. Go through the table and answer the questions that follow.

	Quantity produced (in '000 tons)			Area under cultivation (in '000 Hectare)		
	2008	2009	2010	2008	2009	2010
Rice	108	110	115	153	165	163
Wheat	5023	5865	5789	2897	3451	3258
Jowar	598	568	621	720	758	884
Bajra	4800	4853	4963	2859	3008	3106
Soya-bean	744	759	763	856	890	902
Sun-flower	475	485	496	3256	3589	3698
Maize	1004	1008	1125	1562	1625	1826

Some Definitions:

- Productivity is defined as number of tons of production per unit area.
- Cost of any crop is inversely related to its productivity.
- A crop is said to be dying if its productivity decreases every year.

1. By how much percentage productivity of Wheat is more than the productivity of Rice in year 2010?
   (a) 145 % (b) 152 %
   (c) 161 % (d) 168 %

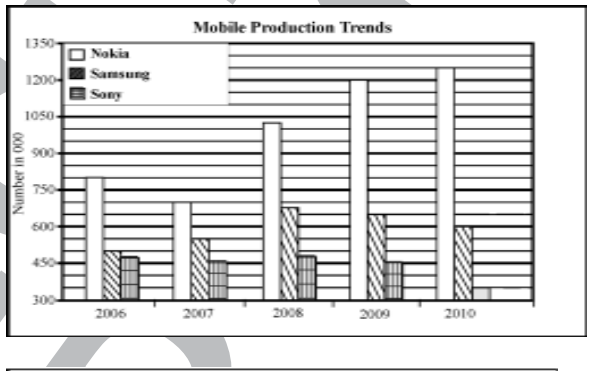
2. Which of the following can be termed as dying crop during these three years?
   (a) Bajra (b) Soya bean
   (c) Maize
   (d) All except Rice and Wheat

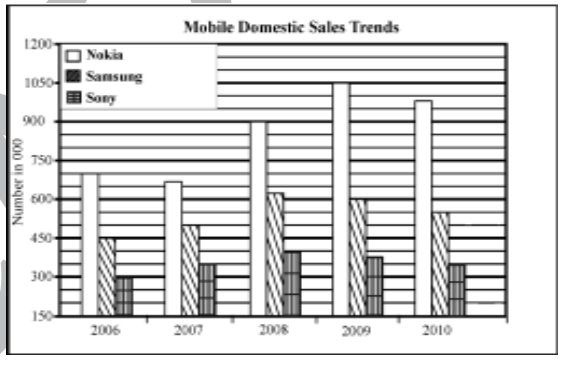
3. Which of the following should be the costliest crop during these three years?
   (a) Rice (b) Soya bean
   (c) Sunflower (d) Maize

4. Which of the crops (given in the table) should be least costly across all the years?
   (a) Rice (b) Bajra
   (c) Wheat
   (d) Cannot be determined

5. By what percentage, average production of wheat is more than average production of Bajra across all the given years?
   (a) 10% (b) 14 %
   (c) 18 % (d) 24%

Directions for questions 6 to 10: Following graphs represents the mobile production and domestic sales of different mobiles for different years. Difference between production and sales of any mobile is because of exports. There is no unsold mobile in any given year, either mobiles were sold in domestic market or were exported. Assume these are the only three mobile producers in India.





6. By how much percentage, percentage domestic sales (as a percentage of production) of Nokia more than that of Sony across all the given years?
   (a) 5 (b) 7
   (c) 10 (d) 12

7. During the given years, what was the share of Nokia in the complete Indian Market in terms of numbers?
   (a) 4000 (b) 4300
   (c) 4500 (d) 4700

8. What is the annual percentage increase in the net sales of mobiles in India from 2006 to 2010?
   (a) 7.32 (b) 5.89
   (c) 6.35 (d) 9.25

9. If average price of a Nokia mobile is Rs. 4,300 and that of Sony is Rs 5,200. Then by how much percentage revenues generated

by Nokia is more that the revenue generated by Sony in the year 2009?
(a) 150% (b) 120%
(c) 130% (d) 210%

10. Which of the given years have seen the maximum percentage increase in ratio of export to domestic sales of total mobile?
(a) 2007 (b) 2008
(c) 2009 (d) 2010

Directions for question 11 and 12: In company nutandbolt corporation, company produces nuts and bolts which are being sold in the market. Company has a total of 10 machines, 5 of which produce nuts and 5 of these produce bolts. Capacity of these machines is given to you and percentage utilization is also given in the following table. Go through the table and answer the questions that follow.

Certain things which go without saying:
1. Number of nuts produced should be equal to number of bolts produced as one cannot sell either of the two alone.
2. Production of the company has to be as per the requirement and estimates of the company sales.

Machines producing Nuts			Machines producing Bolts		
Name of the Machine	Production	Percentage utilization of the Machine	Name	Production	Percentage utilization
N1	20,000	50%	B1	40,000	70%
N2	30,000	40%	B2	50,000	30%
N3	50,000	40%	B3	20,000	35%
N4	20,000	70%	B4	15,000	40%
N5	10,000	40%	B5	5,000	80%

11. If over and above the existing requirement, there is a bulk order of additional requirement of 50,000 nuts and bolts, what is the minimum number of machines whose capacity utilization needs to be increased to satisfy the additional need?
(a) 1 (b) 2
(c) 3 (d) 4

12. One fine day, Management decided to go on cost cutting mode and decided to sell certain number of machines. What can be the maximum number of machines that can be sold out? Assume that company want that total production of the company should not be more than 25% more than the current need.
(a) 4 (b) 5
(c) 3 (d) 2

Directions for question 13 and 14: Following table gives a break up of number of boys and girls with different specializations in a B-School. A student can take as many specializations as possible and total number of students is 150.

Specialization	Marketing	Finance	Operations	HR
Number of Boys	40	60	70	20
Number of Girls	20	60	30	40

13. What can be minimum number of students with all four specializations?
(a) 0 (b) 15
(c) 20 (d) 40

14. What can be the maximum number of students with exactly 3 specializations?
(a) 95 (b) 100
(c) 120 (d) 150

Direction for Question 15 to 17: Study the following table carefully and answer the questions that follow:
The table gives the half yearly sales report of defferent items of a shop.

	Teddy		Photo frame		Wind chime	
Month	No.	Amt.	No.	Amt.	No.	Amt.
July	372	223	114	724	22	660
Aug	467	280	171	1060	38	1856
Sep	2422	1914	169	1048	28	840
Oct	516	310	213	1193	126	3780
Nov	398	239	147	823	49	1568
Dec	419	251	182	1132	37	1184

15. In which month is the total sales the highest?
(a) September (b) December
(c) July (d) October

16. In which month was the sales was minimum?
(a) August (b) November
(c) December (d) July

17. By approximately how much precent is then sales of Teddy in September more than the lowest sales of Wind chimse?
(a) 400% (b) 200%
(c) 100% (d) 50%

Directions for question no. 18 to 22 on the basis of the data given below.

Area/Month		Jan	Feb	Mar
Sales in Bistupur				
	Television	900	1050	1200
	i-pods	15750	16800	7850
Sales in Sakchi				
	Television	1800	2100	2400
	i-pods	9450	10080	10710
Sales in Kadma				
	Television	6300	7350	8400
	i-pods	6300	6720	7140
Units ordered = Units Sold + Ending Inventory -Beginning Inventory				

All sales figure are in Rupees thousands
All other things are constant
All Rupees figures are in thousands.

18. In the period from January to March, Jamshedpur Electronics sold 3150 units of Television, having started with a beginning inventory of 2520 units and ending with an inventory of 2880. What was the value of order placed (Rupees in thousands) by Jamshedpur Electronics during the three months period? [Profits are 25% of cost price, uniformly.]
(a) 2808 (b) 26325
(c) 22320 (d) 25200

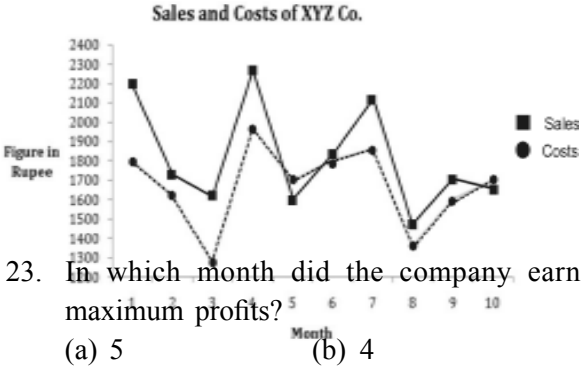
19. What was the total value of surcharge paid - at the rate of 14% of sales value - by Jamshedpur Electronics, over the period of 3 months?
(a) 18522 (b) 18548
(c) 18425 (d) 18485

20. 10% of sales price of i-Pods and 20% of sales price of Television contribute to the profits of Jamshedpur Electronics. How much profit did the company earn in the month of January from Bistupur and Kadma from the two products?
(a) 513 (b) 4410
(c) 3645 (d) 5230

21. In the period from January to March, consider that Jamshedpur Electronics ordered 7560 units of i-Pods for all three areas put together. What was unit sales price of i-Pod during the period? The ending inventory was 6120 units and the beginning inventory stood at 5760.
(a) 16.9 (b) 14.65
(c) 14.80 (d) 13.00

22. For Jamshedpur Electronics Beginning inventory was 720 for Televisions and 1800 for i-Pods and Ending inventory was 840 for Televisions and 1920 for i-Pods in the month of January. How many units of Televisions and i-Pods did Jamshedpur Electronics order for the month of January? Additional Data: In the month of February, 1050 units of Television and 2400 units IPods were sold in all three areas put together.
(a) 1020, 2270 (b) 1020, 2370
(c) 2270, 1030 (d) 1030, 2370

Directions for questions 23 to 25: On the basis of the graph given below answer the questions.



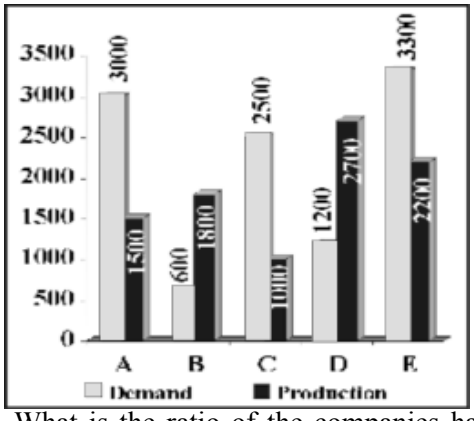
23. In which month did the company earn maximum profits?
(a) 5 (b) 4
(c) 1 (d) 2

24. In which month did the company witness maximum sales growth?
(a) 4 (b) 6
(c) 7 (d) 1

25. What were the average sales and costs of figures for XYZ Co. over the period of ten months?
(a) 1819, 1651 (b) 1919, 1751
(c) 1969, 1762 (d) 1719, 1601

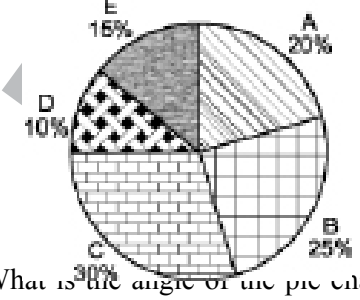
Test - 8

Directions for questions 1 to 4: These questions are based on the graph, which shows the Demand and Production statistics of five companies.



1. What is the ratio of the companies having more demand than production to those having more production than demand?
   (a) 2 : 3 (b) 4 : 1
   (c) 2 : 2 (d) 3 : 2
2. What is the difference between average demand and average production of five companies taken together?
   (a) 1400 (b) 400
   (c) 280 (d) 138
3. The production of Company D is how many times that of the production of the company A?
   (a) 1.8 (b) 1.5
   (c) 2.5 (d) 1.11
4. If company A desires to meet the demand by procuring TV sets from a single company, which one of the following can meet the need adequately?
   (a) B (b) C
   (c) D (d) None

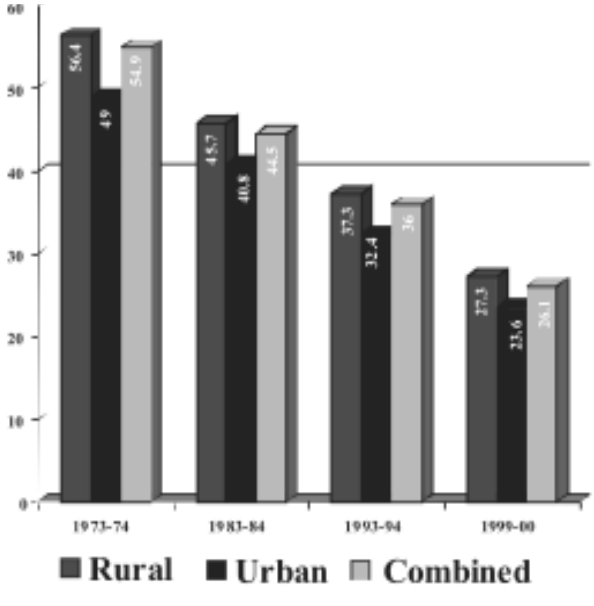
Directions for questions 5 to 8: In the chart given below, A, B, C, D, E represent costs of Paper, Printing, Binding, Miscellaneous and Royalty respectively in publishing a book.



5. What is the angle of the pie chart showing the expenditure incurred on Royalty?
   (a) 27° (b) 15°
   (c) 30° (d) 54°
6. The marked price of the book is 20% more than the CP. If the marked price of the book is Rs 30, what is the cost of the paper in a single copy of book?
   (a) Rs 6 (b) Rs 5
   (c) Rs 4.5 (d) Rs 6.50
7. Which two expenditures together will form an angle of 108° at the centre of the diagram?
   (a) A and E (b) B and E
   (c) A and D (d) D and E
8. If the differences between two expenditures be represented by 18 degree in the diagram, these expenditures are:
   (a) B and E (b) A and C
   (c) B and D (d) None of these

Directions for questions 9 and 10: The bar graph below pertains to estimates of incidence of poverty in India given as percentage. The accompanying table gives population of India during 1971-2001 as per census.

9. What is the combined population of poverty



Year	1971	1981	1991	2001
All India population (in thousands)	548160	684329	846302	1027015

in 2001?
(a) 268 millions (b) 278 millions
(c) 242 millions (d) 300 millions

10. From the given data it can be inferred that:
(a) Rural poverty ratio is constantly declining.
(b) Urban poverty ratio has been consistently falling.
(c) Combined ratio has been decreasing.
(d) All the above.

Directions for questions 11 to 15: Study the data given below and answer the questions that follow.

Number of Units of TVs Sold

	1995	1996	1997	1998	1999
LG	30,000	38,000	36,000	42,000	40,000
Samsung	17,000	28,000	33,000	32,000	27,000
Sony	12,500	20,000	35,000	40,000	50,000
National Panasonic	30,000	25,000	22,000	20,000	15,000
Toshiba	15,725	18,625	13,275	14,375	16,000

the highest?
(a) LG (b) Sony
(c) National Panasonic (d) Toshiba

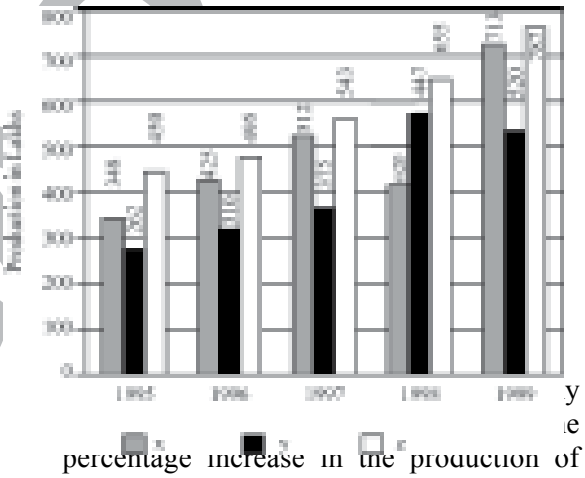
12. Which of the following statements is/are true?
(I) LG is showing an increase in sales every year.
(II) Samsung has recorded a fall in sales thrice during the given five year period.
(III) The percentage increase in the number of units sold from 1995 to 1999 is the highest for Sony.
(IV) The average annual sale of Samsung is more than that of Sony.
(a) (III) alone (b) (I) and (II)
(c) (III) and (IV) (d) (III) and (II)

13. The installed capacity of each company is 75,000 units, and all the units produced by each company are sold. Then, the least and the highest values for annual capacity utilisation for any company are respectively
(a) 16.67% and 66.67%
(b) 17.5% and 72.5%
(c) 14.28% and 75.5%
(d) 5.24% and 95.34%

14. If for 2000, there is a 25% increase in the total sale of TVs and there is 10% decrease in the sale of Toshiba TVs, what percentage of total sales in 2000 is for Toshiba TVs?
(a) 17% (b) 7.8%
(c) 9.3% (d) 6.3%

15. The brand, which showed a decrease of 50% during the given five-year period, registered maximum percentage decrease during the period
(a) 1995-96 (b) 1996-97
(c) 1997-98 (d) 1998-99

Directions for questions 16 to 20: The following bar chart gives the production of cycles by three different companies X, Y and Z, for five different years. Study the chart and answer the following questions.



y
e
percentage increase in the production of cycles over the previous year's production greater than 20%?
(a) 4 (b) 6
(c) 5 (d) 7

17. The annual percentage increase in the total production of cycles from 1995 to 1999 was
(a) 24.08% (b) 23.12%
(c) 22.64% (d) None of these

18. In 1996, 15% of the rural population and 8% of the urban population used cycle as their mode of transportation. If the total population in 1996 is 1.1 billion, what is the rural population in millions? (Assume one cycle is used by a single person).
(a) 600 (b) 0.6
(c) 500 (d) 0.5

19. If the ratio of the average cost to the customer of each cycle of X, Y and Z is 2:4:3,

then what is the percentage increase in the total revenue of the cycle produced in 1997 to 1999. (Assume the cost of cycle remained the same).

(a) 41.27% (b) 40.53%
(c) 42.64% (d) 38.72%

20. Over the five year period, the percentage increase in production was maximum for
(a) X (b) Y
(c) Z
(d) Cannot be determined

Directions for questions 21 to 25: Study the following table carefully and answer the questions that follow: Number of books of defferent subjects sold by a shopkeeper over the years

Year	**Books**				
	Accounts	Bio	Chem.	Design	Eng.
2002	2000	1500	780	900	650
2003	1500	1800	1000	1050	700
2004	1800	1750	920	1100	850
2005	1950	1600	1200	1250	750
2006	2200	1850	1300	1350	800

21. What was the approximate percentage increase in sales of books of design from 2003 to 2005?
(a) 15% (b) 20%
(c) 10% (d) 13%

22. In the given five years which subject book has maximum sales ?
(a) Design (b) English
(c) Accounting (d) Biology

23. What was the percentage drop in sales of Accounting books from 2002 to 2004 ?
(a) 5% (b) 10%
(c) 15% (d) 20%

24. In the case of which subjects books was there a continuous increase in sales over the years ?
(a) Chemistry (b) Biology
(c) English (d) Design

25. The Sales of English book in 2006 was what percent of sales of Biology books in 2005?
(a) 20% (b) 100%
(c) 33.33% (d) 50%

Test - 9

Direction for Questions 1 to 5: Study the following table carefully and answer the questions that follow:

The monthly Expenditure of 6 departments (In Thousands)

Exp. heads	Mark.	HR	Finc.	IT	Logi.
Salary	12000	6000	21000	9000	12000
Bonus	2400	1200	4500	2400	3000
Overtime	5400	2100	6000	5100	6000
Arrears	6000	5400	12000	4200	7500
Miscellaneous	1200	300	1500	300	1500
Total	27000	15000	45000	21000	30000

1. Which among the following department has minimum ratio of earning in form of arrears to earning in from of salary?
   (a) HR (b) Marketing
   (c) Finance (d) IT
2. Which among the following department earns maximum bonus in comparison to its total income?
   (a) Logistics (b) HR
   (c) Marketing (d) IT
3. Which among the following departments has maximum percentage of its salary head out of the total income ?
   (a) IT (b) HR
   (c) Finance (d) Marketing
4. How many department get their salary less than four times the income from bonus ?
   (a) 5 (b) 3
   (c) 2 (d) 0
5. The earning from overtime is what percent of the earning from arrears in department of Logistics ?
   (a) 11 (b) 33
   (c) 80 (d) None of these

Directions for questions 6 to 10: Table below gives the frequency distribution of the final grades of 100 students in mathematics and Physics. Analyse the data presented to answer these questions.

Physics Grades ↓ Mathematics Grades →

	40-49	50-59	60-69	70-79	80-89	90-99
90-99				4	2	5
80-89			2	3	7	2
70-79			1	7	6	3
60-69	2	5	9	8	5	
50-59	3	3	6	1		
40-49	2	7	7			

6. How many students received grades 80 & above in Mathematics?
   (a) 20 (b) 30
   (c) 23 (d) 25
7. How many students would qualify for admission to a prime Engineering College that stipulates above 80% in Mathematics and Physics?
   (a) 9 (b) 12
   (c) 16 (d) 18
8. The School Trust provides scholarship for higher studies to students who secure 90% and above in Mathematics and Physics. How many students are eligible for scholarship for higher studies?
   (a) 5 (b) 3
   (c) 7 (d) 4
9. What percentage of students got less than 70% in both Mathematics and Physics?
   (a) 44 (b) 43
   (c) 39 (d) 47
10. Pursuing graduation in Science stream requires a minimum of 50 per cent in Mathematics. How many students of this batch are disqualified to pursue graduation in Science?
    (a) 7 (b) 16
    (c) 21 (d) 4

Directions for questions 11 and 12: The table below gives the Human Development Index (HDI). The HDI value is between 0 and 1.

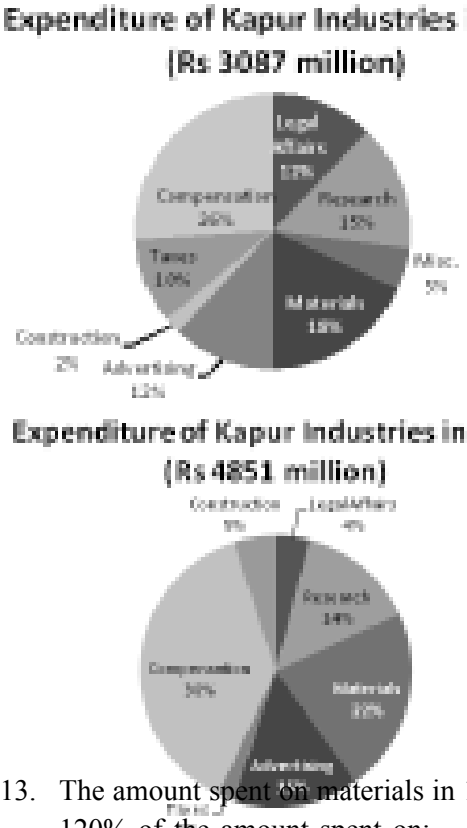
States	1981 Value	1991 Value	2001 Value
Andhra Pradesh	0.298	0.377	0.416
Assam	0.272	0.348	0.386
Bihar	0.237	0.308	0.367
Gujarat	0.360	0.431	0.479
Haryana	0.360	0.443	0.509
Karnataka	0.346	0.412	0.478
Kerala	0.500	0.591	0.638
Madhya Pradesh	0.245	0.328	0.394
Maharashtra	0.363	0.452	0.523
Orissa	0.267	0.345	0.404
Punjab	0.411	0.475	0.537
Rajasthan	0.256	0.347	0.424
Tamil Nadu	0.343	0.466	0.531
Uttar Pradesh	0.255	0.314	0.388
West Bengal	0.305	0.404	0.472
All India	0.302	0.381	0.472

11. Select the incorrect statement.
    (a) Kerala has consistently reported the highest HDI.
    (b) Bihar has consistently reported the worst HDI.
    (c) Assam has maintained stability in its comparative ranking among states.

(d) Rajasthan has shown an improvement in its comparative ranking among other states.

12. Which among the following states improved their HDI value in 2001 to match the all India value?
(a) Tamil Nadu (b) Orissa
(c) Rajasthan (d) West Bengal

Directions for questions 13 to 15: Answer these questions based on the pie chart given below.



13. The amount spent on materials in 1980 was 120% of the amount spent on:
(a) Research in 1980
(b) Advertising in 1990
(c) Compension in 1980
(d) Legal affairs in 1980

14. The fraction of the total expenditures for 1980 and 1990 spent on compensation was about-
(a) $\frac{1}{2}$ (b) 9/20
(c) 3:4 (d) 17:32

15. The amount spent in 1980 for materials, advertising and taxes was about the same as:
(a) The amount spent on research and compensation in 1990.
(b) The amount spent for compensation in 1990.
(c) The amount spent on materials in 1990.
(d) 5/3 of the amount spent on advertising in 1990.

Direction for 16 to 21: Study the table given below and answer the given questions.
Number of Selection in govt. services from different zones of country in different year from chronicle classes

Years	Selected Students				
	East	West	North	South	Central
2006	150	25	50	45	75
2007	225	40	45	62	70
2008	450	65	30	90	73
2009	470	73	32	105	70
2010	500	80	35	132	74
2011	505	75	36	130	75

16. In which year did the total number of Selections (approximately) twice the total number of selections that the had in the year 2006?
(a) 2011 (b) 2010
(c) 2009 (d) 2008

17. In which zone did the number of selections (approximately) remain the same during the years 2006 to 2011?
(a) East (b) West
(c) Central (d) South

18. In which year was the number of selections from east zone less than 50% of the total Selection?
(a) 2006 (b) 2008
(c) 2009 (d) 2010

19. In which of the following years did each zone have a large number of Selections than it had in the immediately preceding year?
(a) 2010 (b) 2009
(c) 2008 (d) 2007

20. In 2006 what is the ratio of slections from East Zone to North Zone?
(a) 1 : 3 (b) 3 : 1
(c) 2 : 1 (d) 1 : 7

21. What is percent increase in selection from East Zone in 2007 from 2006?
(a) 50 % (b) 100 %
(c) 33.33 % (d) 75 %

Directions for questions 22 to 25: Study the following table carefull and answer the questions that follow:

Number of children appeared and qualified in the entrance examination in KG of Five shools over the years (In thousands)

Schools	ASM		Bal Bharal		Child Care		DPS		oxford		Total	
	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.	App.	Qual.
2005	68	15	108	30	50	10	98	25	70	0	394	100
2006	76	14	72	12	45	12	120	30	90	30	403	98
2007	92	20	88	20	60	14	80	15	80	25	400	94
2008	105	25	92	19	70	15	106	18	75	15	448	92
2009	95	22	95	20	65	20	88	12	85	12	428	86
2010	87	19	97	23	80	18	90	15	106	25	460	100

22. In the year 2005, for which of the following schools was the number of children qualified approzimately 25 per cent of the number of candidates appeared in the same year?
    (a) ASM (b) Bal Bharat
    (c) Child Care (d) DPS

23. For in which year in oxford was the percentge of children qualified exactly 25 percent of the number of candidates disqualified in the same year?
    (a) 2002 (b) 2006
    (c) 2008 (d) 2009

24. In which of the following years was the percentge of total number of children qualified to total number of candidates appeared highest among the given years?
    (a) 2002 (b) 2006
    (c) 2008 (d) 2009

25. In which of the following of years was the number of chidren qualified the same?
    (a) 2005 & 2006 (b) 2006 & 2009
    (c) 2007 & 1010 (d) 2007 & 2009

Test - 10

Directions for questions 1 to 3: Use the data in the table given below to answer these questions.

	% of Protein	% of Carbohydrates	% of Fat	Cost per 100 gm
Food A	10	20 30	Rs 1.80	
Food B	20	15 10	Rs 3.00	
Food C	20	10	40	Rs 2.75

1. What will be the cost of purchasing x gram of Food A, y grams of food B, and z grams of Food C?
   (a) Rs (0.3x+1.8y + 2.75z)
   (b) Rs (1.8x + 3z + 2.75y)
   (c) Rs $\left(\frac{.09}{5}x+.03Y+\frac{.11}{4}Z\right)$
   (d) Rs (x+y+z)

2. Which of the following diets would supply the most grams of protein?
   (a) 500 grams of A
   (b) 250 grams of B
   (c) 350 grams of C
   (d) 200 grams of B and 200 grams of C

3. All the following diets would supply at least 75 grams of fat. Which of the diets costs the least?
   (a) 300 grams of A
   (b) 200 grams of C
   (c) 150 grams of A and 100 grams of C
   (d) 500 grams of B and 100 grams of A

Directions for questions 4 to 8: Refer to the following table and answer these questions.

Projected Household Demand for Food in India at 7% Income Growth

Commodity	Annual Household Demand (Million metric tonnes)			
	1990	2000	2010	2020
Food grains	168.3	208.6	266.4	343.0
Milk	48.8	83.8	153.1	271.0
Edible oils	4.3	6.3	9.4	13.0
Vegetables	56.0	80.0	117.2	168.0
Fruits	12.5	22.2	42.9	81.0
Meat, Fish & Eggs	3.4	6.2	12.7	27.0
Sugar	9.6	12.8	17.3	22.0

4. Compared to the food demand in the year 2000, the demand in the year 2020 is expected to be over 4 times in respect of-
   (a) Fruits (b) Meat, Fish and Eggs
   (c) Milk (d) Edible oils

5. The tables show projected food demand at 7 per cent Income Growth. If for some reason, the Income Growth is less than 7 per cent, then which of the following can result in the year 2020?
   (a) The projected demand will, more or less, remain same.
   (b) The demand will decrease.
   (c) The demand may increase due to increased population.
   (d) Cannot say.

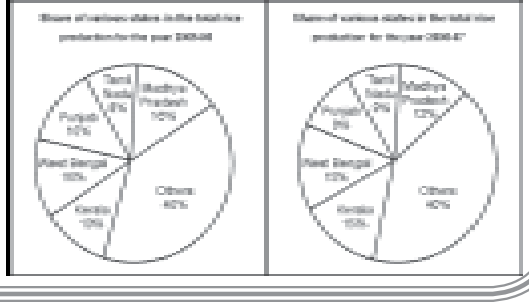
6. Based on the data given in the table, which of the following is most likely?
   (a) There will be more diabetic patients in the year 2020..
   (b) Non-vegetarian population of the country will increase.
   (c) People will tend to become vegetarian in their food habits.
   (d) No definite prediction can be made.

7. In the three decades from 1990 to 2020, the demand increase is three times in the case of-
   (a) Edible oils (b) Vegetables
   (c) Milk (d) Sugar

8. Which of the following group of commodities show a closer similar increased demand for the decade 2000 to 2010?
   (a) Foodgrains and Sugar
   (b) Milk and Edible oil
   (c) Edible oil and Vegetables
   (d) Vegetable and Fruits

Direction for Questions 9 to 13: The questions are based on the pie charts given below:

9. If the Rice production by Karnataka in 2006-07 was 320 thousand tonnes, which was 10% of "others' then what is the total rice production of India in 2005-06? (in thousand tonnes)
   (a) 2000 (b) 8000



(c) 7200 (d) 6000

10. If the ratio of the rice production of Kerala in 2005-06, to that of Punjab in 2005-06 is 80 : 81, then what is precentage change in the total rice production of India from 2005-06 to 2006-07?
    (a) 12.5% (b) 8.25%
    (c) 11.11% (d) Can't be determined

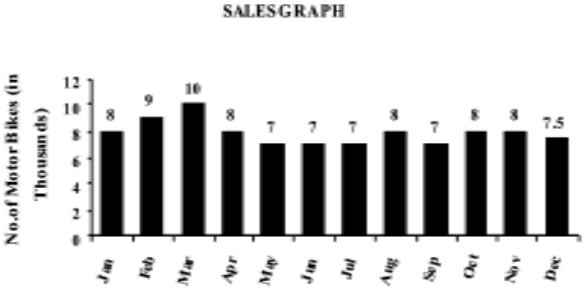
11. Out of the total rice production in 2005-06, 20% was exported and government procured 10% of the remaining. If sent 32 thousand tonnes was send by Punjab for procurement, then how much percentage of total rice procured is from Punjab? Use data given of previous questions.
    (a) 8.5% (b) 4%
    (c) 2.5% (d) 5%

12. If the ratio of production of the total rice and the total wheat in 2005-06 is 8:7 and Madhya Pradesh's share in the total wheat production in that year is 17.5%, then what is the what production in that year of Madhya Pradesh in 2005-06? (Thousand tonnes). Use data of previous questions
    (a) 12.25 (b) 7.6
    (c) 2.2 (d) 9.25

13. It the Production of rice by West Bengal has increased by 10% from 2005-06, then in 2006-07, what is the rice production of Tamil Nadu in 2007-08? Thousand tonnes)
    (a) 825 (b) 480
    (c) 310 (d) Can't be determined

Directions for questions 14 to 20: Study the graph below to answer these questions.

The graph given below depicts the sales of Chinese Motor Bikes in South India. The sales are represented in thousands and monthly sales are plotted on the graph.



(a) January/March (b) April/June
(c) July/September (d) October/December

15. The total sales for the whole year is ..... motor bikes.
    (a) 84,000 (b) 84,500
    (c) 94,000 (d) 94,500

16. Which two quarters of the year have same sales?
    (a) First and Second
    (b) Second and Third
    (c) Third and Fourth
    (d) First and Third

17. Maximum sales were registered in the month of.....
    (a) January (b) February
    (c) March (d) April

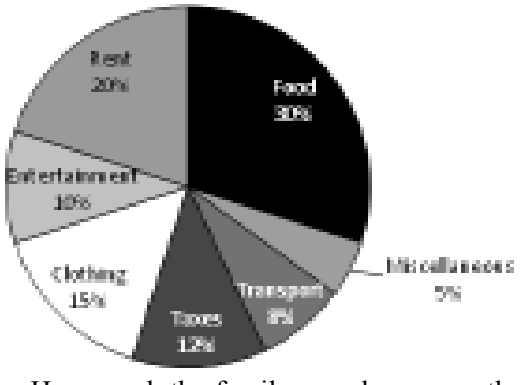
18. Average sales of first quarter is equivalent to sales of which month?
    (a) February (b) March
    (c) April (d) May

19. Maximum drop in sales took place in the month of.....
    (a) December (b) September
    (c) July (d) April

20. The average monthly sales come to approximately.....motor bikes.
    (a) 7,500 (b) 7,800
    (c) 8,000 (d) 8,200

Directions for questions 21 to 25: Refer to the following Pie Chart which shows how a certain family distributes its expenditures and answer the questions.

Expenditures
(Monthly expenditure 9000)



21. How much the family spends per month on taxes
    (a) Rs. 720 (b) Rs. 900
    (c) Rs. 1080 (d) Rs. 1200

22. How many degrees will be there in the central angle showing clothing, taxes and

transportation combined?

(a) 100 (b) 110

(c) 120 (d) 126

23. Due to hike in petrol price, the transport expenditure of the family has increased by 2% which the family wants to make up by reducing the entertainment expenses. In order to maintain the same budget, by how much amount the expenditure on entertainment be reduced per month?

(a) Rs. 108 (b) Rs. 180

(c) Rs. 90 (d) Rs. 200

24. The family has not been spending any amount on clothing for the first nine months of the calendar year. Now it wants to buy new clothes on the occasion of Diwali festival which is on 28th October. What is the maximum amount the family can afford to spend under this head?

(a) About Rs. 12000/-

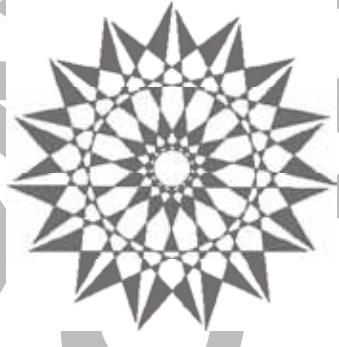
(b) About Rs. 13500/-

(c) About Rs. 14000/-

(d) About Rs. 15000/-

25. Due to a reduction in the taxation rates by 1%, the family finds some surplus money which it wants to give away to charity. Approximately how much amount it may donate for a charitable cause during the year?

(a) Rs. 600/- (b) Rs. 900/-



SOLUTIONS

VEDIC MATHEMATICS

1. 3481
2. 2025
3. 1444
4. 3721
5. 7744
6. 11025
7. 13456
8. 306916
9. 998001
10. 1004004
11. 1018081
12. 98010000
13. 32761
14. 18225
15. 841
16. 997002999
17. 985074875
18. 1018108216
19. 1009027027
20. 912673
21. 1259712
22. 1157625
23. 1191016
24. 804357
25. 5832000
26. 0.7719
27. 0.1003
28. 0.0526
29. 5.7347
30. 0.9715
31. 0.0598
32. 0.2276
33. 0.0105
34. 0.0451
35. 0.1870
36. 257.64
37. 359.125
38. 31013.84
39. 566
40. 700.35

DATA TABLES

1. (a) The production of unit 1 is 1115, the lowest.
2. (b) The production in 2nd quarter is 971, the highest.
3. (c) Growth in production during 1998–2002 for Unit 1 = (80+92+86+82) – (30+40+36+34) = 200
   Unit 2 = 351 – 150 = 201
   Unit 3 = 350 – 156 = 194
4. (b) The production of Unit 2 in 2nd quarter of 2002 is 97.
5. (d) Better education for women and family planning programmes are valid reasons for the decline in the 0–4 age group population. From the data given over 60 age group population is constantly increasing, so better health facilities also seems to be a reason.
6. (a) Required % increase
   $= \frac{58.94 - 54.85}{54.85} \times 100 \approx 8\%$
7. Statement (a) is wrong as population of 04 is declining as per data.
   Statement (c) is wrong as we do not know the percentage of teenagers in age group of 15-59 so we cannot mate conclusion.
   Only statement (b) is correct as population of over 60 years age group is constantly incresing.
8. (d) Required % $= \frac{15+20}{80} \times = 43.75$
9. (c) x $= \frac{15}{4} = 3\frac{3}{4}$

LINE GRAPHS

1. (a) Percentage production of cars out of total production in 2000
$$=\frac{86}{86+42+34}\times 53.08\%$$
You should be able to judge that from the graph also.
2. (b) Total number of automobiles exported in 1999
$$=48,0000\times\frac{12}{100}+60,0000\times\frac{20}{100}+40,0000\times\frac{10}{100}$$
= 57600 + 120000 + 40000 = 217600
3. (b) Required ratio
$$=48,0000\times\frac{28}{100}:60,0000\times\frac{35}{100}:38,0000\times\frac{42}{100}=$$
16: 25: 19
4. (c) Required proportion
= 75 × 30 × 2 : 60 × 40 × 1 : 84 × 25 × 1.5
= 30: 16: 21
5. (a) Percentage of motorbike out of total production of automobiles in 1997
$$=\frac{56}{56+44+40}\times 100=40\%$$
6. (d) Personal profile for Economic is 58.
7. (b) Personal profile for religious is 20, the lowest score among all.
8. (b) In Religious category the range is 20–45, the highest among all categories.
9. (c) From the given graph it is quite clear that personal profil and average female profiles is converging at aesthetic.

BAR CHARTS

1. (c) 2nd & 3rd plan
$$=\frac{7500-4800}{4800}\times 100=56.25$$
4th & 5th plan $=\frac{39303-15902}{15902}\times 100=147.15$
5th & 6th Plan $=\frac{97500-39303}{39303}\times 100=148.07$
6th & 7th plan $=\frac{180000-97500}{97500}\times 100=84.61$
2. (b) Sum of first three plans = 2358 + 4800 + 7500 = 14658
3. (d) as calculated in question (1) we can see that none of the % wise wire increase outlay is equal to % wise increase outlay to sixth to seventh plan.
Note- we do not need to calculate exact values.
4. (d) Total outlay of first five plans
= 2358 + 4800 + 7500 + 15902 + 39303 = 69863
% increase $=\frac{97500-69863}{69863}\times 100=39.5$
$\frac{2358}{180000}\times 100\approx 1.25$
5. (c)
6. Export in 2011 = 15Crores. Export in 2012 = 30 crores
So increase = $\frac{30-15}{15}\times 100\% = 100\%$. hence (d)
7. Sum of Export in 2009 and 2011 = (20 + 15) crores = 35 crores = Export in 2008. hence (b)
8. Rate of change of Export is given by the following:
In 2008: $\frac{35-30}{30}\times 100 = 16\frac{2}{3}\%$
In 2009: $\frac{20-35}{35}\times 100 = 42.86\%$
In 2010: $\frac{25-20}{20}\times 100 = 25\%$
In 2011: $\frac{15-25}{25}\times 100 = 40\%$
In 2012: $\frac{30-15}{15}\times 100 = 100\%$
So, the change is minimum in between 2007 and 2008.
hence (a)
9. Difference in Export in 2008 and 2012 = (35 - 30) crores = 15 crores. Hence (c)
10. As calculated earlier it is clear that 2008 has minimum % change in expoprt is in 2008 Hence (a)

STACKED BAR GRAPHS

1. (a) Australia's exports to Japan, South Asia and Russia = (90 + 70 + 0) thousands = 160 thousands
2. (d) Information is given about only imports and total domestic demand is not given.
3. Money spent on tele calling by company ABC = (75 - 65) % of total = $\frac{10}{100} = \frac{1}{10}$ hence (d)
4. Money spent on moviers by company XYZ =(60 - 40) % fo total = $\frac{20}{100} \times 100{,}000$ = Rs.20000 hence (c)
5. Money spent by ABC on PPC, Mailers & SEO = [30 + (45 - 30) + (90 - 75)] % of total = $\frac{20}{100} \times 300{,}000$
   = Rs. 180000 hence (b)
6. Money spent by ABC on Tele Calling and miscellaneous =[(75 - 65) + (100 - 95)] % = 35 %
   Money spent by XYZ on Tele Calling and miscellaneous = [(85 - 75) + (100 - 95)]% = 15 %
   ∴ Company ABC spends more.
7. Ratio of ABC = $\frac{30}{5}$ = 6:1
   Ratio of XYZ = $\frac{40}{5}$ = 8:1
   hence XYZ has higher ratio Hence (b)
8. Amount spent on PPC = 30 % of 200000 = 60000
   Amout spent on mailers = 15 % of 200000 = 30000
   Total amount = 90000 Hence (b)
9. (d) Because there is no specific data for adult females.
10. (b) Normal weight group had the least accurate perception about their body weight.

PIE CHARTS

1. (b) Number of workers in category S in 1998 $= 2000 \times \frac{24}{100} = 480$
   Number of workers in category S in 2000 $= 2400 \times \frac{20}{100} = 480$
2. (c) Number of workers in category U in 1998 $= 2000 \times \frac{8}{100} = 160$
   Number of workers in category U in 2000 $= 2400 \times \frac{10}{100} = 240$
   Required % $= \frac{240-160}{100} \times 100 = 50\%$
3. (c) No. of workers in 1998:
   U = 160, P = 260, Q = 360, R = 300, S = 480, T = 440
   No. of workers in 2000
   U = 240, P = 264, Q = 600, R = 384, S =480, T = 432
   Required no. = 80 + 4 + 240 + 84 = 408
4. (a) Required no. = (600 + 480) - (160 + 260) = 660
5. (a) External assistance $= \frac{7862 \times 100}{30300} = 25\%$ (approx.)
6. (d) Required angle $= \frac{16846 \times 360}{30300} = 200°$ (approx.).
7. (d) As only maximum limit is known and we don't determine the commission.
8. ∴ The ratio of the total revenue from C and D = (25^0) (2x) : (40^0) (x)
   Where x → average earning from D = 50x = 40x = 5: 4 Hence (d)
9. The ratio of average revenue in E and D is:

$\frac{2x}{115^0}$: $\frac{x}{40^0}$ **where** $\rightarrow$ **total earning from D**

$\frac{2}{23}$: $\frac{1}{8}$ **= 16:23** Hence (a)

10. Let the total no. of revenue providrs be x.

∴the total no. of revenue providrs after increase = $\frac{110x}{100}$

The total no. of revenue providrs egaged in C after increase = $\frac{115}{100} \times \frac{115}{360} \times x$

∴the angle of C in a pie-chart after the increase:

$\left[\frac{\frac{115}{100}\times\frac{115}{360}\times x}{\frac{115}{100}\times x}360^0\right] = \left(\frac{115\times150}{110}\right)^0 = 120^0$ (approx.) Hence (a)

TRIANGULAR GRAPHS

1. (d) No. of persons using buses in
   Surat $= 3000 \times \frac{25}{100} = 750$
   Raisen $= 6000 \times \frac{37.5}{100} = 2250$
   Kanpur $= 4000 \times \frac{12.5}{100} = 500$
   Pune $= 2000 \times \frac{12.5}{100} = 250$
2. (d) Required average
   $$= \frac{2000 \times \frac{75}{100} + 4000 \times \frac{50}{100} + 6000 \times \frac{50}{100} + 8000 \times \frac{20}{100}}{4}$$
   $$= \frac{1500 + 2000 + 3000 + 1600}{4} = 2025$$
3. We do not need to calculate this as on just a look we can see that it is more than bus in every term. Hence option (b).
4. (d) It is clear from the graph that in Pune and Raisen only 12.5% people use cars transport.
5. (b) Except statement 2 all other statements are true.
6. (a) Total no. of people using metro in the three cities = 67500 + 75000 + 31250 = 173750
   Total population of the three cities = 100000 + 125000 + 150000 = 375000 % of Metro users = 46.33%
7. (c) Since, metro users in these three cities is maximum which is clear from the graph of the total population. Hence, Metro is the most popular mode of transportation.
8. (c) No. of people use Car = 25% of A + 25% of C + 50% of B = 25000 + 37500 + 62500 = 125000
9. (a) The least common mode of transportation is bus = 375000 - (173750 + 125000) = 76250
10. (c) Least common mode has
    $\frac{76250}{375000} \times 100 = 20.33$ % of the population and the most common mode has 46.33% of the population. So, difference = 26.
    % difference = $\frac{26}{46.33} \times 100 = 56\%$

WEB GRAPH

1. (a) India won a total of 61 matches followed by Australia winning 60 matches.
2. (b) Pakistan won the least number of matches = 47 followed by Sri-lanka who won 48 matches.
3. (b) In 2008 Sri Lanka won 10 matches out of the 30 matches. Hence, the winning ratio of Sri Lanka is 33.33%
4. (a) The ranking order is:
   (i) India (ii) Australia
   (iii) England (iv) Sri Lanka
   (v) Pakistan
   So. England is the country followed by Sri Lanka in the ranking.
5. (c) If is clear from the graph that in 2009 Pakistan and England both won 25 mathes.
6. (a) The total strength of 1st year batch was 120.
7. (c) The total strength of the college was 448.
8. (b) EC branch has the maximum number of students followed by CS.
9. (c) Mechanical has 70 students overall which is the least.
10. (d) 4th year had the maximum number of students = 130.

NETWORK DIAGRAM

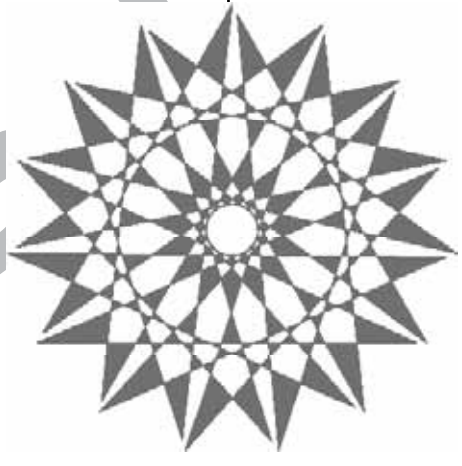
1. (c) There are three ways via city 1, 3 ways via city 2 and 1 way via city 3. So, a total of 7 ways.
2. (b) The shortest route is via A246B which has the length = 3 + 2 + 3 + 2 = 10
3. (c) The longest route is via A147B which has the length = 5 + 5 + 4 + 2 = 16.
4. (d) The shortest route via 7 is any of the above route. The distance of all the three routes is same = 11
5. (d) as all routes are unidirectional so 6 & 7 cannot be visited in one trip
6. (c) There are three routes to city 3. Now, from city 4 there are 4 routes to city B. So, overall there are 12 routes from A to B.
7. (b) The shortest route is via A1347B and A1357B which takes only 19 minutes.
8. (a) The longest route is A2356B which takes 31 minutes.
9. (b) The shortest route via 4 is A1347B, which takes the least time.
10. (a) Shortest time taken if (I) is blocked then. A347B or A357B i.e. 20.

SCATTER DIAGRAM

1. (c) From the graph it is clear that the Coomer's family has the lowest average income.
2. (b) The Bose family has the highest average expenditure.
3. (d) The plot of Dubey family is nearest to the Line indicating equal income and expenditure. Hence, that family has the lowest average savings.
4. (a) The highest amount of Savings occurs to the members of Ahuja family.
5. (d) As only earning members are represented by graphy so we cannot determine total number of members of a family.
6. (b) A's shopping bill was 500×5 + 100×15 + 250×20 + 400×25 = 2500 + 1500 +5000 + 10000 = 19000
7. (c) A's shopping in quantity = 5 + 15 + 20 + 25 = 65
   B's shopping in terms of quantity = 5 + 10 + 20 + 30 = 65
   So, both did the same shopping in terms of quantity.
8. (d) A's bill = 19000. B's bill = 5×200 + 10×100 + 20×400 + 30×300 = 1000 + 1000 + 8000 + 9000 = 19000.
   So, total bill = 19000 + 19000 = 38000
9. (c) Average price = 100+100+200+250+300+400+400+500) /8 = 2250/8 = 281.25
   So, 4 products had the prices more than that of the average price of all the commodities.
10. (b) Required ratio = 5:25=1:5

MIXED GRAPH

1. (c) Growth = 4.0 - 2.6 = 1.4.
   Percentage growth = $\frac{1.4}{2.6}\times 100 = 53.84\%$
2. (d) There will be consecutive growth of 2% for 5 years. Hence the ratio will be 1 : $(1.02)^5$ = 1 : 1.104 = 2 : 2.208.
3. (c) Total coffee imported to EU = 37% and that to India = 8%. So, ratio = 37 : 8.
4. (a) India exported products worth Rs. 3.25 million to US. So, 100% of exports in 1990 = 3.25 million. So, 70% of 17% of Total exports = $\frac{70\times 17\times 3.25}{100\times 100} = 0.38$ million.
5. (b) Total exports done by India in 1995 = 3.7 + 4.75 + 2.5 + 2.6 = 13.55
   Percentage of exports done to EU = $\frac{4.75}{13.55}\times 100 = 35\%$
6. (d) It is a very simple question, see the bar graph first bar says, all occupations females are 38%, thus the males are 62%.
7. (b) You can take the percentages of both i.e. 18.7% & 8.7%, the difference in them is 10%, now you can find the 10% of the total value i.e. 4415000 = 4415000 × 10/100 = 441500.
8. (d) See from the table given, the median annual salary for males are 12,390 and for females are 9093. Now males are 12390 - 9297 ≃ 3300. It is what per cent of female i.e. 100 × 3300/9090 =35%
9. (b) Find the product of professional percentage given and their percentage given in the bar i.e. 17.6 × 41.7 = 734. Now do the same for the other category i.e. 17.9 × 17.4 ; =311. Calculate the difference, which comes out to be 423 i.e. 4.25%. Now 4.25% of 4415000 is ≃185000 (approx) i.e. 2nd option is the answer.
10. (d) I is true from the bar graph only. II & III can be checked by applying the same method as we did in the last question and they both are also true, hence 4th option.



ANSWER KEYS

Test-1

1.	(a)	6.	(c)	11.	(d)	16.	(d)	21.	(c)
2.	(c)	7.	(a)	12.	(b)	17.	(d)	22.	(c)
3.	(b)	8.	(d)	13.	(c)	18.	(b)	23.	(d)
4.	(d)	9.	(b)	14.	(b)	19.	(d)	24.	(d)
5.	(c)	10.	(d)	15.	(b)	20.	(a)	25.	(d)

Test - 2

1.	(c)	6.	(d)	11.	(b)	16.	(c)	22.	(d)
2.	(b)	7.	(d)	12.	(a)	17.	(d)	23.	(c)
3.	(d)	8.	(d)	13.	(a)	18.	(d)	24.	(d)
4.	(c)	9.	(d)	14.	(b)	19.	(b)	25.	(b)
5.	(b)	10.	(b)	15.	(c)	20.	(c)		
						21.	(a)		

Test - 3

1.	(b)	7.	(b)	12.	(a)	17.	(b)	22.	(c)
2.	(b)	8.	(b)	13.	(d)	18.	(a)	23.	(d)
3.	(c)	9.	(c)	14.	(c)	19.	(c)	24.	(c)
4.	(c)	10.	(a)	15.	(c)	20.	(c)	25.	(d)
5.	(b)	11.	(b)	16.	(b)	21.	(c)		
6.	(a)								

Test - 4

1.	(c)	7.	(c)	13.	(a)	19.	(b)	24.	(d)
2.	(a)	8.	(c)	14.	(b)	20.	(a)	25.	(d)
3.	(d)	9.	(a)	15.	(c)	21.	(c)		
4.	(d)	10.	(c)	16.	(b)	22.	(b)		
5.	(a)	11.	(b)	17.	(a)	23.	(c)		
6.	(b)	12.	(d)	18.	(b)				

Test - 5

1.	(b)	7.	(d)	12.	(d)	18.	(c)	24.	(a)
2.	(b)	8.	(c)	13.	(c)	19.	(b)	25.	(b)
3.	(a)	9.	(b)	14.	(d)	20.	(b)		
4.	(c)	10.	(a)	15.	(a)	21.	(c)		
5.	(a)	11.	(b)	16.	(b)	22.	(b)		
6.	(d)			17.	(a)	23.	(b)		

Test - 6

1.	(b)	6.	(b)	11.	(b)	16.	(c)	21.	(e)
2.	(d)	7.	(b)	12.	(b)	17.	(d)	22.	(b)
3.	(a)	8.	(d)	13.	(c)	18.	(a)	23.	(d)
4.	(b)	9.	(b)	14.	(b)	19.	(d)	24.	(c)
5.	(b)	10.	(b)	15.	(b)	20.	(b)	25.	(a)

Test - 7

1.	(b)	6.	(b)	12.	(b)	17.	(b)	23.	(c)
2.	(d)	7.	(b)	13.	(a)	18.	(d)	24.	(a)
3.	(c)	8.	(a)	14.	(b)	19.	(a)	25.	(a)
4.	(c)	9.	(c)	15.	(d)	20.	(c)		
5.	(b)	10.	(d)	16.	(d)	21.	(a)		
		11.	(b)			22.	(b)		

Test - 8

1.	(d)	6.	(b)	11.	(d)	17.	(a)	22.	(c)
2.	(c)	7.	(c)	12.	(c)	18.	(a)	23.	(b)
3.	(a)	8.	(d)	13.	(a)	19.	(a)	24.	(d)
4.	(c)	9.	(a)	14.	(a)	20.	(b)	25.	(c)
5.	(d)	10.	(c)	15.	(a)	21.	(b)		
				16.	(d)				

Test - 9

1.	(d)	6.	(b)	11.	(c)	16.	(d)	21.	(a)
2.	(d)	7.	(c)	12.	(d)	17.	(c)	22.	(d)
3.	(a)	8.	(a)	13.	(a)	18.	(a)	23.	(c)
4.	(c)	9.	(a)	14.	(b)	19.	(a)	24.	(a)
5.	(c)	10.	(a)	15.	(d)	20.	(b)	25.	(d)

Test - 10

1.	(c)	6.	(d)	11.	(d)	17.	(c)	22.	(d)
2.	(d)	7.	(b)	12.	(a)	18.	(a)	23.	(b)
3.	(a)	8.	(c)	13.	(d)	19.	(d)	24.	(b)
4.	(c)	9.	(b)	14.	(a)	20.	(b)	25.	(b)
5.	(d)	10.	(a)	15.	(d)	21.	(c)		
				16.	(b)				

Practice Test Solutions

Test - 1

1. The revenue of company X in 2009 = $1800000 \times 1.12 \times 1.13 \times 1.15 = 2619792$
2. Ratio = $\frac{1200000 \times 1.1 \times 1.18 \times 1.12 \times 1.2}{260000 \times 1.1 \times 1.12 \times 1.18} = \frac{36}{65}$
3. Total revenue in 2006 = 6400000
   Total revenue in 2009 = 9441280
   % increase = $\frac{3041280}{6400000} \times 100 = 47.5\%$
4. The total revenue of Z increased by 97% till 2010 which is the maximum.
5. The maximum inflation is in the month of August 2009. Hence, the prices will be highest in that month.
6. The average rate of inflation for the given period is 8.60%
7. Price after 11.72% inflation = 100 × 1.1172 = Rs. 111.72.
8. April 08 had the highest percentage change in the inflation rate.
9. As India had a higher run rate at the end . So, India scored more runs.
10. As, the graph shows net run rate and not the runs scored per over, hence, it cannot be determined.
11. The maximum no. of runs scored in an over cannot be determined.
12. As, India scored more runs than England, hence, India won the match.
13. On summing the total partnerships, we get that India scored a total of 226 runs.
14. Tendulkar scored a maximum of 4(
15. Tendulkar scored 40 runs and Dhoni
    26 runs. So, Dhoni and Tendulkar scored together a total of 66 runs. % of runs scored by them = $\frac{66}{226} \times 100 = 29.2\%$
16. Tendulkar scored 40 runs and Sehwag scored 30 runs. So, required $\% = \frac{40-30}{30} \times 100 = 33.33\%$
17. Possible routes are-
    A1358B, A135678B, A13567B, A13658B, A13678B, A1367B, A2358B, A23567B, A23678B, A23658B, A23678B, A2367B, A24658B, A24678B, A2467B,
    So total 15 routes are there.
18. The shortest route is A2352B of length 13.
19. The longest route is A13658B, the length of which is 20.
20. When node 3 is closed down due to traffic, then only 3 routes will be left from A to B.
21. The shortest routes will be A124678B, the length of which is 14.
22. The company E had the maximum percentage change in 2010.
23. Since, we don't know that the percentage change is increase or decrease; we can- not say that the prices increased or decreased.
24. Again we don't know about the nature of change. Hence, we cannot say if0 the price of their shares will increase or decrease.
25. The nature of change of price is not known. Hence, cannot be determined.

Test - 2

1. Density is defined as the no. of people living per unit area. The population density of Delicia is 8.94 and the highest.
2. The total population of Mamamia is 223000.
3. Density of Jigaro is 6.73 and that of Mamamia is 6.48. % difference = $\frac{0.25}{6.48}\times100=3.8\%$
4. Male to female ratio is 100 : 123. No. of males in Aplachino $\frac{2000}{223}\times100=$ 8968
5. The total no. of students in school A = 200+300+100+400+300 = 1300
6. 2010 had a total of 700 students and is the maximum.
7. Both 2008 and 2009 had the same difference and was the maximum.
8. The least percentage change was in 2010, $=\frac{100}{400}\times100=25\%$.
9. Since, the expense of the house in 2010 is not known, we cannot calculate the percentage change in the clothing expenditure.
10. The percentage of expense on education in 2009 = 8.33%. Ratio of percentage share of expense on education to that of clothing in 2010 is 5 : 6
11. Expense on Bills in 2009 = 4.16% of 500000 = 20833.333 Overall expense in 2010 = 1.2 × 500000 = 600000 Expense on Bills in 2010 = 10% of 600000 = 60000 % increase = 188%
12. The Rent and Food expenses decreased in 2010 and the rest of the expenses increased in net value in 2010.
13. The combined share of Star Channels is 44% and Zee TV's share is 26%. So, % difference = $\frac{18}{44}\times100=40.9\%$
14. The combined share of SAB TV, Sahara One, 9X and Sony is 21%. The combined share of Star Channels = 44%. Hence, % difference = $\frac{23}{44}\times100=52\%$
15. Total no. of viewers of Star Plus = 40 % of 250000 = 100000 Total Viewership = 250000+20000 = 270000. Share of Star Plus = $\frac{100000}{270000}\times100=37.03\%$
16. Zee TV's share originally = 26 % of 250000 = 65000 Total Viewership = 250000+20000 = 270000
    Zee TV's share = $\frac{65000}{270000}\times100=24\%$
17. The total flow to the node D is 400, D will use 125 litres and pass on the rest 275 litres. The 200 litres will pass through the pipe DG and a minimum of 75 litres will flow through pipe DF. Hence, a maximum slag of 125 liters can be there in pipe DF.
18. The minimum flow can be there if pipe DF has minimum flow. Pipe DF has minimum flow of 75. And by given condition pipe CF has a flow of 170. F uses 150 litres and hence has a flow of 45 litres.
19. If we divert all the flow of pipe GH to other pipelines, we can get a maximum slag of 200 litres in that pipeline. Hence, a maximum slag of 200 is possible.
20. If city B increases its consumption by 20, its capacity will reach 300 litres. So, the slag will increase by 50 litres.
    So, percentage increase in slag $=\frac{50}{150}\times100=33.33\%$
21. It is clear from the graph that the maximum profit percentage is in Radio Station sector.
    Profit % = $\frac{1000}{1000}\times100=100\%$
22. The total net profit comes out to be Rs. 1900 crores
23. A total of 5 sectors made a profit of more than 10% of the Venture. Which are as follows-
    Movies, Radio stations, Petroleum, Power and communications.
24. Life Insurance had the highest Venture to Turnover ratio of 1.333.
25. Total Venture in Retail Stores = 3000 and Total venture done = 17400. Percentage = 17.2%

Test - 3

1. Total routes are as follows- A156B, A1567B, A15476B A1547B, A256B, A267B, A25476B,A2547B, A2456B, A24567B, A2476B, A247B, A3456B, A34567B, A3476B & A347B hence 16 routes are
2. If route 2 to 5 is closed, the 4 possible routes get closed. Hence, a total of 12 routes remain from A to B.
3. The longest route consists of 6 nodes. Hence, a distance of 6 km.
4. A spent 12.5% of 15 hours = 1.87 hours, B spent 50% of 20 = 10 hours and C spent 25% of 30 = 7.5 hours watching movies. So, they all spent 1.8 + 10 + 7.5 = 19.3 hours.
5. A spent 67.5% time in sports, B spent 25% and C spent 37.5% time in sports. So, they all spent the maximum time in Sports.
6. Time spent by C in sports = 37.5% of 30 = 11.25 hours. Time spent by A in watching movies = 1.87 hours. So, C spent = $\frac{11.25-1.87}{11.25}\times 100=\frac{9.38}{11.25}\times 100=83.33\%$ more time in sports.
7. Time taken in reading novel
   By A: 25% × 15 = 3.75 hrs.
   By B: 25% × 20 = 4 hrs
   By C: 37.5% × 30 = 11.25
   Total time = 3.75 + 4 + 11.25 = 19 hrs.
   % time spent by B = $\frac{4}{19}\times 100=21\%$
8. Total time they spent initially = 19.3 hours. Since, A increased his leisure time by 10 hours, so, 12.5% of 10 hours will be increased in watching movies. So, total time they all spent for movies = 19.3 + 1.25 = 20.55 hours.
   % increase = $\frac{1.25}{19.3}\times 100=6.4\%$
9. Tuition fee in 2007 = 30% of 2,00,000 = 60,000. So, tuition fee in 2009 = 80,000. Now, 80,000 is 40% of the total expense. So, total expense = Rs. 2,00,000
10. Tution fee in 2010 = Rs. 90,000 = 35% of total expense. So, total expense = 257000. So, hostel fee = 10% = Rs. 25700
11. Mess fee in 2007 = 25% of 2,00,000 = 50,000. Mess fee in 2010 = 30% of 257000 = Rs. 77100.
    % age increase = $\frac{27100}{50000}\times 100=54\%$
12. From the graph it is clear that the highest percentage increase in the expense is in Books and Uniforms.
13. Both the schools C and F have equal and the highest teacher to school ratio = 0.125
14. The school E has the minimum number of students per classroom = 900/25 = 36.
15. Total students = 500 + 600 + 800 + 400 + 900 + 1200 = 4400. Total benches = 100 + 150 + 200 + 300 + 500 + 400 = 1650. Average number of students per bench = 2.66
16. No. of students per classroom for school A = 50. Total classrooms = 10 + 15 + 20 + 10 + 25 + 20 = 100. Avg. no. of students per class = 44. So, ratio = 50/44 = 25/22
17. Schools B and D are having more than 10 students per teacher and hence are B grade schools.
18. From the graph it is clear that the price of Wheat increased from Rs. 10 to 15 till November, that is an increase of 50% which is the highest.
19. The price of sugar in January was Rs. 12 and that in November was Rs. 15. So, average price = Rs. 13.5
20. The prices were maximum in the month of July. Which is 18+20+30=68
21. Sum of lowest prices in Jan = 10 + 12 + 20 = 32. Sum of highest prices in July = 18 + 20 + 30 = 68. Difference = 36.
22. From the graph it is clear that 2004 had the maximum percentage increase in the profits.
23. As we don't know the investment in 2005, so we cannot say about the return in that year.
24. From the graph it is pretty clear that the maximum percentage decrease in the profits is in 2010.
25. Since, we don't know about the investments made each year, we cannot determine the net profit for that year.

Test - 4

1. On observing the graph properly, we find that Oct 2007 had the lowest unemployment which means that it had the highest Employment.
2. Jan 2011 had the highest unemployment for China.
3. Since, we don't know the number of people for any country. Hence, the exact number cannot be determined.
4. Since, we don't know the number of people for both the countries. Hence, we cannot say that in which/how many months did India have more number of Unemployed people than China.
5. In 4 months the unemployment rate of Russia was less than that of India.
6. Production = Sales - Imports = 200 - 50 = 150
7. For largest expense to production ratio, the expense must be the largest and production the least. In, 2010, the Expense is largest and the ratio of Expense to production is highest.
8. From 2007 to 2009 - Expenses are increasing while sales is decreasing hence 3 years.
9. For least Import to Export ratio, the import must be minimum and comparatively the difference in Export and Import must be highest. In 2006, the ratio is minimum.
10. Only, Mango flavour can satisfy its demand. No other ice-cream flavour can satisfy its demand.
11. All Mango liking students will get their favourite ice-cream. 130, 50 and 120 students liking Vanilla, Butter Scotch and Strawberry respectively will not be able to get their favourite ice-cream. Hence, a total of 300 student will not be able to get thier favourite ice-cream.
12. Since, Strawberry ice-cream bar are not enough to satisfy its own demand then , no other Vanilla student will be able to buy Stawberry ice-cream. Hence, 300 students will not be able to get ice-cream.
13. If 25 Butter Scotch and 30 Vanilla ice-cream bars are imported then 55 more students will get their favourite ice-cream. So, a total of 245 students will be left with no ice-cream. So, 24.5% of students will not be able to get their favourite ice-cream.
14. On summing up the bills of company A, B and C we get that the bill of Company B is the highest.
15. On, summing the total bills of Ramu, Kallu, Billu and Tillu we get that the total bill of Billu was the highest.
16. A mobile bill of Kallu = 250
    C mobile bill of Ramu = 110
    % Difference = $\frac{140}{250}\times 100 = 56\%$
17. Total Change in Bill of Kallu = -50+60 = 15
    % Change = $\frac{15}{620}\times 100 = 2.4$
18. 112 out of 300 Adults liked Drama movies. Hence, $\frac{112}{300}\times 100 = 37.33\%$ of Adults liked Drama movies.
19. Out of 200 men, 112 men liked Action movies. If the remaining 88 liked, Comedy or Romance movies, then at least 44 of the 200 ladies will like Comedy or Romance movies. Hence, at least 22% of the Ladies liked Comedy or Romance movies.
20. % of People liking Comedy = 24
    % of People not liking Drama = 100 - 28 = 72
    Ratio = 24 : 72 = 1 : 3
21. Total no. of people liking action movies = 21% of 400 = 84. Now, 84 people among 500 like Action movies. So, % of People liking Action movies = $\frac{84}{500}\times 100 = 16.8\%$
22. His total pocket-money in May = Rs. 100 + Rs. 40 = Rs. 140
    Total Expenditure in May = 50% of 140 = Rs. 70
    Total Pocket-money in June = Rs. 100 + Rs. 50 = Rs. 150

Total Expenditure = 60% of Rs. 150 = Rs. 90

Total Expenditure = Rs. (70 + 90) = Rs. 160

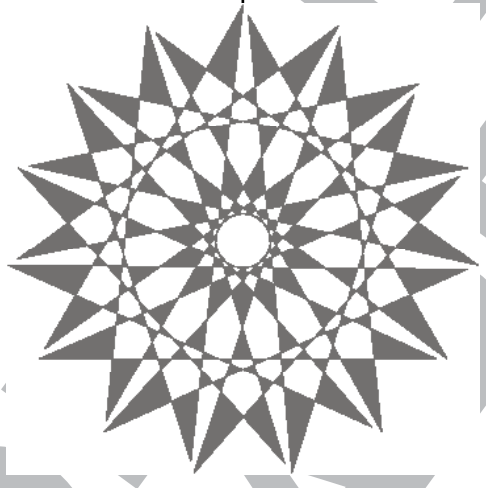
23. Total Savings in April = 25% of Rs. 130 = 52

Total Expenditure in July = 25% of Rs. 160 = 40

Ratio = 52:40=13:10

24. He spent the maximum in November.

25. The slope of the savings graph is steepest in the July month. Hence, the maximum percentage increase in the savings is in the month of July.



Test - 5

1. A total of 13 short leaves were taken.
2. Total 2 persons took more than two short leaves. Ankur & Ankit
3. Anshul worked on Thursday for the maximum time.
4. A total of 7 half days were taken by them altogether.
5. Arvind is the one who has taken only 1 short leave and no half days. So, he should be the one who should be chosen as the employee of the week.
6. Cannot be determined, since the salary of each of them may differ.
7. On summing up the total shares of Amit, Sumit and Vishal we get that the shares of Sumit and Vishal are equal and maximum.
8. Amit has 250 shares of Alpha and Sumit has 150 shares of Theta. Hence, the ratio is 5:3.
9. Among Sumit and Vishal, Sumit has more Theta shares. Hence, total values of shares of Sumit is the maximum.
10. The value of Beta shares is Rs. 5 according to the previous question. So, total value of Beta shares held by Amit = 125 × 5 = Rs. 625
11. Total amount of Shares held by Vishal = 3375 + 1000 = 4375
    Total amount of Shares sold by Amit to Vishal = Rs. 250
    $\%\text{increase in the amount} = \frac{250}{4375} \times 100 = 5.7\%$
12. On summing up the total amounts of each country we get that China donated the highest amount.
13. India donated US $125 which corresponds to Rs. 500. Hence, US $ 1 = Rs. 4. Now, USA donated US $65 in the form of clothes. Hence, USA donated Rs. 280 in the form of clothes.
14. We do not know how much Rupees is equal to US $1. Hence, it cannot be determined.
15. India donated a total of US $375 which is equal to Rs. 825, hence US $ 1 is equal to Rs. 3. Total donation made to Japan = US $ 1605. Total amount is Rs.4815. Now, Rs. 1 = 1.8 Japanese Yen. Hence, total donation = 4815 × 1.8 = 8667 Japanese Yen.
16. US $ 1 = Rs. 3
    Rs. 1 = 1.8 Japanese Yen, Hence, US $ 1 = 3 × 1.8 = 5.4 Japanese Yen.
17. The maximum no. of students were in the first year of the college.
18. Electronics branch had the least no. of students.
19. The no. of students in 3rd year mechanical branch = 35
    The no. of students in 1st year Computer Science branch = 25
    $\%\text{ Difference} = \frac{10}{35} \times 100 = 28\%$
20. Total no. of Mechanical first year students = 24
    Total number of students in the college = 463
    % of 1st year Mechanical students = $\frac{24}{463} \times 100 = 5.1\%$
21. Price of Share A on Monday = 42
    Price of share A on Friday = 90
    $\%\text{ Increase} = \frac{47}{42} \times 100 = 110\%$
22. Change in price of Share B from Monday to Friday = 120 - 104 = 16
    $\%\text{ decrease} = \frac{16}{120} \times 100 = 12\%$
23. Difference between the prices of A and B on Monday = 120-42 = 78
    Difference between the prices of A and B on Friday = 105-89 = 16
    Difference = 78-16 = 62
24. The share A has the highest rise in price. Hence, share A will give maximum percentage return on his investments.
25. The price of share B is highest on Tuesday and decreases till Friday. Hence, a deal on Share B will be worth profit.

Test - 6

1. There is an increase in the Employee Salary in only 2008. Hence, the percentage increase is maximum in 2008.
2. Since, the total expenditure of each year is not known, hence, amount of money spent in Marketing cannot be known.
3. The variation in Miscellaneous is the minium as it varies from 5 to 10 which is the least.
4. Let the expenses of the company in 2006 be Rs. 100
   Total expenses of the company in 2007 = Rs. 110
   Share of Marketing = 30% of 110 = Rs. 33
   Total expenses of the company in 2008 = Rs. 121
   Share of Raw- Materials = 15% of 121 = Rs. 18.15
   Ratio = 33:18.15 = 20 : 11
5. There $= \frac{15}{30} \times 100 = 50\%$ of 15 over 30 in 2000. Hence, the maximum percentage increase is in 2000.
6. The mixed sector company didn't increase from 2000 to 2005. Hence, in 2005 the % increase in mixed sector companies is minimum.
7. The number of private companies in 2000 is 20 and the no. of public sector companies in 2010 is 15. Hence, their ratio is 20 : 15 = 4 : 3
8. The ratio of Private to that of Public sector is highest for 1995 which is equal to 15 : 10 = 3 : 2
9. It is clear from the graph that Russia has the highest import over all the years.
10. China imported only 15% of its goods as textiles. Hence, China imported the least textile goods.
11. China's total import over the years = 5500
    30% of the China's imports was of Cars.
    Hence, China imported Cars of Rs. 1650 Crores over all the years.
12. Maximum import is there in 2000, Also Russia has highest import in 2000 and it is highest importer in agriculture so in 2000 there is a highest import in agriculture goods.
13. On summing up the prices of each of the shares at a time we get that the prices at 2 PM were the highest.
14. The price of Share B increased from 40 to 52, i.e. a rise of 12 over 40 till the end of the day =30%. The rise in other shares at c= $\frac{5}{60} \times 100 = 8.33$ and of A= $\frac{5}{60} \times 100 = 8.33$
    Hence, the maximum percentage increase is of Share B.
15. At 12 PM there was a total increase of 13. At 2 PM there was a total increase of 9 and at 4 PM there was a total increase of 3. Hence, the maximum increase in the prices of shares was at 12PM.
16. Percentage increase in price of Share A at 2 PM = $\frac{2}{26} \times 100 = 7.6\%$
    Percentage increase in price of Share C at 12 PM = $\frac{5}{60} \times 100 = 8.33\%$
    Ratio = 12 : 13
17. Decrease in price kakasaki-2003
    Charisma-2006, 2009 and 2010 hence total 4 times price is decreasing
18. There was a increase of Rs. 1500 over 42600 for Splender in 2004 = 3.5% increase.
    There was a increase of Rs. 1800 over 78000 for Charisma in 2002 = 2.3% increase.
    Hence, the maximum per cent increase in price was of Splender in 2004.
19. Decrease in price of Splender in 2008 is 0. Hence, percentage decrease in price of Splender in 2008 is minimum.
20. Since, there is an even growth rate of each of the two wheeler across the years. Hence, the share of Kakasaki accounted for maximum revenue in 2008.
21. Since, the cost per bike is not known. Hence, profit percentage cannot be de-

termined.

22. No. of old people in 1901 = 4 million.

No. of old people in North = 20% of 4 million = 0.8 million

During the century, it grows by 100% to 1.6 million

In 1901, per capita expenditure on old is Rs. 25

During the century, it grew 80% to Rs. 45.

Government's health bill = 1.6 million × 45 = Rs. 72 million

23. Adult population in North in 1901

= 20% of total adult population = 0.2 × 6 = 1.2 million

Adult population in North in 2001

= 1.2 × 1.4 = 1.68 million (as growth rate = 40%).

24. (c) Young people in South in 1901 = 5 × 0.2 = 1 million

It grew 40% over the century, hence, in 2001, it is 1.4 million.

∴ Government's expenditure = 20 × 2 = Rs. 40

∴ Government's bill = 1.4 × 40 = Rs. 56 million.

25. (a)

Population of old people (in million)

	1901	**2001**
North	0.2 × 4 = 0.8	0.8 × 2 = 1.6
South	0.2 × 4 = 0.8	0.8 × 1.4 = 1.12
East	0.3 × 4 = 1.2	1.2 × 2 = 2.4
West	0.3 × 4 = 1.2	1.2 × 1.8 = 2.16
Total = 1.6 + 1.12 + 2.4 + 2.16 = 7.28		

Test - 7

1. Productivity of Wheat = $\frac{5789}{3258} = 1.77$

   Productivity of Rice = $\frac{115}{163} = 0.70$

   Increase = 1.07

   % increase = $\frac{1.07}{0.7} \times 100 = 152$ %

2. The productivity of all the crops except Wheat and Rice is decreasing. Hence, all the crops except Wheat and Rice are dying.

3. Sunflower's production is much lower than the area it requires for cultivation. Hence, the price of Sunflower is maximum.

4. Wheat's production per unit area is maximum. Hence, wheat's cost should be the least across all the years.

5. Avg. production of Wheat = $5023 + 5865 + 5789 = 16677$

   Avg. production of Bajra = $4800 + 4853 + 4963 = 14616$

   % Difference = $\frac{16677 - 14616}{14616} \times 100 \approx 14$ %

6. Total Production of Nokia = 800 + 700 + 1025 + 1200 + 1250 = 4975

   Total Domestic Sales of Nokia = 700 + 675 + 900 + 1050 + 975 = 4300

   % of Domestic Sales of Nokia = $\frac{4300}{4975} \times 100 = 86.4\%$

   Total Production of Sony = 475 + 450 + 475 + 450 + 350 = 2200

   Total Domestic Sales of Sony = 300 + 350 + 400 + 375 + 350 = 1775

   % of Domestic Sales of Sony = $\frac{1775}{2200} \times 100 = 80.6\%$

   % Difference = $\frac{86.4 - 80.6}{80.6} \times 100 = 7.18\%$

7. Total Domestic Sales of Nokia = 700 + 675 + 900 + 1050 + 975 = 4300

8. Sales in 2006 = 1450

   Sales in 2010 = 1875

   % increase = $\frac{1875 - 1450}{1450} \times 100 = 29.31\%$

   Annual % increase = $\frac{29.31\%}{4} = 7.32\%$

9. Sales of Nokia in 2009 = 1050

   Sales of Sony in 2009 = 375

   Revenue generated by Nokia = 1050 × 4300 = 4515000

   Revenue generated by Sony = 375 × 5200 = 1950000

   % Difference = $\frac{4515000 - 1950000}{1950000} \times 100 = 131\%$

10. The ratio of export to domestic sales in 2009 = 0.135802

    The ratio of export to domestic sales in 2010 = 0.173333

    Hence, the year 2010 has seen the maximum % increase in ratio of exports to domestic sales.

11. The capacity of N_3 when increased to 80% will be enough to produce extra 50,000 Nuts and the capacity of B_2 when increased to 60% will be enough to produce extra 50,000 Bolts.

    Hence, the minimum no. of machines whose capacity needs to be increased is 2.

12. Current production of Nuts = 130,000

    Current Production of Bolts = 130,000

    If Machine N_3 is run on full efficiency then, no. of nuts produced will be = 125,000.

    So, 2 Nut manufacturing machines are enough.

    If Machnie B_2 is run on full efficiency then total production will be more than 125% of current needs. Hence, machine B_2 cannot be used. So, 3 Bolt making machines are required.

    Total no. of machines that can be sold = 5.

13. Total no. of students doing specialization are as follows:

    Marketing - 60; Finance - 120;

Operations - 100; HR - 60
120 students select Finance.
From the remaining 30, 30 select marketing and 30 Select Marketing and Finance.
The 30 who selected Marketing also selected Operations and remaining 70 select Finance and Operations. So, there is no one who selected all the three. So, a minimum of 0 students can be there who selected all 4 the subjects.

14. 120 select Finance.
100 of the same who selected Finance also selected Operations.
60 of 100 who selected Finance and Op- erations also selected Marketing.
40 of the remaining 100 who chose Finance and Operations also select HR.
So, a total of 100 students selected exactly 3 subjects.

15. Total sales in July = Rs. 1607
Total sales in Aug = Rs. 3196
Total sales in Sep = Rs. 3802
Total sales in Oct = Rs. 5283
Hence (d)

16. Lowest sales of Teddy is in July.
Hence (d)

17. Teddy in Sep = Rs. 1914
Lowest Sales of wind chimse = Rs. 660
Rs. 1914 - Rs. 660 = Rs. 1254
$\frac{1254}{660} \times 100 \cong 200\%$
Hence (b)

18. Total Sales of Televisions (in thousands) is Rs.31,500
Total CP = $\frac{31500}{1.25} = 25200$

19. Total Sales by Jamshedpur Electronics (in thousands) = Rs. 132300
Total Surcharge at 14% = 132300 × 14 /100 = 18522

20. Sales of Television in the month of January from Bistupur and Kadma (in thousands) = 900 + 6300 = 7200
Sales of i-Pods in the month of January from Bistupur and Kadma(in thousands) = 15750 + 6300 = 22050
20% of Television and 10% of i-Pods = 1440 + 2205 = Rs. 3645 (in thousands)

21. Total units of i-pod sold = 7560 + 5760 - 6120 = 7200 units.
Total sales is Rs. 122300
Price = Rs. 16.9 (in thousands)

22. Using the additional data given for Feb.
Price of Television = 10500/1050 = 10
Price of i-Pod = 33600 /2400 = 14
No. of units of Television sold in January = 9000/10 = 900
No. of units of i-Pods sold in January = 31500/14 = 2250
No. of units of Television ordered = 900 - (720 - 840) = 1020
No. of units of i-Pods ordered = 2250 - (1800 - 1920) = 2370
Hence, [b]

23. The difference in Sales and costs is maximum in month 1. Hence, the company earned maximum profit in that month.

24. The rise of sales curve is steepest in month 4. Hence, the maximum sales growth is witnessed in month 4.

25. Average sales =(2300+1700+1600+2300+1600+1800+2100+1450+1700+1600)/100
$\frac{18050}{10} = 1805$
As only one option satisfy this sales so we need not to calculate casts.

Test - 8

1. Required ratio = 3 : 2.
2. (c) Average demand = $\frac{3000+600+2500+1200+3300}{5} = 2120$

   Average production = $\frac{1500+1800+1000+2700+2200}{5} = 1840$

   ∴ Required difference = 2120 - 1840 = 280
3. Required proportion = $\frac{2700}{1500} = 1.8$. You can see that the production is more than 1.5 and less than 2; Hence 1.8. No need for actual calculations.
4. Company A has deficit of 1500 and company D has surplus of 1500.
5. Required angle = 15% of 360=54°.
6. (b) C.P. of book = $\frac{30\times100}{120}$ = Rs 25.

   ∴ cost of paper = 20% of 25 = Rs 5
7. 108° is 30% of 360° $\left(\frac{108}{360}\times100=30\right)$

   Here A+D is 30% Hence (C).
8. 18 in pie chart = 5%

   Then, pairs could be A and B, B and C, D and E, A and E.
9. Required number = $\frac{1027.015\times26.1}{100} \approx 268$
10. It is clear from the graph that all the statements correct.
11. Average annual sale

LG	Sony	National Panasonic	Toshiba	Samsung
37,200	31,500	22,400	15,600	274078

   more, more, but at the same time it is 18000 less in 1996 alone. Hence LG.
12. First we check I, II & IV (simple) which are all wrong hence option (A)
13. The least production is 12500 for Sony in 1995

    ∴ Required % = $\frac{12500}{75000}\times100$ = 16.67%

    The highest production is 50,000 for Sony in 1999

    ∴ Required % = $\frac{50000}{75000}\times100$ = 66.67%
14. Total sale of TVs in 2000 = (40000+27000+50000+15000+16000)× 1.25=185000 sale of Toshiba - $16000\times\frac{90}{100}=14400$

    ∴ Required % = $\frac{14400}{185000}\times100 \approx 7.8\%$
15. In 1995-96-% decrease $=\frac{5000}{30000}\times100=16.66\%$

    In 1996-97-% decrease $=\frac{3000}{25000}\times100=120\%$

    In 1997-98-% decrease $=\frac{2000}{22000}\times100=9.09\%$

    In 1998-99-% decrease $=\frac{5000}{20000}\times100=25\%$
16. For x - in 1996, 1997 & 1998 its more than 20%

    For x - 1997,

    For x - 1998 & 1999
17. Total production in 1995 = 348 +262 + 450 = 1060

    Total production in 1999 = 713+520+787=2020

    ∴ Annual % increase = $\frac{(2020-1060)\times100}{1060\times4}$ = 22.64%.
18. Let urban population be x billion and rural y billion.

    Then, x+y = 1.1 - (i)

    Now, $\frac{8x}{100}+\frac{15y}{100}$=123000000

    [425+310+495] = 0.123 billion

    8x+15y = 12.3 billion - (ii)

    From (i) and (ii), y = .5 billion = 500 million.
19. Total cost of 97 = 512× 2 + 375 ×4 + 543× 3 = 4153.

    Total cost of 99 = 713× 2 + 520 × 4 + 787 × 3 = 5867

    ∴ % increase = $\frac{5867-4153}{4153}\times100$ = 41.27%.
20. Percentage increase in production over the five years for,

    company X = $\frac{713-348}{348}\times100$ = 104.88%

company Y = $\frac{520-262}{262} \times 100$ = 98.47%

company Z = $\frac{787-450}{450} \times 100$ = 74.89%.

21. % increase = $\frac{1250-1050}{1050} \times 100 \equiv 20\%$
hence (b)

22. Total Sales for Accounting → 945
Total Sales for Biology → 850
Total Sales for Chemistry → 520
Total Sales for Design → 565
Total sales for English = 375
Hence (c).

23. % drop → $\frac{200}{2000} \times 100 = 10\%$.
Hence (b).

24. Continuous increase is for Design.
Hence (d).

25. Required % age = $\frac{800}{1200} \times 100 = 33.33\%$.
Hence (c).

Test - 9

1. Marketing $\rightarrow \frac{6}{12}$, H R $\rightarrow \frac{5.4}{6}$, Finance $\rightarrow \frac{12}{21}$, IT $\rightarrow \frac{4.2}{9}$
   Lowest is IT.
   Hence (d)
2. Marketing $\rightarrow \frac{24}{270}$, HR $\rightarrow \frac{12}{150}$, Finance $\rightarrow \frac{45}{450}$, IT $\rightarrow \frac{24}{210}$
   Maximum is IT.
   Hence (d)
3. Marketing $\rightarrow \frac{12}{27}$, HR $\rightarrow \frac{6}{15}$, Finance $\rightarrow \frac{21}{45}$, IT $\rightarrow \frac{9}{21}$,
   Maximum is IT.
   Hence (a)
4. Finance & IT Satisfy the given condition.
   Hence (c)
5. Required % age $\rightarrow \frac{6000}{7500} \times 100 = 80\%$.
   Hence (c).
6. Required number of students = 2+7+6+5+2+3 = 30
7. Required number of students = 2 + 5 + 7 + 2 = 16.
8. Required number of students is 5.
9. Required number of students = 2 + 5 + 9 + 3 + 3 + 6 + 2 + 7 + 7 = 44.
10. Required number of students = 2 + 3 +2 = 7.
11. Statement (a), (b) & (d) are correct and only (c) is incorrect
12. West Bangal has improved from 305 to 472 and matched value of all India.
13. Ans: (a) Percentage of amount spent on materials in 1980=18%.
    Percentage of amount spent on research in 1980=15%.
    $\frac{18\times100}{15} = 120\%$
14. The amount spent on compensation in 1980 = $3087 \times \frac{26}{100}$
    Amount spent on compensation in 1990 = $4851 \times \frac{38}{100}$
    $\therefore$ required fraction = $\frac{\frac{3087\times26}{100}}{\frac{4851\times38}{100}} = \frac{45}{100} = \frac{9}{20}$
15. The amount spent for materials, advertising and taxes in 1980 = $3087 \times \frac{(18+12+10)}{100} = 1234.8$
    The amount spent on advertising in 1990 = $4851 \times \frac{15}{100} = 72765$, Now $\frac{5}{3}$ of 727.65= 1213 which is closest to 1234.8 i.e. amount spent on advertising, taxes & material in 1980.
16. 4 Total number of Selection in various years are 2006 $\rightarrow$ 345, 2007 $\rightarrow$ 442, 2008 $\rightarrow$ 708, 2009 $\rightarrow$ 750, 2010 $\rightarrow$ 821,2011 $\rightarrow$ 821
    The Total number of Selections in 2006 = 345
    $\therefore$ The number of Selections in 2008 is twice the number in 2006. hence (d).
17. The number of Selections (approximately) remained the same from central zone.
18. In 2006, the number of Selection from North zone was 150 while the total number of selections was 340. Clearly 150 < 50% of 340.
19. In 2010, Chronicle has given a large number of selecton from each zone than it gave in 2009.
20. Ratio of cst zone to north zone in 2006= $\frac{150}{50}$ = 3:1 hence (b)
21. % increase = $\frac{225-150}{150} \times 100 = 50\%$
    hence (a)
22. Require % for DPS = $\frac{25}{98} \times 100 = 25.5\%$
    Hence (d)
23. Oxford Required % in 2008 $= \frac{15}{75-15} \times 100 = 25\%$. Hence (c)
24. Require % in 2005 $\rightarrow \frac{100}{394} \times 100 = 25.4\%$.
    Require % in 2006 $\rightarrow \frac{98}{403} \times 100 = 24.3\%$.
    Require % in 2008 $\rightarrow \frac{92}{448} \times 100 = 20.53\%$.
    Require % in 2009 $\rightarrow \frac{86}{428} \times 100 = 20.09\%$.
    Hence (a)
25. Human of qualified children for Bal Bharat is same in 2007 & 2009. Hence (d)

Test - 10

1. Cost of x grams of food A = $\left(\frac{1.80}{100}\times x=\frac{.09}{5}x\right)$

   Cost of y grams of food B = $\frac{3}{100}\times y$ = .03y

   Cost of z grams of food C = $\frac{2.75}{100}\times z=\frac{.11}{4}z$

2. Quantity of protein in 500 gms of A = 10% of 500 = 50 gms.
   Quantity of protein in 250 gms of B = 20% of 250 = 50 gms.
   Quantity of protein in 350 gms of C = 20% of 350 = 70 gms.
   Quantity of protein in 200 gms. of B and 200 gms. of C = 20% of 200 + 20% of 200 = 40 + 40 = 80 gms.

3. Cost of 300 grams of A = 1.80 × 3 = Rs 5.40
   Cost of 200 grams of C = 2.75 × 2 = Rs 5.50
   Cost of 150 grams of A and 100 grams of C = Rs 5.45.
   Cost of 500 grams of B and 100 grams of A = 35+1.80 = Rs 16.80.

4. It is clearly given that the table shows milk yield for major countries per head of cattle per year.

5. Since it is not clear whether population projection remark same on.

6. Since the demand for every commodity is increasing, only prediction about increase in population can be made.

7. The demand for vegetables in 1990 was 56 million metric tonnes which is expected to be 168 million metric tonnes in 2020.

8. The demand for edible oils and vegetables from 2000 to 2010 is increased by about 50 percent.

9. Karnataka's Production = 10% of "Others" = 10% of 40%
   4% = 320 thousand tonnes

   $\therefore$ 100% = $\frac{320}{4}\times\frac{10x}{9y}$ 100 thousand tonnes
   = 8000 thousand tonnes
   Hence (b)

10. Assume total production in 2005 -06 is x
    Assume total production in 2006 -07 is y
    10% of x : 9% of y = 80 :81

    $\frac{80}{81}=\frac{8}{9}$

    x = $\frac{y-8/9y}{8/9y}$ y
    So % increase from 'x' to 'y'
    = $\times\frac{1/9y}{8/9y}$ 100
    = $\times\frac{1}{8}$ 100
    = $\times\frac{32}{640}$ 100
    = 12.5%
    Hence (a)

11. Total rice production in India
    = 8000 thousand tonnes
    Total procured by government = 10% of (80% of 8000)
    = 8% of 8000 thousand tonnes
    Punjab's % out of procurement
    = $\times\therefore$ 100
    = 5% (d)

12. Total rice production: Total wheat production
    = 8 : 7
    $\frac{8000}{8}$ total wheat production = $\times\frac{17.5}{100}$ 7 tonnes
    = 7000 thousand tonnes
    M.P.% age=17.5% of total wheat
    = $\times\frac{94,500}{2}$ 7000 thousand tonnes
    = 12.25 thousand tonnes (a)

13. We can find out West Bengal's rice production in 2007-08 but since we do not know the % age shares
    of these in 2007-08, share of Tamil Nadu cannot be found out.
    Hence (d)

14. January to March (8 + 9 + 10)1000 = 27,000
    April to June (8 + 7 + 7)1000 = 22,000
    July to September (7 + 8 + 7)1000 = 22,000
    October to December (8 + 8 + 7.5)1000 = 23,500

15. (d) 27,000 + 22,000 + 22,000 + 23, 500 = 94,500

16. As calculated earlier quarter 2 & 3 have

some sales.

17. It is clear from the graph that maximum sales in March which is 10,000
18. Ang. sales of 1st quarter= $\frac{94,500}{2}$
19. Highest sales is in march so maximum sales drop is in April.
20. $=\frac{12}{100}\times 9000$ = 7875 which is same as Feb
21. Monthly taxes $=\frac{(15+12+8)}{100}\times 360 = 126$

= Rs. 1080

22. Required angle

$9000\times\frac{2}{100}$

23. Increase in expenditure = = Rs. 180.
24. Monthly expenditure on clothing = 15% of 9000 = Rs. 1350
    In ten months = 1350 × 10 = Rs. 13500
25. 1% of 9000 = Rs. 900

ANNEXURE - A

Tables of Squares, Cubes and Reciprocals

Number	Squares	Cubes	Reciprocals
1	1	1	1 = 100%
2	4	8	0.5= 50%
3	9	27	0.333 = 33.33%
4	16	64	0.25 = 25%
5	25	125	0.2 = 20%
6	36	216	0.1667 = 16.67%
7	49	343	0.1428 = 14.28%
8	64	512	0.125 = 12.5%
9	81	729	0.1111 = 11.11%
10	100	1000	0.1 = 10%
11	121	1331	0.0909 = 9.09%
12	144	1728	0.0833 = 8.33%
13	169	2197	0.0769 = 7.69%
14	196	2744	0.0714 = 7.14%
15	225	3375	0.0667 = 6.67%
16	256	4096	0.0625 = 6.25%
17	289	4913	0.0588 = 5.88%
18	324	5832	0.0556 = 5.56%
19	361	6859	0.0526 = 5.26%
20	400	8000	0.05 = 5%
21	441	9261	0.0476 = 4.76%
22	484	10648	0.0454 = 4.54%
23	529	12167	0.0434 = 4.34%
24	576	13824	0.0416 = 4.16%
25	625	15625	0.04 = 4%
26	676	17576	0.0384 = 3.84%
27	729	19683	0.037 = 3.7%
28	784	21952	0.0357 = 3.57%
29	841	24389	0.0344 = 3.44%
30	900	27000	0.0333 = 3.33%

ANNEXURE - B

Multiplication Table - 30 × 30