

DATA INTERPRETATION
&
LOGICAL REASONING

Concept Tests

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Concept Tests

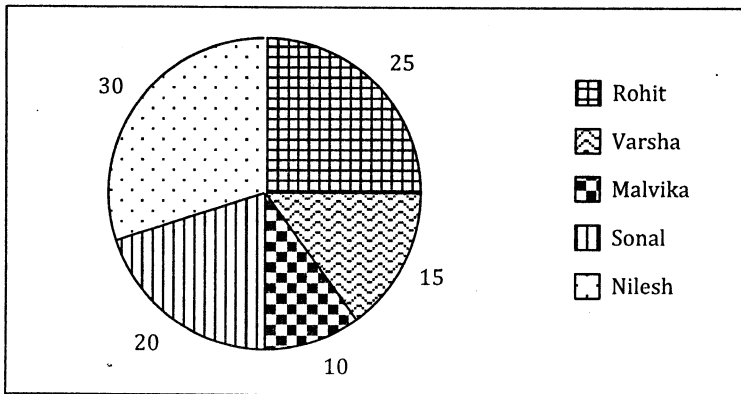
DATA INTERPRETATION AND ANALYSIS

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Rohit, Varsha, Malvika, Sonal and Nilesch are flat mates. They had bought a washing machine, a refrigerator, an air conditioner, a television and a microwave oven.

The following pie chart shows the percentage distribution of the amount of money each person put in to buy the air conditioner.



- If the amount spent on buying the air conditioner is Rs. 25,000, the amount put in by Varsha is what percentage of the amount put in by Nilesch?
(1) 50% (2) 200% (3) 100% (4) 150%
- The amount spent on the refrigerator is 120% of what has been spent on the air conditioner. What is the amount contributed by Sonal on the refrigerator if it is known that her contribution for the refrigerator is 10 percentage points more than her contribution for the air conditioner? Use data from the previous question if required.
(1) Rs. 7,500 (2) Rs. 1,0000 (3) Rs. 6,000 (4) Rs. 9,000
- If the total amount spent in buying all five appliances is Rs. 1,50,000 and the money contributed by each individual for each product is in the same ratio as their contribution for the air conditioner, what total amount was spent by Varsha to buy all the appliances?
(1) Rs. 20,000 (2) Rs. 22,500 (3) Rs. 25,000 (4) Rs. 27,500
- If Malvika had put in Rs. 1,200 to buy the microwave oven and this accounted for 5 percentage points more than her percentage contribution for the air conditioner, what was the cost of the microwave oven?
(1) Rs. 7,500 (2) Rs. 7,200 (3) Rs. 8,400 (4) Rs. 8,000
- Rohit had pitched in $\frac{2}{7}$ th of the amount required to buy the television. How much did Rohit contribute for the television if it is known that the cost of the television is 84% of the cost of the air conditioner? Assume data from the first question of the set.
(1) Rs. 5,400 (2) Rs. 8,400 (3) Rs. 6,000 (4) Rs. 6,300

Instructions for questions 6 to 10: Answer the following questions based on the information given. Study the following table and answer the questions based on it.

The table below shows the yearly expenditure of a company (in Lakh Rupees) over a given period.

Year	Item of Expenditure				
	Salary	Fuel and Transport	Bonus	Interest on Loans	Taxes
1998	288	98	3	23.4	83
1999	342	112	2.52	32.5	108
2000	324	101	3.84	41.6	74
2001	336	133	3.68	36.4	88
2002	420	142	3.96	49.4	98

- What is the average annual interest on loans paid by the company (in Rs. Lakhs) during the period?
 (1) 32.43 (2) 33.72 (3) 34.18 (4) 36.66 (5) None of these
- The total bonus paid by the company during the given period is approximately what percentage of the total salary paid during this period?
 (1) 0.1% (2) 0.5% (3) 1% (4) 1.5% (5) 1.25%
- The total expenditure on all expense heads in 1998 was approximately what percentage of the total expenditure on all expense heads in 2002?
 (1) 62% (2) 66% (3) 69% (4) 71% (5) None of these
- The total expenditure of the company on the given expense heads (in Rs.) during the year 2000 is?
 (1) 544.44 lakhs (2) 201.11 lakhs (3) 446.6 lakhs (4) 478.87 lakhs (5) None of these
- The ratio of the total expenditure on taxes during the given period to the total expenditure on fuel and transport during the given period is approximately?
 (1) 4 : 7 (2) 10 : 13 (3) 15 : 18 (4) 5 : 8 (5) 8 : 5

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

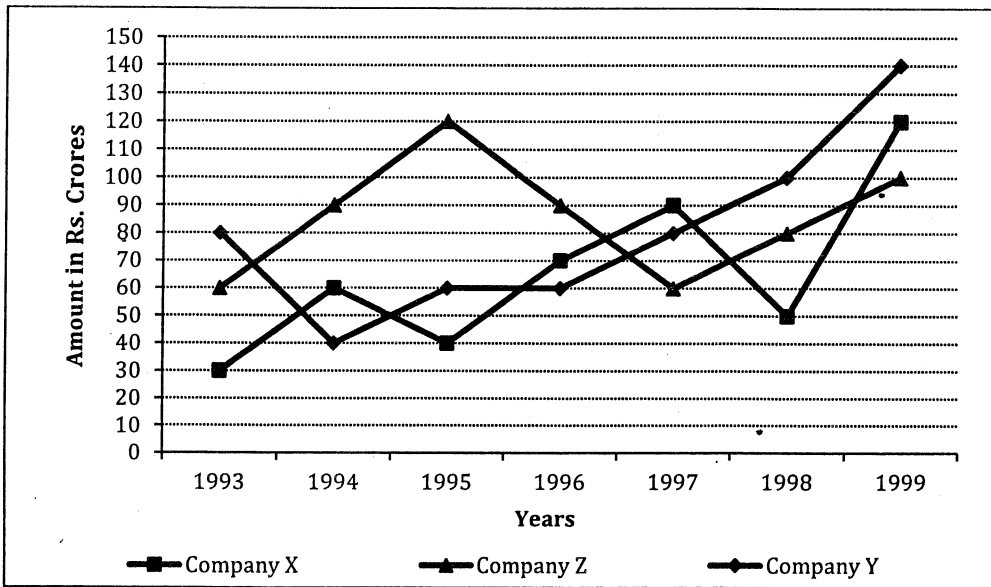
The following table shows the percentage of marks obtained by seven students in six different subjects in an examination. The numbers in brackets denote the maximum marks in each subject.

Student	Subject (Max. Marks)					
	Maths	Chemistry	Physics	Geography	History	Computer Science
	-150	-130	-120	-100	-60	-40
Ayush	90	50	90	60	70	80
Aman	100	80	80	40	80	70
Sajal	90	60	70	70	90	70
Rohit	80	65	80	80	60	60
Muskan	80	65	85	95	50	90
Tanvi	70	75	65	85	40	60
Tarun	65	35	50	77	80	80

- What are the average marks obtained by all the seven students in Physics? (rounded off to two decimals)

- (1) 77.26 (2) 89.14 (3) 91.37 (4) 96.11 (5) 83.45
2. The number of students who scored obtained 60% and more in all the subjects is?
 (1) 1 (2) 2 (3) 3 (4) 4 (5) None
3. What were the total marks obtained by Sajal in all the six subjects?
 (1) 409 (2) 419 (3) 429 (4) 439 (5) 449
4. In which subject is the overall percentage the highest?
 (1) Physics (2) Chemistry (3) Maths (4) History (5) Cannot be determined
5. What is the overall percentage of Tarun?
 (1) 52.5% (2) 55 % (3) 60% (4) 63% (5) 58%

Instructions for questions 6 to 10: Answer the following questions based on the information given. Study the following line graph and answer the questions. The line graph shows the exports of three companies (in Rs. crores) from 1993 to 1999.



6. For which of the following pairs of years are the total exports from the three companies together are equal?
 (1) 1995 and 1998 (2) 1996 and 1998 (3) 1997 and 1999
 (4) 1995 and 1996 (5) None of these
7. Average annual exports during the given period for Company Y are approximately what percent of the average annual exports for Company Z?
 (1) 87.12% (2) 89.64% (3) 91.21% (4) 93.33% (5) 85.67%
8. In which year was the difference between the exports from companies X and Y the least?
 (1) 1994 (2) 1995 (3) 1996 (4) 1997 (5) More than one of the above
9. What was the difference between the average exports of the three companies in 1993 and the average exports of the same companies in 1998?

- (1) 15.33 crores (2) 18.67 crores (3) 20 crores (4) 22.17 crores (5) 17.5 crores

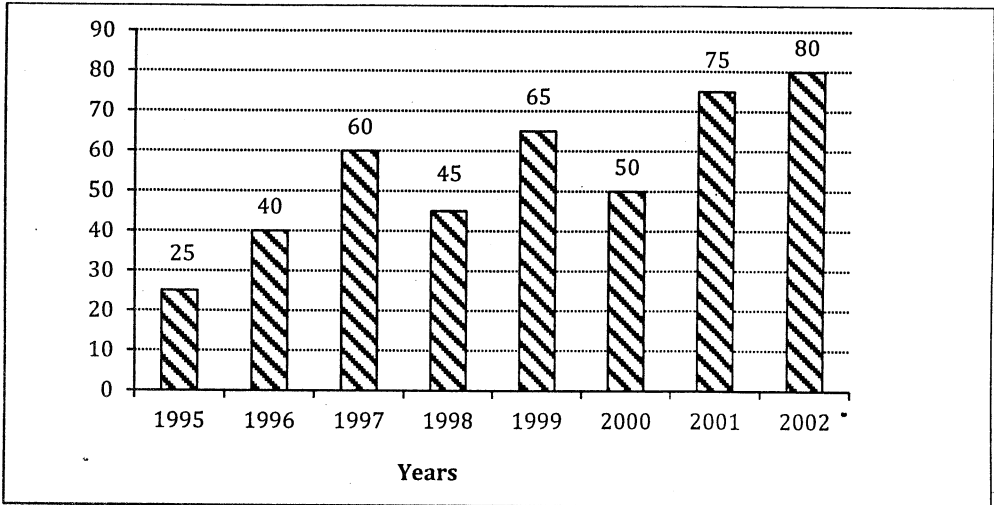
10. In how many of the given years were the exports from company Z more than the average annual exports of company Z?

- (1) 2 (2) 3 (3) 4 (4) 5 (5) 1

CONCEPT TEST III

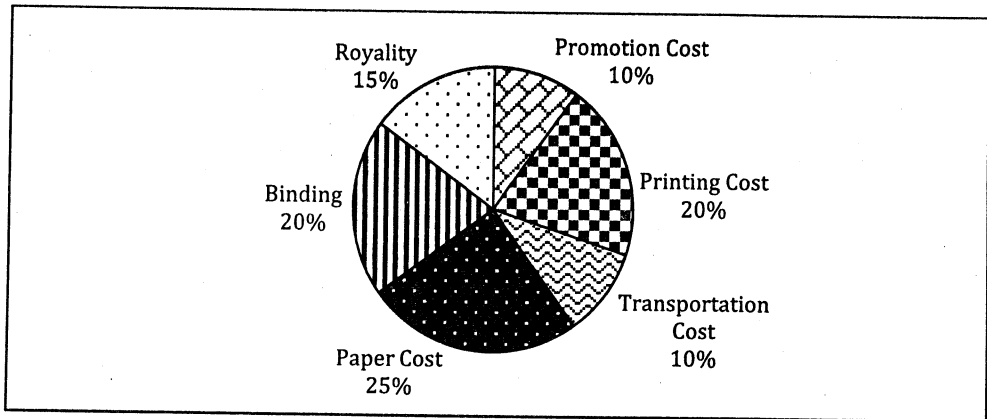
Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the bar chart and answer the question based on it. The bar chart shows the fertilizer production (in '000 tonnes) by a company between 1995 and 2002.



- What was the percentage decline in the production of fertilizers from 1997 to 1998?
 (1) 33.33% (2) 66.67% (3) 20% (4) 25% (5) 21%
- The average production of 1996 and 1997 was exactly equal to the average production of which of the following pairs of years?
 (1) 2000 and 2001 (2) 1999 and 2000 (3) 1998 and 2000
 (4) 1995 and 2001 (5) None of the above
- What was the percentage increase in fertilizer production from 1995 to 2002?
 (1) 320% (2) 300% (3) 220% (4) 200% (5) 270%
- In which year was the percentage increase, in production as compared to the previous year, the maximum?
 (1) 2002 (2) 2001 (3) 1997 (4) 1996 (5) None of these
- In how many of the given years was the production of fertilizers more than the average production over the given period?
 (1) 1 (2) 2 (3) 3 (4) 4 (5) Cannot be determined

Instructions for questions 6 to 10: Answer the following questions based on the information given. The following pie-chart shows the percentage distribution of the expenditure incurred in publishing a book. Study the pie-chart and the answer the questions based on it.

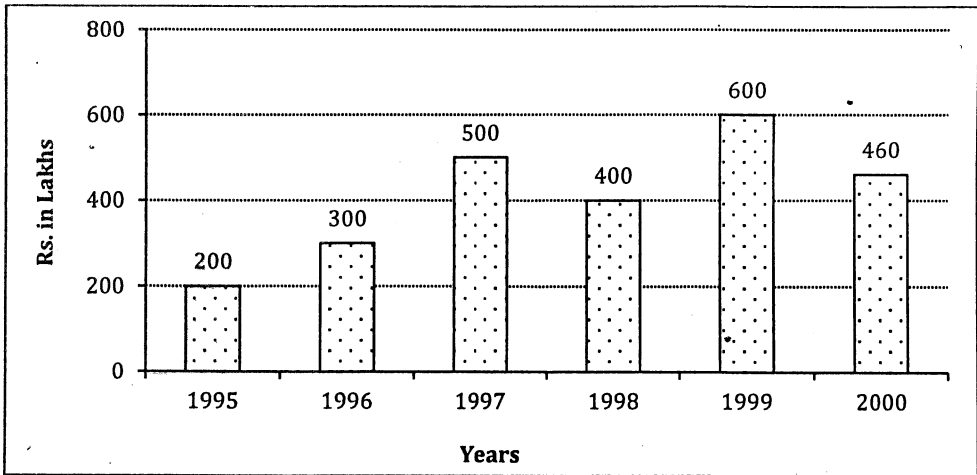
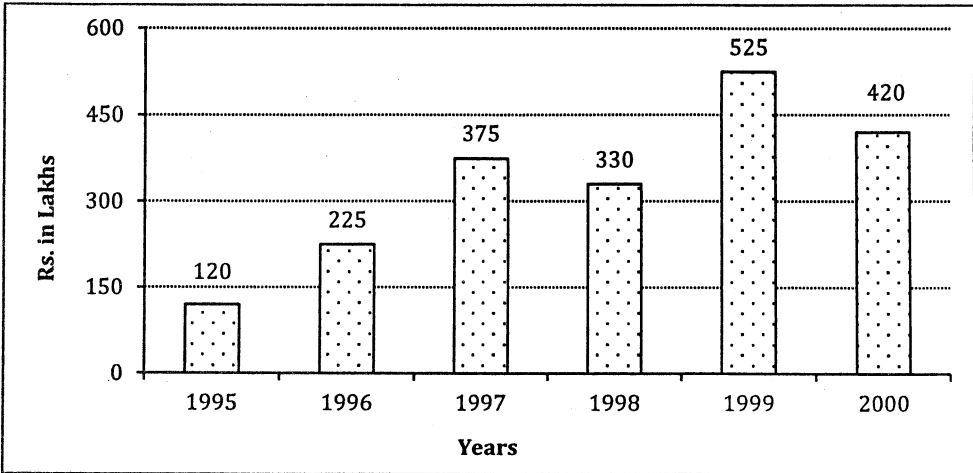


6. If for a certain quantity of books, the publisher has to pay Rs. 30,600 as printing cost, what amount of royalty will have to be paid for the same quantity of books?
 (1) Rs 19,450 (2) Rs 21,200 (3) Rs 22,950 (4) Rs 26,150 (5) Rs 23,580
7. What is the central angle (in degrees) of the sector corresponding to the expenditure incurred on Royalty?
 (1) 15 (2) 24 (3) 54 (4) 36 (5) 48
8. The marked price of a book is 20% more than the cost price. If the marked price of a book is Rs. 180, what is the paper cost of a single book?
 (1) Rs 36 (2) Rs 37.5 (3) Rs 42 (4) Rs 44.25 (5) None of these
9. If 5500 copies are published and the transportation cost on them amounts to Rs. 82,500, then what should be the selling price of the book so that the publisher can earn a profit of 25%?
 (1) Rs 187.5 (2) Rs 191.5 (3) Rs 175 (4) Rs 180 (5) None of these
10. The royalty on a book is less than the printing cost by:
 (1) 5% (2) 33.2% (3) 20% (4) 25% (5) None of these

CONCEPT TEST IV

Instructions for questions 1 to 5: Answer the following questions based on the information given.

The first bar graph below shows the amounts (in Rs. Lakhs.) invested by a company to purchase raw materials over the years and the second shows the values (in Rs. lakhs) of finished goods sold by the company over the years.

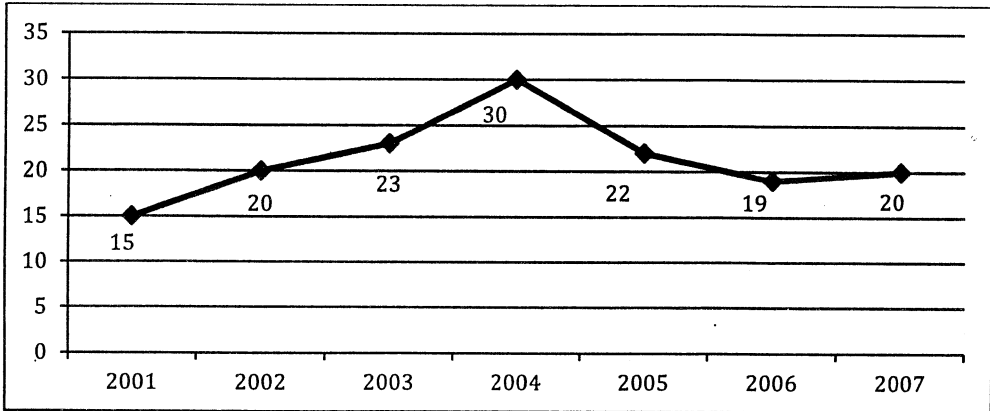


- The maximum difference (in Rs. Lakhs) between the amount invested in raw materials and value of finished goods was during the year?
 (1) 1995 (2) 1996 (3) 1997 (4) 1998 (5) 2000
- The value of finished goods in 1999 was approximately what percentage of the total amount invested in raw materials in the years 1997, 1998 and 1999?
 (1) 33% (2) 37% (3) 41% (4) 45% (5) 49%
- What was the difference (in Rs.) between the average amount invested in raw materials during the given period and the average value of finished goods during this period?
 (1) 62.5 lakhs (2) 68.5 lakhs (3) 71.5 lakhs (4) 77.5 lakhs (5) 73.5 lakhs
- In which year was the percentage change (compared to the previous year) in the investment on raw materials the same as the percentage change (compared to the previous year) in the value of finished goods?

- (1) 1996 (2) 1997 (3) 1998 (4) 1999 (5) 2000

5. In which year has there been the highest percentage increase in the amount invested in raw materials as compared to the previous year?
 (1) 1996 (2) 1997 (3) 1998 (4) 1999 (5) Cannot be determined

Instructions for questions 6 to 10: Answer the following questions based on the information given.



The line graph above shows sales of a TV brand in ('000s) from 2001 to 2007.

6. What are the average sales (in '000s) of this TV brand during the given period?
 (1) 28.21 (2) 25.85 (3) 21.28 (4) 23.36 (5) 26.53
7. Which year has shown the maximum absolute change in sales for this TV brand?
 (1) 2002 (2) 2004 (3) 2007 (4) 2003 (5) 2005
8. Which of these years has shown a decrease in sales?
 (1) 2007 (2) 2002 (3) 2003 (4) 2004 (5) 2005
9. What is the percentage change in the sales in the period 2002 – 2004?
 (1) 12.5% (2) 25% (3) 37.5% (4) 50% (5) None of these
10. What has been the overall growth in the TV industry across the years?
 (1) 33.33% (2) 50% (3) 63.67% (4) 78% (5) Cannot be determined

TABLES AND CASELETS

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

City	Years				
	2005	2006	2007	2008	2009
Kolkata	120	135	140	150	155
Mumbai	102	105	107	109	113
Delhi	134	140	142	147	152
Bangalore	182	195	205	208	218
Chennai	165	175	184	197	205
Pune	160	179	185	195	207

The table above shows the number of cars purchased in six different cities in five different years.

- The total number of cars purchased in Kolkata in 2007 forms what percentage of cars purchased in Kolkata in 2009?
 (1) 75% (2) 90% (3) 80% (4) 85% (5) None of these
- What is the difference between the total number of cars purchased in Mumbai and Delhi together in the year 2005 and 2008?
 (1) 17 (2) 25 (3) 20 (4) 23 (5) 16
- What is the total number of cars purchased across all six cities over the given period
 (1) 4652 (2) 4715 (3) 4791 (4) 4561 (5) 4811
- What is the percentage increase in the number of cars purchased in Bangalore in 2007 over the previous year?
 (1) 5.3% (2) 7.2% (3) 6.8% (4) 5.67% (5) None of these
- What is the ratio of total number of cars purchased in Delhi to that in Chennai over the given period?
 (1) $\frac{695}{916}$ (2) $\frac{705}{926}$ (3) $\frac{725}{906}$ (4) $\frac{715}{926}$ (5) $\frac{715}{906}$

Instructions for questions 6 to 10: Answer the following questions based on the information given.

The table below shows the number of boys and girls studying in three different schools – A, B and C.

Year	School							
	A		B		C		Total	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
2005	20		40			25	85	65
2006	15	35			30			115
2007				50	27	22	72	102
Total	60	75		115		92	242	

- How many students are studying in these three schools in the year 2006?
 (1) 195 (2) 205 (3) 215 (4) 210 (5) 200
- The number of girls in school C in 2006 is what percentage of the number of boys in school A in 2007?
 (1) 180 (2) 150 (3) 120 (4) 90 (5) None of these
- What is the ratio of total number of students in all three schools in 2006 to the total number in 2007?
 (1) $\frac{101}{37}$ (2) $\frac{105}{39}$ (3) $\frac{105}{31}$ (4) $\frac{107}{37}$ (5) $\frac{100}{87}$
- In school A, what is the ratio of the total number of boys and girls?
 (1) 3 : 4 (2) 4 : 3 (3) 4 : 5 (4) 5 : 4 (5) 8 : 5
- In which year is the total number of students highest across all the schools?
 (1) 2006 and 2007 (2) 2006 (3) 2007 (4) 2005 and 2006 (5) 2005

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

An institute offers a MBA degree with specializations available in Finance, Marketing and HR. 40% of the total students are girls. The number of boys studying Finance in the institute is 432 which is 40% of the total number of boys in the institute. 25% of the girls in the institute study HR. The number of boys and girls studying Finance is in the ratio 4 : 1. 35% of the boys in the institute study Marketing.

- How many girls study Marketing in this institute?
 (1) 392 (2) 432 (3) 456 (4) 108 (5) 180
- The number of girls studying Finance is what percentage of the number of girls studying Marketing?
 (1) 15% (2) 40% (3) 25% (4) 30% (5) 45%
- What is the ratio of the number of boys studying HR to the number of girls studying HR?
 (1) 2 : 3 (2) 2 : 5 (3) 5 : 3 (4) 3 : 2 (5) 5 : 4
- What is the total number of students in the institute?
 (1) 1600 (2) 1640 (3) 1540 (4) 1720 (5) 1800
- What is the ratio of girls and boys studying Marketing?
 (1) 8 : 7 (2) 7 : 8 (3) 5 : 7 (4) 7 : 5 (5) None of these

Instruction for questions 6 to 10: The table below gives the number of students who appeared for and passed in-an examination from five different schools over the years.

School	A		B		C		D		E	
Year	App.	Pass.	App.	Pass.	App.	Pass.	App.	Pass.	App.	Pass.
2006	415	221	278	264	745	448	624	320	684	368
2007	384	205	290	270	712	426	674	380	625	354
2008	325	286	312	272	768	321	690	455	614	286
2009	430	336	325	276	815	756	716	648	576	272
2010	412	390	345	290	845	714	728	596	542	354
2011	365	340	334	305	932	628	744	686	522	104

- What is the ratio of the total number of students who appeared for the examination in 2008 to the total number of students who appeared for the examination in 2009?
 (1) 291 : 298 (2) 301 : 318 (3) 673 : 715 (4) 381 : 398 (5) None of these
- During 2010, which school had the highest percentage of students that passed the examination?
 (1) A (2) B (3) C (4) D (5) E
- For school C, which year showed the lowest passing percentage?
 (1) 2006 (2) 2007 (3) 2008 (4) 2011 (5) None of these
- What was the overall percentage of number of students who passed in terms of the number of students who appeared from all the schools together in 2011?
 (1) 61.71% (2) 78.41% (3) 66.23% (4) 71.21% (5) None of these
- What is the approximate ratio of the average number of students passed from schools B and D respectively over the given period?

- (1) 71 : 85 (2) 28 : 51 (3) 15 : 33 (4) 46 : 59 (5) None of these

CONCEPT TEST III

Instructions for questions 1 to 5: Answer the following questions based on the information given. Given below are the marks of 5 students, A, B, C, D and E in curricular as well as extra-curricular subjects.

Curricular Performance

Student	Marks Scored (out of 100)			
Name	English	Science Subjects		
		Physics	Chemistry	Mathematics
A	60	81	75	90
B	73	83	70	92
C	75	70	90	81
D	82	90	68	71
E	75	66	95	80

Extra-Curricular Performance

Student Name	Physical Education
A	80
B	75
C	68
D	88
E	71

- What is the average score in Mathematics for all students taken together?
 (1) 79.4 (2) 83.1 (3) 82.8 (4) 82.0 (5) None of these
- Which students have scored the same total in all the Science subjects taken together?
 (1) A and B (2) B and E (3) D and A (4) A, C and E (5) C and E
- Except Physical Education, all the other subjects are curricular courses. Who has secured the fourth position in curricular subjects?
 (1) A (2) D (3) B (4) C, E (5) E
- Which student has the highest average score across all the subjects? What is the score?
 (1) D, 78.8 (2) A, 79.2 (3) E, 79.4 (4) B, 79.8 (5) None of these
- A student F is introduced in the group. If his average score for the science subjects (Physics, Chemistry and Mathematics) is 80, and his overall score (curricular and extra-curricular) is 410, which of the following statements is true?
 - F has scored more than C in Physical Education.
 - F has scored the highest in English as well as Physical Education.
 - F has improved the overall group average by less than one mark.
 (1) Only (i) and (iii) are true (2) Only (ii) is true (3) Only (iii) is true
 (4) All are true (5) None are true

Instructions for questions 6 to 8: Answer the following questions based on the information given.

ABC Motors, a premier automobile company, also manufactures fan belts and is usually able to sell most of its products. The unsold products become defective and have to be scrapped.

The production cost of the fan belts is Rs. 20 per unit for the first 40000 units and Rs. 25 per unit thereafter.

This production cost only accounts for labour and raw material costs. In addition to this, the company spends Rs. 1,50,000 per annum on electricity bills,

Rs. 30,000 per annum on transportation and Rs. 20,000 per annum on other expenses.

6. Find the total cost incurred by the company if it manufactures 50000 units of fan belts in a year.
 (1) Rs. 10,50,000 (2) Rs. 12,50,000 (3) Rs. 13,50,000 (4) Rs. 14,50,000 (5) None of these
7. In a particular year, 75,000 belts were produced. If 40% of the stock was sold for Rs. 24 per unit, at what price should the rest of the stock be sold, so that the company can operate at break-even point (i.e. without any profit or loss)?
 (1) Rs. 25 (2) Rs. 25.33 (3) Rs. 25.67 (4) Rs. 26 (5) None of these
8. In a particular year, 60000 belts were produced, but the company was able to sell only 55000 belts at a price of Rs.30 per unit. Find the overall profit or loss per unit sold.
 (1) Rs. 2.5 (2) Rs. 2.62 (3) Rs. 2.73 (4) Rs. 2.85 (5) Rs. 3
9. For 45000 belts, what is the ratio of the variable cost to the fixed cost? Consider the variable cost as any such cost that is calculated on a per unit basis and the fixed cost as a cost considered on a lump-sum basis.
 (1) 37 : 8 (2) 9 : 2 (3) 1 : 8 (4) 5 : 3 (5) None of the above
10. For 40000 belts, the fixed costs form what percentage of the total cost? Consider the classification fixed costs and variable costs to be the same as in the previous question.
 (1) 80% (2) 25% (3) 20% (4) 100% (5) None of the above

Instructions for questions 11 to 15: Answer the following questions based on the information given.

In a school consisting of 2400 children, the ratio of girls to boys is 7 : 5 respectively. All the children have taken different classes as per their hobby viz. chess, badminton, table-tennis and carom. 30% percent of the boys take table-tennis classes. The number of girls taking badminton classes is three - fifth of the number of boys taking the same. One-fourth of the girls take carom classes. The total number of students taking carom classes is 650. One-fifth of the boys take chess classes and the remaining boys take badminton classes. The girls taking chess classes are thrice the number of boys taking the same. The remaining girls take table-tennis classes.

11. What is the ratio of the number of girls taking table-tennis classes to the number of boys taking badminton classes?
 (1) 33 : 30 (2) 3 : 2 (3) 33 : 20 (4) 8 : 5 (5) 16 : 11
12. The number of girls taking carom classes is what percentage of the total number of children in the school?
 (1) 14.58% (2) 12% (3) 9.54% (4) 16% (5) 20%
13. What is the total number of children taking badminton classes?
 (1) 450 (2) 800 (3) 320 (4) 650 (5) 530

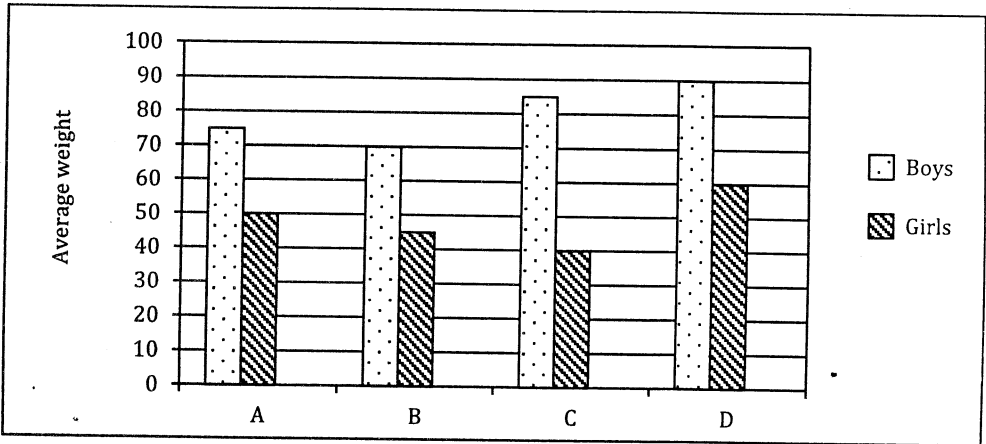
14. What is the number of girls taking table-tennis classes?
 (1) 600 (2) 120 (3) 330 (4) 440 (5) 350
15. Which game is taken up by the maximum number of girls?
 (1) Chess (2) Badminton (3) Table Tennis (4) Carom (5) More than one of the above

CHARTS AND DIAGRAMS

CONCEPT TEST I

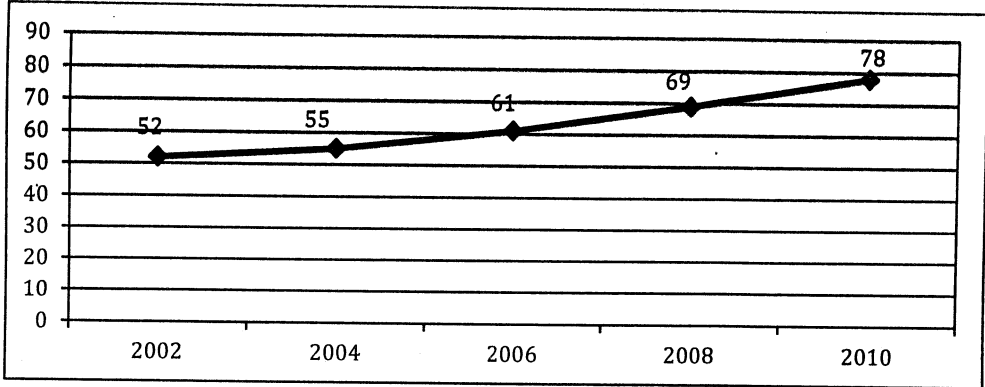
Instructions for questions 1 to 5: Answer the following questions based on the information given.

The bar graph below shows the average weight of boys and girls in four different classes A-D.



- What is the difference between the average weight of boys in class A as well as class C, when each is represented as a percentage with respect to the average weight of boys in class B?
 (1) 28.57 (2) 14.28 (3) 42.81 (4) 57.14 (5) None of these
- By what percentage should the average weight of the girls of class D be reduced for it to be equal to the average weight of girls of Class A?
 (1) 16.67% (2) 21.2% (3) 25.7% (4) 11.33% (5) 13.17%
- What is the ratio of the difference between the average weight of boys and girls for classes B and C respectively?
 (1) 7 : 8 (2) 7 : 5 (3) 5 : 8 (4) 7 : 9 (5) None of these
- If there are an equal number of boys in each class and an equal number of girls in each class, what is the ratio of the average weight of all boys to the average weight of all girls?
 (1) 61 : 40 (2) 65 : 38 (3) 67 : 37 (4) 57 : 34 (5) 64 : 39
- In class B, by what percentage is the average weight of boys more than the average weight of girls?
 (1) 56% (2) 52% (3) 55.55% (4) 45% (5) 50%

Instructions for questions 6 to 10: Answer the following questions based on the information given. The line graph below shows the price of a commodity over the period 2002 – 2010. Based on the graph, answer the following questions.

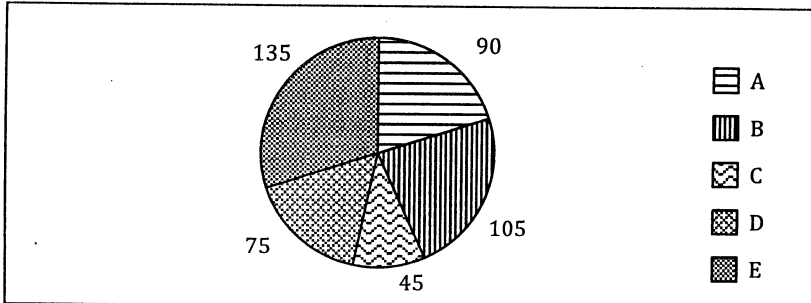


6. What is the overall percentage increase in the price of the commodity from 2002 to 2004?
 (1) 11% (2) 3% (3) 6% (4) 16% (5) 12%
7. What is the overall percentage increase in the price of the commodity over the given period?
 (1) 12.5% (2) 25% (3) 37.5% (4) 50% (5) None of these
8. What is the percentage point difference between the percentage change in the price of the commodity for the periods 2002 – 2006 and 2006 – 2010?
 (1) 10.5 (2) 11.5 (3) 9.5 (4) 12 (5) None of these
9. What is the ratio of the absolute price difference for the periods 2008 – 2010 and 2004 – 2006 respectively?
 (1) 2 : 5 (2) 3 : 2 (3) 2 : 3 (4) Cannot be determined (5) None of these
10. What is the average annual growth rate over the given period?
 (1) 25% (2) 6.25% (3) 37.5% (4) 35% (5) 12.5%

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the chart and answer the following questions



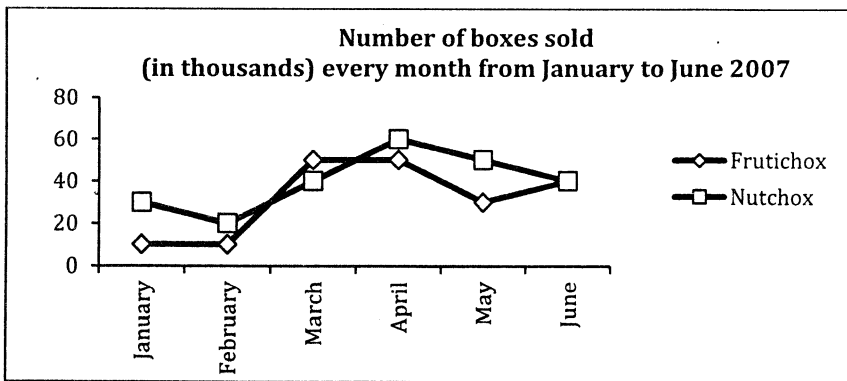
A, B, C, D and E are five different brands of ice-cream and the angle subtended by them at the centre represent their respective market share. The total size of the market is 720 people

1. How many people eat brand D?
 (1) 75 (2) 100 (3) 150 (4) 125 (5) 90

2. What is the difference in the number of people who eat brands C and A?
 (1) 70 (2) 80 (3) 100 (4) 90 (5) None of these
3. What percentage of people opts for brand E?
 (1) 37.5% (2) 12.5% (3) 25% (4) 50% (5) None of these
4. If 80 people shift from brand E to brand C, than what is the new angle subtended for brand C?
 (1) 75° (2) 90° (3) 95° (4) 80° (5) 85°
5. If some people shift from brand B to brand D, thereby increasing the angle subtended by B from 75° to 80°, how many people are added to B?
 (1) 15 (2) 10 (3) 20 (4) 30 (5) None of these

Instructions for questions 6 to 10: Answer the following questions based on the information given.

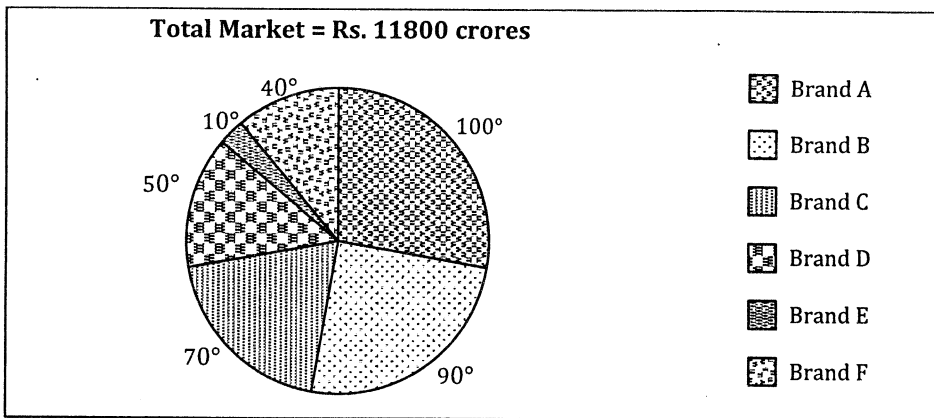
Chocblox Pvt. Ltd. makes two types of chocolate bars, Nutchox and Fruitchox. It sells Nutchox bars wholesale in boxes of 100 bars each at Rs. 480 a box, and Fruitchox bars wholesale in boxes of 120 bars each at Rs. 640 a box. The sales figures of these two products for the first 6 months of 2007 are shown in the graph below.



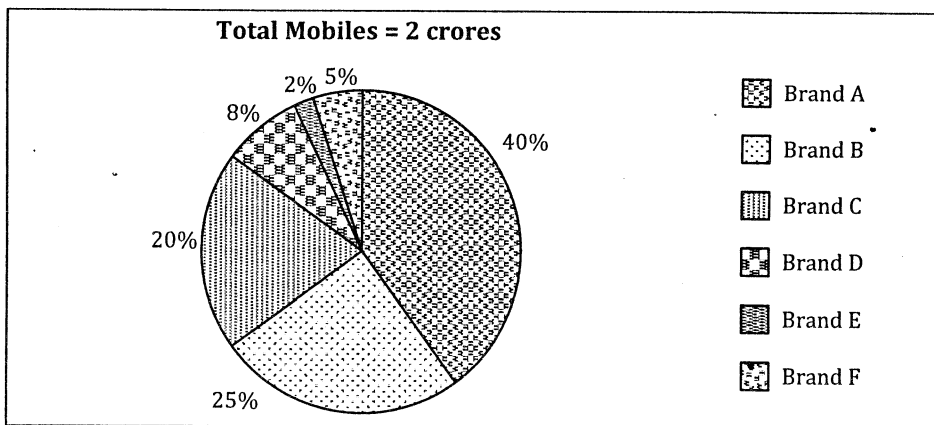
6. During how many months were an equal number of boxes of Nutchox and Fruitchox sold?
 (1) 0 (2) 1 (3) 2 (4) 3
7. What percentage of the total number of boxes sold in May contained Nutchox?
 (1) 37.5% (2) 60% (3) 62.5% (4) None of these
8. What percentage of the total number of individual bars sold in February was Fruitchox?
 (1) 33.33% (2) 37.5% (3) 50% (4) None of these
9. In which month was the number of bars sold for each type equal?
 (1) January (2) February (3) March (4) April
10. During how many months was more money received from Fruitchox sales than from Nutchox sales?
 (1) 0 (2) 1 (3) 2 (4) 3

CONCEPT TEST III

Instructions for questions 1 to 5: Answer the following questions based on the information given. The following pie chart gives the market share of various mobile phone brands in the year 2006.



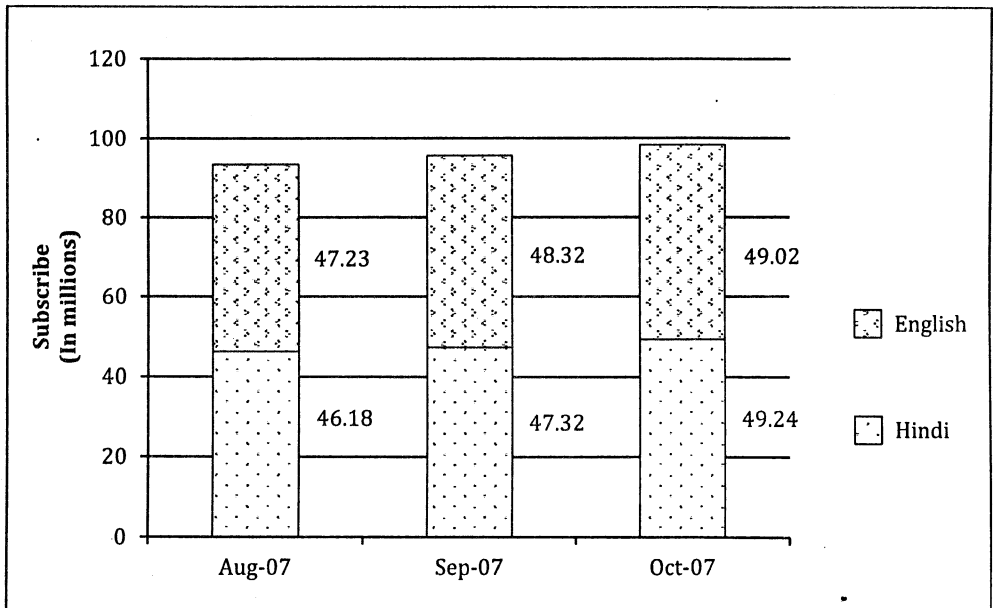
The following pie chart gives the market share of mobile phones manufactured by those brands in the year 2006. One brand produces only one type of mobile phone.



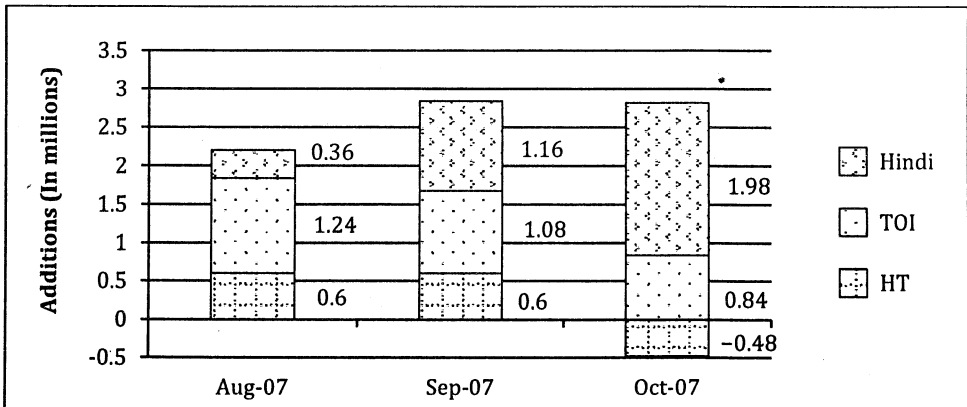
- What is the difference between the market shares of Brand A and Brand F?
 (1) Rs. 3277.78 Crores (2) Rs. 1966.67 Crores (3) Rs. 2950.00 Crores
 (4) Rs. 1311.11 Crores (5) None of these
- What is the price of a single mobile phone of brand C?
 (1) Rs. 5258.20 (2) Rs. 4000.00 (3) Rs. 5736.10 (4) Rs. 2294.44 (5) Rs. 3850.46
- How many brands' mobile phones are costlier than Rs. 10,000?
 (1) 1 (2) 2 (3) 3 (4) 4 (5) 5
- Which is the most expensive mobile phone brand?
 (1) Brand A (2) Brand B (3) Brand D (4) Brand E (5) Brand F
- Which brand's mobile phone cost is equal to the average cost of all mobile phones taken together?
 (1) Brand A (2) Brand B (3) Brand C (4) Brand D (5) Brand E

Instructions for questions 6 to 10: Answer the following questions based on the information given.

The following chart shows the Hindi and English language newspaper subscriber base for the three month period from August 2007 to October 2007. Only these two language newspapers are available in the country.



The following chart shows the data of the subscribers added each month for Hindi and English newspapers. For English newspapers, the data has been broken up into TOI and HT subscribers (these are the only two English language newspapers available in the country). All data represents values at the end of the corresponding month.



6. What was the total newspaper subscriber base in July 2007?
 - (1) 90.79 million
 - (2) 89.91 million
 - (3) 92.31 million
 - (4) 91.67 million
7. If the total TOI subscriber base in July 2007 was 36.28 million, then how many net HT subscribers will be there at the beginning of November 2007?
 - (1) 9.83 million
 - (2) 9.47 million
 - (3) 10.01 million
 - (4) Data insufficient
8. Which of the following statements is necessarily true?
 - (1) The Hindi newspaper subscriber base has reduced in October 2007 as compared to that at the end of the previous month.

- (2) The TOI subscriber base has increased uniformly per month over the period August to October 2007.
- (3) The HT subscriber base has increased in October 2007 as compared to the beginning of the previous month.
- (4) None of these
9. Which of the following has the highest percentage increase in the subscriber base in September 2007 as compared to the previous month?
- (1) Hindi (2) TOI (3) HT (4) Cannot be determined
10. From August to October, the number of subscribers to Hindi newspapers formed what percentage of the subscribers to English newspapers?
- (1) 49.68% (2) 98.73% (3) 101.28% (4) None of the above

RELATIONSHIPS

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

In a family of eight, there are three couples. The family members are A, B, L, M, N, P, R and S. The male members are A, B, P and R. The female members are L, M, N and S. B and R are fathers. A is a student and is grandson of the businessman. N is a manager and is married to a broker. S, a home maker, is the only mother-in-law in the family and is married to B. P is the brother-in-law of the teacher who is the wife of R, a travel agent. L is the only daughter of B and is an MBA. One of the family members is a student.

1. Who is the teacher?
- (1) L (2) A (3) B (4) M (5) P
2. Who is the husband of S?
- (1) A (2) B (3) P (4) R (5) Cannot be determined
3. Which of the following is a couple?
- (1) B-S (2) M-L (3) R-N (4) P-M (5) A-L
4. Who is the wife of P?
- (1) S (2) M (3) N (4) L (5) Cannot be determined
5. Who are the siblings of L?
- (1) M and P (2) N and R (3) P and R (4) M and N (5) A and P

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Anmol is the youngest member of the family. His first cousin Aditya's paternal grandmother is his (Anmol's) maternal grandmother. Pawan is Aditya's paternal uncle and Pawan's only sister's name is Sonal. Bhawer is the paternal grandfather of Nikunj. Aryan is Aditya and Nikunj's paternal first cousin. However, Aditya and Nikunj are not children of the same parents and their fathers are brothers. Sushila is the wife of Bhawer. Sonal has three brothers - Ramesh, Pawan and Navin.

6. How many grandchildren does Bhawer have?
- (1) 2 (2) 1 (3) 3 (4) 4 (5) None of these

7. How is Sonal related to Bhawer?
 (1) Daughter in law (2) Daughter (3) Grand daughter (4) Wife (5) None of these
8. What is the relationship of Aditya with Nikunj and Pawan respectively?
 (1) First cousin, nephew (2) First cousin, first cousin (3) Father, first cousin
 (4) Nephew, father (5) Cannot be determined
9. Who among the following can be Aditya's father?
 (1) Bhawer (2) Ramesh (3) Pawan (4) Navin (5) Either (2) or (4)
10. Who among the following is Sonal's child?
 (1) Anmol (2) Aditya (3) Aryan (4) Nikunj (5) Cannot be determined

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

$P\#Q \Rightarrow Q$ is the husband of P .

$P*Q \Rightarrow Q$ is the wife of P .

$P-Q \Rightarrow Q$ is the father of P .

$P/Q \Rightarrow Q$ is the mother of P .

$P\%Q \Rightarrow Q$ is the brother of P .

$P@Q \Rightarrow Q$ is the sister of P .

$P+Q \Rightarrow Q$ is the son of P .

$P\div Q \Rightarrow Q$ is the daughter of P .

1. How is B related to E in $A*B@C+D-E$?
 (1) Brother (2) Sister (3) Sister-in-law (4) Brother-in-law (5) Nephew
2. How is E related to C in $A\%B+C/D-E$?
 (1) Paternal grandfather (2) Maternal grandmother (3) Paternal grandmother
 (4) Maternal grandfather (5) No relation
3. Who among these is the nephew of Q in $P@Q-R+S+T$?
 (1) P (2) R (3) S (4) T (5) None of the above
4. Which among the following means that Q is the uncle of T?
 (1) $P\#Q\%R*S\div T$ (2) $P\%Q\#R*S\div T$ (3) $P/Q*R\#S\div T$
 (4) $P\#Q/R+S\div T$ (5) $P-Q+R*S\div T$
5. Which among the following relations means that U is the daughter-in-law of R?
 (1) $P-Q+R\div S\%T*U$ (2) $P/Q*R\div S\%T*U$ (3) $P\#Q+R\div S\%T*U$
 (4) $P/Q+R\div S\%T*U$ (5) All of the above

Instructions for questions 6 to 10: Answer the following questions based on the information given.

$P+Q$ means P is the daughter of Q.

$P@Q$ means P is the son of Q.

$P\#Q$ means P is the brother of Q.

$P\div Q$ means P is the sister of Q.

$P-Q$ means P is the father of Q.

P/Q means P is the mother of Q.

6. How is M related to R's son in $M/N \div P @ Q @ R$?
 (1) Wife (2) Sister (3) Sister-in-law (4) Aunt (5) Daughter
7. How is A's father related to E in $D \# A + B / C - E$?
 (1) Father (2) Brother (3) Grandfather (4) Brother-in-law (5) Father in law
8. How is A related to X's mother in $X \# Y - Z @ A$?
 (1) Sister (2) Sister-in-law (3) Mother (4) Daughter (5) Daughter-in-law
9. How is P related to S in $P / Q \div R - S$?
 (1) Mother (2) Aunt (3) Sister (4) Grandmother (5) Data inadequate
10. How is A related to E in $C / A @ B - D \# E$?
 (1) Father (2) Brother (3) Brother-in-law (4) Father-in-law (5) None of these

CONCEPT TEST III

Instructions for questions 1 to 4: Answer the following questions based on the information given.

There are six people in a family - P, Q, R, S, T and U. R is the sister of U. Q is the brother of T's husband. S is the father of P and grandfather of U. There are two fathers, three brothers and a mother in this family.

1. Which of these represents people who are brothers?
 (1) Q, R, S (2) U, Q, T (3) Q, P, U (4) P, R, S (5) S, P, U
2. Who is the mother?
 (1) S (2) Q (3) R (4) T (5) None of these
3. Who is T's husband?
 (1) P (2) Q (3) U (4) S (5) None of these
4. Who are the two fathers?
 (1) S, U (2) U, P (3) S, T (4) S, P (5) P, T
5. A man said to a woman, "your only brother's wife's daughter's only cousin is my son". How is the woman related to the man's son?
 (1) Sister (2) Mother (3) Sister-in-law (4) Aunt (5) Cannot be determined
6. Introducing Pradeeba, Ajay said, 'she is the wife of my mother's only son'. How is Pradeeba related to Ajay?
 (1) Daughter (2) Sister (3) Wife (4) Sister-in-law (5) Data inadequate
7. Pointing to a girl in the photograph, Rajesh said, 'Her mother is the only daughter of my paternal grandfather's only son'. How is the girl's mother related to Rajesh's father?
 (1) Daughter (2) Sister (3) Daughter-in-law (4) Granddaughter (5) None of these
8. Two sisters, Bhavya and Kriti were playing. Kriti's mother said to Bhavya's mother that Kriti's father's mother's husband's only daughter is Trisha. How is Bhavya's mother related to Trisha?
 (1) Sister (2) Sister-in-law (3) Mother-in-law (4) Mother (5) Data inadequate

9. How is Nimit's father's wife's only brother's father's wife's only daughter related to Nimit?
 (1) Sister (2) Aunt (3) Mother (4) Sister-in-law (5) None of these
10. How is my mother's husband's only son's wife related to me?
 (1) Sister (2) Aunt (3) Wife (4) Daughter (5) Data inadequate

CONCEPT TEST IV

1. Kathan tells Jia that "Your father Gunjan is my wife's father's son's brother." How is Gunjan related to Kathan?
 (1) Father-in-law (2) Father (3) Brother-in-law (4) Brother (5) Nephew
2. If Khushi is the unmarried girl Julie's father's son-in-law's son's maternal grandmother, then how is Julie related to Khushi?
 (1) Mother (2) Daughter (3) Mother-in-law (4) Daughter-in-law (5) Sister
3. Pointing to the person in the photo, Jesal tells his son Jenil "He is your mother's mother-in-law's only grandchild's father's father-in-law". How is the person in the photo related to Jenil's mother?
 (1) Uncle (2) Brother (3) Brother-in-law (4) Father-in-law (5) Father
4. A said to B: "You are my brother's mother's husband's only sister's husband's only son's sister." How are A and B related?
 (1) Brother (2) Sister (3) Siblings (4) Not related (5) Cousins
5. A is B's mother's husband's father's wife's only daughter. How is A related to B?
 (1) Sister (2) Mother (3) Niece (4) Aunt (5) None of these

Instructions for questions 6 to 10: Answer the following questions based on the information given.

P+Q means P is the daughter of Q.

P@Q means P is the son of Q.

P#Q means P is the brother of Q.

P÷Q means P is the sister of Q.

P-Q means P is the father of Q.

P/Q means P is the mother of Q.

6. If $A \div B - C - D \# E$, then by how many generations are A and E separated?
 (1) 0 (2) 1 (3) 2 (4) 3 (5) Cannot be determined
7. If $D/A/E \div B \# C$, then how is A related to C?
 (1) Mother (2) Father (3) Sister (4) Brother (5) Grandmother
8. If $E - A - B @ D/C$, then which of the following is false?
 (1) E is C's grandfather (2) D is A's husband (3) B is C's brother
 (4) None of these (5) More than of the above
9. Which of the following means that B is the mother-in-law of C?
 (1) $C/D \# E @ A @ B$ (2) $E \# D @ C \div A + B$ (3) $B/A - E \# D @ C$
 (4) $B/A/E \# D + C$ (5) None of these

10. In which of the following options is the relationship between A and E same as that in E#B@D#C@A?
- (1) B#C+A-D#E (2) A@B#C/E#D (3) E+D#C@B+A
 (4) B/A-E#D@C (5) None of these

DIRECTIONS AND ARRANGEMENTS

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

9 people, A to I are seated in a row, facing the north. Their seating arrangement is in accordance with the following conditions:

1. E sits at the centre.
 2. F and I sit on the corner seats.
 3. H is equidistant from both I and E.
 4. D sits three places to the right of E.
 5. A is two places to the left of D and next to H.
 6. G is in between B and C and C is closer to E.
1. Who is the sixth person from the right end?
 (1) B (2) C (3) A (4) G (5) H
 2. How many persons are sitting between G and D?
 (1) 2 (2) 4 (3) 3 (4) 1 (5) 0
 3. Who are the immediate neighbours of E?
 (1) A and C (2) H and C (3) A and G (4) G and H (5) None of these
 4. Which of the following pairs is not sitting next to each other?
 (1) D and H (2) B and F (3) A and B (4) C and G (5) C and E
 5. If the positions of H and B are interchanged as well as that of E and F, then who is sitting between C and H?
 (1) A (2) I (3) H (4) D (5) G

Instructions for questions 6 to 9: Answer the following questions based on the information given.

A, B, C, D, E, F, G and H are 8 people sitting around a circular table, facing the centre. They are seated according to the following rules:

- a. E is three positions to the left of A.
 - b. E is equidistant from A and D.
 - c. D is two positions to the left of H.
 - d. G is farthest from E.
 - e. F and E are adjacent to C.
6. How many places to the right of A is E sitting?
 (1) 4 (2) 2 (3) 3 (4) 5 (5) 1
 7. Who is sitting opposite B?
 (1) A (2) C (3) D (4) F (5) Cannot be determined

8. Who are the immediate neighbours of F?
 (1) A and B (2) C and F (3) E and A (4) A and C (5) B and C
9. The distance between which of the following pairs in the arrangement is the same as the distance between them in the English alphabet?
 (1) F and G (2) C and H (3) A and C (4) B and D (5) None of these
10. Raghav starts from his home and goes towards the east for 5 km. He then takes a right turn and walks for 3 km more, after which he takes a left turn. He walks 2 km and then takes another left turn. Now he walks 11 km and finally, he takes another left turn and walks 1 more km to reach his destination.
 What is the distance of Raghav's final position with respect to his original position?
 (1) 7 (2) 5 (3) 10 (4) 12 (5) 8

CONCEPT TEST II

Instructions for questions 1 to 4: Answer the following questions based on the information given.

A group had six members - Their names are Sonal, Malvika, Neha, Rohit, Abhro and Nilesh. They had specialized in Finance, Psychology, Communication, Engineering, Manager and Mathematician, though not necessarily in the same order. Also, they are from Delhi, Gujarat, Kolkata, Mumbai, Chennai and Bangalore and work in company A, B, C, D, E and F, again not necessarily in the order of their names.

The following information is known.

1. Malvika is from Bangalore and does not specialize in Engineering or Mathematics.
2. Sonal has specialized in Finance and works in company A.
3. Nilesh works in company D and specializes in Management.
4. Neha is from Mumbai, works in company C and specializes in Communication
5. The persons specializing in Engineering and Mathematics are from Delhi and Gujarat, though not necessarily in the same order.
6. The person who works in company F is from Delhi and the person who works in company A is from Kolkata.
7. Rohit works in company F and Abhro does not work in company E.

1. Who is from Kolkata?

- (1) Abhro (2) Neha (3) Nilesh (4) Rohit (5) Sonal

2. In which subject does Malvika specializes?

- (1) Management (2) Finance (3) Psychology
 (4) Communication (5) Cannot be determined

3. To which city does Nilesh belongs?

- (1) Kolkata (2) Delhi (3) Gujarat (4) Chennai (5) Mumbai

4. In which company does Abhro work?

- (1) B (2) D (3) A (4) F (5) C

5. A person walks towards East, then moves to the right, then moves in the east again. Now, the person moves towards the north, then east and finally takes a right again. What is the direction of the person with respect to the original position? Assume that the person travels an equal distance at each step.

- (1) South (2) South west (3) South east (4) North east (5) None of these

6. Aarav lost his pet Genie on the way back from market. To find him, he walks 20 metres south. He then takes a left turn and walks 30 metres. He takes a left turn again and walks another 30 metres. Taking a left turn again, he walks 50 metres. Still not able to find Genie, he takes a left turn and continues walking for 60 metres. Finally, when he takes a right turn and walked 30 metres, he found Genie. If Genie did not move from its place from the time Aarav started searching for it, how far (in metres) was it from the point from where Aarav started looking for it?
- (1) 40 (2) 50 (3) $50\sqrt{2}$ (4) 60(5) (5) $60\sqrt{2}$
7. Bunty's school is situated 7 kms to the east of his house. He starts from his house on a cycle and rides 4 kms towards the north. He then turns right and rides 3 km towards his school. He again turns right and rides 1 km and then turns left and rides another 4 km. In which direction should he now turn to reach his school if this his last turn?
- (1) East (2) South (3) North (4) West (5) South-East
8. A sign post is erected at a crossing. Due to a storm, it gets turned in such a way that the direction which should have originally shown as North-East is now shown as North-West. A passerby walks in the wrong direction thinking that it is south. Which direction is he actually walking in?
- (1) East (2) North-East (3) North (4) South-West (5) West
9. One fine morning, just after sunrise, 4 friends were sitting around a square table, one on each side of the table, all facing towards the centre of the table. Sarth's shadow fell exactly to his right side. If Vineel is sitting on the side of the table, which is to the right of Sarth, then which direction is Vineel facing?
- (1) East (2) South (3) West (4) North (5) Data Inadequate

CONCEPT TEST III

Instructions for questions 1 to 5: Answer the following questions based on the information given.

A, B, C, D, E, F and G are seven friends who sit on a bench, facing south, in a straight line. The following points are known about their sitting order:-

- C sits on one of the corner seats.
 - E and G have the same number of people sitting between them as B and D have between them.
 - A sits two places to the left of C.
 - B and F sit next to each other.
 - G sits in the middle.
 - B is to the immediate left of G.
- Who is the second person from the right end?
 (1) F (2) D (3) B (4) E (5) Cannot be determined
 - Who are the immediate neighbours of B?
 (1) A and F (2) F and G (3) G and D (4) F and D (5) None of these
 - Looking south, who is sitting at the extreme left?
 (1) B (2) E (3) D (4) None of these (5) Cannot be determined
 - How many people are sitting between A and F?
 (1) Zero (2) One (3) Two (4) Three (5) None of these

5. The position of which pair of people cannot be determined?
 (1) E and F (2) F and D (3) B and D (4) D and E (5) B and E

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Read the following statements and answer the questions that follow:

- I. P, Q, R, S, T, U and V are sitting on a bench and all of them are facing the west.
 II. S is sitting third from the north end.
 III. V is between T and U.
 IV. Q is at one of the extremes end and T is his neighbour.
 V. R is on the immediate right of S.
6. Which of the given statements is not required to find out P's position?
 (1) I (2) III (3) IV (4) All are required
7. Between which of the following pair of people is S sitting?
 (1) P and R (2) R and U (3) V and Q (4) None of these
8. Name the person with whom R should change places so that he sits at the third place from the southern end?
 (1) V (2) T (3) S (4) U
9. Which of the following pair of people is sitting at the extreme ends?
 (1) RU (2) PV (3) QU (4) None of these
10. Who is sitting to the immediate right of T?
 (1) Q (2) R (3) S (4) V

CONCEPT TEST IV

Instructions for questions 1 to 4: Answer the following questions based on the information given.

A, B, C, D, E, F, G, and H are eight colleagues sitting on two benches arranged opposite each other. The following points are known about their seating arrangement:

- a. A is not sitting at any corner position and G is in one of the corner positions.
 b. G and F are on the same side as C.
 c. H is sitting exactly opposite A and on the same side as E.
 d. D and B have exactly one person between them.
 e. E is sitting in one of the corner seats and exactly opposite C.
 f. D is sitting diagonally opposite C.
1. Who among these is at a corner position?
 (1) H (2) G (3) F (4) B (5) A
2. Who is sitting diagonally opposite E?
 (1) C (2) D (3) A (4) F (5) G
3. How many people are sitting between G and C?
 (1) Zero (2) One (3) Two (4) Cannot be determined (5) None of these
4. If A and B exchange their positions, who among these is a neighbour of H?
 (1) E (2) C (3) B (4) A (5) G

Instructions for questions 5 to 7: Answer the following questions based on the information given.

There are two identical 4-storey (ground + 3-storey) buildings facing each other, each of which has only one flat on each floor. The Reddy family occupies the top floor in one of the buildings. The Singh family lives on the ground floor as Mr Singh has a knee problem, which makes it difficult for him to climb stairs. The Parikhs live on the floor just above the Patels. The Shahs who occupy the top floor in one of the buildings do not live in the same building as the Parikhs as they are business rivals. The Khannas live just below the Reddys and on the same floor as the Guptas. The Kumar family also lives in one of these 8 flats.

5. Who lives just above and in the same building as the Kumar family?

- (1) Shahs (2) Khannas (3) Guptas (4) Reddys (5) Cannot be determined

6. Who lives in the same building as the Shah family?

- (1) Gupta family (2) Parikh family (3) Khanna family
(4) None of the above (5) More than one of the above

7. The Parikh family sorted out the differences with the Shah family and now both the families became business partners. So if the Parikhs want to live in the same building as and closest to the Shahs, with whom should they exchange their house?

- (1) Khannas (2) Kumars (3) Reddys (4) Guptas (5) Cannot be determined

Instructions for questions 8 to 12: Answer the following questions based on the information given.

Ajay, Balram, Chetak and Dhiraj are 4 fashion designers who took part in one of Madonna, Lopez, Kate and Phirangi fashion shows in four consecutive months of a year (not in that order). These shows were held in Atlanta, Beijing, Indonesia and Frankfurt (not in that order). The following information is given about the previous year's fashion shows which generally start from Beijing every year. Answer the questions based on the following data. No two shows were held at the same location. No two fashion designers participated in the same show and no one participated in more than one show.

1. Ajay did not take part in the Kate Fashion show and Chetak's show, Madonna was held in the month of October.

2. Lopez, the fashion show in which Dhiraj took part was in the last month of the year. He did not go to the location starting with a vowel.

3. Ajay and Balram had common initials with the name of the respective location where their shows were held.

8. Ajay's fashion show was in which month and which country?

- (1) November, Beijing (2) November, Frankfurt (3) September, Frankfurt
(4) November, Atlanta (5) September, Atlanta

9. Balram's show was held in which month?

- (1) November (2) December (3) October (4) September (5) Cannot be determined

10. Which fashion show was held in Indonesia?

- (1) Phirangi (2) Kate (3) Lopez (4) Kate or Lopez (5) Madonna

11. Where was the last show of the year organized?

- (1) Frankfurt (2) Atlanta (3) Beijing (4) Indonesia (5) Cannot be determined

12. Which of the following is the right combination of show-month-country?

- (1) Phirangi - September - Beijing (2) Kate - November - Britian

- (3) Madonna - October - Indonesia (4) Lopez - December - Indonesia
 (5) None of these.

CONCEPT TEST V

Instructions for questions 1 to 4: Answer the following questions based on the information given.

A, B, C, D, E, F and G are seven friends, each wearing a shirt of a colour from red, blue, black, brown, white, yellow and green and working in different companies from among P, Q, R, S, T, U and V. They prefer not to work on a specific day in the week. A week starts from Monday and Saturday and Sunday are considered weekends. The following information is also given :

- a. G and F do not work only on weekends and work in company P and R respectively.
- b. B does not work on Tuesday and wears a black shirt.
- c. C does not work on the third day of the week and works in company V.
- d. E wears white, A wears red and D wears blue.
- e. The person who wears white works in company S.
- f. The person who wears brown does not work in companies V or R.
- g. D works in company U and does not work on Thursday.
- h. The person who does not work on Monday is working in company Q.
- i. C does not like yellow.

1. What colour is C's shirt?

- (1) Red (2) Black (3) Brown (4) Green (5) White

2. Who does not like to work on Friday?

- (1) E (2) G (3) D (4) F (5) A

3. In which company does E work?

- (1) P (2) Q (3) R (4) S (5) T

4. On which day does F not like to work?

- (1) Sunday (2) Saturday (3) Monday (4) Tuesday (5) Cannot be determined

Instructions for questions 5 to 9: Answer the following questions based on the information given.

The following clues give the names of five inventors, their life spans, countries of origin and inventions. Use the clues to answer the questions.

- Al-Khwarizmi was born in Persia and lived for 70 years. He did not invent Portland Cement.
- Joseph Aspdin is not from the U.S.A. He is also not the inventor of Modern Algebra.
- DonatBanki, twelve years older than Joseph Aspdin, was from Hungary. He did not invent Stainless Steel.
- Harry Brearley from the U.K. had the longest life span. He is not the inventor of the carburetor.
- Wallace Carothers invented Nylon. He was not from England.
- The inventor from England invented Portland Cement.
- The carburetor was not invented by the inventor from Persia.
- The life spans of the inventors are as follows:
- 780-850, 1788-1875, 1859-1922, 1896-1937 and 1871-1948.

5. What was the life span of Wallace Carothers?

- (1) 1788-1875 (2) 780-850 (3) 1859-1922 (4) 1871-1948 (5) None of the above

6. What did the inventor from Hungary invent?

- (1) Modern Algebra (2) Portland Cement (3) Carburetor

- (4) Stainless Steel (5) None of these
7. Who invented Modern Algebra?
 (1) Al-Khwarizmi (2) DonatBanki (3) Harry Brearley
 (4) Wallace Carothers (5) Cannot be determined
8. What did Harry Brearley invent?
 (1) Modern Algebra (2) Portland Cement (3) Carburetor
 (4) Stainless Steel (5) Cannot be determined
9. What did the inventor from U.S.A. invent?
 (1) Modern Algebra (2) Portland Cement (3) Carburetor
 (4) Stainless Steel (5) None of these

SERIES AND ANALOGIES

CONCEPT TEST I

Instructions for questions 1 to 3: Answer the following questions based on the information given.

Find the missing terms

1. 28, 54, ?, 180, 302
 (1) 110 (2) 115 (3) 127 (4) 128 (5) 129
2. 0, 4, 3, 28, ?
 (1) 25 (2) 125 (3) 115 (4) 30 (5) 20
3. 1T11, 2S12, 3R13, ?, 5P15
 (1) 4Q44 (2) 4Q41 (3) 4Q14 (4) 41Q4 (5) 44Q1

Instructions for questions 4 and 5: Answer the following questions based on the sequence given.

YQSONALXRGHVZITECDBFJKMPUW

4. How many vowels are present between Y and V?
 (1) 0 (2) 1 (3) 2 (4) 3 (5) 4
5. If all the prime positioned letters in the series are deleted, then how many letters are deleted and how many of them are vowels?
 (1) 9,1 (2) 9,0 (3) 9,3 (4) 9,2 (5) None of these

Instructions for questions 6 and 7: Answer the following questions based on the sequence given.

5AZ9αWXβ213QF7μESL4

6. How many digits in the series are immediately preceded by a letter and immediately followed by a symbol?
 (1) 5 (2) 4 (3) 3 (4) 1 (5) 2
7. How many letters in the series are immediately preceded by a letter?
 (1) 7 (2) 6 (3) 4 (4) 2 (5) 3
8. 35 : 48 :: 37 : ?
 (1) 49 (2) 47 (3) 50 (4) 51 (5) None of these

9. BB: ? :: CCC : EEEEE
 (1) DDDD (2) DDD (3) AAA (4) AAAA (5) None of these
10. Find the missing term
 $\frac{15}{7}, \frac{77}{13}, \frac{221}{19}, ?$
 (1) $\frac{437}{27}$ (2) $\frac{437}{23}$ (3) $\frac{399}{27}$ (4) $\frac{437}{29}$ (5) None of these

CONCEPT TEST II

Instructions for questions 1 to 12: Answer the following questions based on the information given.

Find the missing term(s).

1. 23, 33, 50, __, 105, 143
 (1) 63 (2) 72 (3) 64 (4) 74 (5) 73
2. 10, 80, 270, 640, 1250, __
 (1) 2500 (2) 2160 (3) 3430 (4) 1330 (5) 1810
3. 6, 19, 77, __, 2317
 (1) 1386 (2) 286 (3) 387 (4) 721 (5) 386
4. 9, 11, 13, 12, 13, 15, 15, 15, 19, 18, 17, __
 (1) 18 (2) 26 (3) 20 (4) 25 (5) 21
5. 7, 8, 16, 43, ?, 232
 (1) 107 (2) 105 (3) 103 (4) 109 (5) 110
6. 2, 2, 4, ?, 48, 240
 (1) 15 (2) 16 (3) 12 (4) 10 (5) 11
7. 5, 9, 18, 34, ?, 95
 (1) 57 (2) 59 (3) 61 (4) 55 (5) 53
8. 4, 4, 8, 48, ?, 138240
 (1) 1252 (2) 1352 (3) 1052 (4) 1152 (5) 1162
9. 8, 24, ?, 2280, 54720
 (1) 162 (2) 142 (3) 132 (4) 157 (5) 192
10. 235, 237, 240, ?, 252, 263
 (1) 242 (2) 247 (3) 245 (4) 241 (5) 244
11. 5, 10, 30, ?, 600, 3600
 (1) 100 (2) 110 (3) 125 (4) 120 (5) 130
12. 2, 10, 30, ?, 130, 222
 (1) 65 (2) 68 (3) 70 (4) 75 (5) 80

CONCEPT TEST III

Instructions for questions 1 to 14: Answer the following questions based on the information given.

Find the missing term(s).

1. 3, 7, 13, ?, 31, 43

- (1) 17 (2) 18 (3) 21 (4) 19 (5) 22

2. 7, 14, 42, 210, ?, 16170

- (1) 1400 (2) 1420 (3) 1450 (4) 1470 (5) 1490

3. 7, 26, ?, 124, 215, 342

- (1) 60 (2) 61 (3) 62 (4) 63 (5) 64

4. 11, 22, ?, 528, 4224, 42240

- (1) 88 (2) 77 (3) 66 (4) 55 (5) 44

5. 6, 18, 108, 972, ?, 174960

- (1) 11664 (2) 11554 (3) 11444 (4) 11334 (5) 11224

6. 0, 0, 3, 20, ?, 714

- (1) 110 (2) 105 (3) 95 (4) 120 (5) 115

7. A, B, F, O, ?, D

- (1) E (2) F (3) G (4) J (5) H

8. J, F, ?, A, M, J, J

- (1) N (2) D (3) K (4) P (5) M

9. M, T, W, ?, F, S, S

- (1) H (2) L (3) N (4) C (5) T

10. A, D, ?, P, Y, J

- (1) K (2) J (3) L (4) I (5) R

11. A, C, ?, E, W, G

- (1) X (2) Y (3) Z (4) K (5) R

12. J, M, ?, J, A, O, D

- (1) M (2) N (3) P (4) R (5) S

13. B, D, G, ?, S, D

- (1) K (2) L (3) M (4) N (5) P

14. E, F, ?, K, O, T

- (1) G (2) I (3) J (4) H (5) None of these

CONCEPT TEST IV

Instructions for question 1: Answer the following questions based on the information given.

Find the odd man out.

1. 1, 3, 8, 18, 42, 89, 184

- (1) 18 (2) 89 (3) 3 (4) 2 (5) 184

Instructions for questions 2 and 3: Answer the following questions based on the information given.

Given below is a group of numbers. One term does not fit the series. Find the term which will replace the odd man out.

2. 22, 23, 32, 35, 37, 57, 75, 79

- (1) 39 (2) 77 (3) 58 (4) 76 (5) 36

3. 232, 75, 23, 6, 1

- (1) 230 (2) 77 (3) 25 (4) 5 (5) 2/3

Instructions for questions 4 to 7: Find the odd man out

4.

- (1) Sea (2) Ocean (3) River (4) Pond (5) Sky

5.

- (1) Sugar (2) Salt (3) Stone (4) Water (5) Rock

6.

- (1) Cobbler (2) Student (3) Plumber (4) Carpenter (5) Electrician

7.

- (1) Chocolate (2) Books (3) Sugar (4) Honey (5) Sweets

Instructions for question 8: Find the missing number.

8. 324 : 24 :: 441 : __

- (1) 16 (2) 18 (3) 22 (4) 17 (5) 9

Instructions for questions 9: Find the missing letter.

9. JpUi : lRwK :: FgTq : __

- (1) hJvS (2) hIvT (3) hIvS (4) HiVs (5) hiVS

CONCEPT TEST V

Instructions for questions 1 to 4: Find the missing term.

1. 1687435 : 2798546 :: 3587013 : __

- (1) 4698024 (2) 4698124 (3) 4698924 (4) 4698424 (5) 4698514

2. AD : WZ :: FI : ?

- (1) RU (2) RT (3) TU (4) SU (5) RS

3. WATCH : TIME :: ALTIMETER : ?

- (1) Blood Pressure (2) Weight (3) Atmospheric pressure
(4) Height (5) None of these

4. SCHOOL : FISH :: ? : BEES

- (1) Flock (2) Swarm (3) Group (4) Herd (5) None of these

Instructions for questions 5 to 8: Answer the following questions based on the sequence given.

E9Kδ@7A[]1M5Σ2L3Ω4H ≤ 0∞μ6F8

5. Find the 6th largest number in the sequence.

- (1) 6 (2) 4 (3) 5 (4) 3 (5) 2

6. Four of the following group of elements are similar in some way and form a group. Find the odd man out which does not belong to the group.

- (1) 7A[] (2) 4H≤ (3) 9Kδ (4) 6F8 (5) 2L∞

7. If all the letters and symbols are dropped from the series then how many odd digits are present which are immediately preceded by an odd number and immediately followed by an odd number?

- (1) 2 (2) 0 (3) 3 (4) 4 (5) 1

8. If the last 15 elements of the original series are reversed, find the 10th element to the right of the 6th element to the left of the 14th element from the left end

- (1) F (2) M (3) 0 (4) H (5) 4

Instructions for questions 9 & 10: Answer the following questions based on the sequence given.

A 3 7 B 7 1 9 C 9 D 5 D K L 6 R 6 S 7 S

9. How many letters are immediately preceded and immediately followed by the same digit?

- (1) One (2) Two (3) Three (4) Zero (5) None of these

10. How many digits are immediately preceded as well as followed by the same letter?

- (1) Zero (2) One (3) Two (4) Three (5) Four

CODES

CONCEPT TEST I

1. If 'GOVERNMENT' is coded as 'TGOVERNMEN' in a certain language, how will 'POLITICIAN' be coded in that language?

- (1) NPOLITICIA (2) APOLITICIN (3) TPOLIICIAN (4) ICIANPOLIT (5) None of these

2. If 'SUPREME' is coded as 'MESUPRE' in a certain language, how will 'COURTESY' be coded in that language?

- (1) SCYOURTE (2) SYCOURTE (3) URCOSYTE (4) SYTEURCO (5) SYURTECO

3. If 'RAILWAY' is coded as 'AILWAYR' in a certain language, how will 'STATION' be coded in that language?

- (1) NSTATIO (2) TATOINS (3) TATIONS (4) NTSATIO (5) None of the above

4. In a certain code, SIKKIM is written as THLJLL, how is TRAINING written in that code?

- (1) SQBHOHOH (2) UQBJOHHO (3) UQBHOHOF (4) UQBJOHOH (5) None of these

5. If 'BROTHER' is coded as 'BEHORRT' in a certain language, how will 'AUTHORITY' be coded in that language?
 (1) AHIORTTUY (2) AHOIRTTUY (3) AHIORUTTY (4) AHIOTRTUY (5) AHRIOTTUY
6. If 'PERSUADING' is coded as 'AEIUDGNPRS' in a certain language, how will 'INDICATOR' be coded in that language?
 (1) AIOICDNRT (2) AOIICDNRT (3) AIIODCNRT (4) AIIOCDNRT (5) AIIICDNRT
7. If 'PROPERTY' is coded as 'QSPQFSUZ' in a certain language, how will 'INFORMATION' be coded in that language?
 (1) JOGPSNBUJPO (2) JOGPNBUJPO (3) JOPGSNBUJPO
 (4) JOGPSNUBJPO (5) JOGPSNBUJOP
8. If 'FUNDAMENTAL' is coded as 'HWPFPCOGPVCN' in a certain language, how will 'DISCIPLINE' be coded in that language?
 (1) FUKERKNKPG (2) FKUEKRNKPG (3) FKUKERNKPG
 (4) FKUEKRNKPG (5) FKUEKRNKGP
9. If in a certain language. CALCUTTA is coded as GEPGYXXE, which word would be coded as FSQFCE in that language?
 (1) BOMBYA (2) BOMYAB (3) BOMBAY (4) BOBAMY (5) None of these
10. If 'REPRESENT' is coded as 'SDQQFRFMU' in a certain language, how will 'DEPICTION' be coded in that language?
 (1) EDQHDJSNO (2) EDQHDSNJO (3) EDQHDSJNO (4) EDHQDSJNO (5) EQDHDSJNO

CONCEPT TEST II

1. If 'DESPERATION' is coded as 'DHSPHRDTLRN' in a certain language, how will 'INDICATOR' be coded in that language?
 (1) LDNLCDTOR (2) LNDLDCTRR (3) LLNDCDTRR (4) LNØLCDTRR (5) LNDDLCTRR
2. If 'SUPERMARKET' is coded as 'RVOFQLZQJFS' in a certain language, how will 'SEDATION' be coded in that language?
 (1) RFBCSJPM (2) RFCSBJPM (3) RFCBJSJM (4) RCFBSJPM (5) RFCBSJPM
3. If 'OCCLUMENCY' is coded as 'UDDMANIPDZ' in a certain language, how will 'LIBERATION' be coded in that language?
 (1) MOCISEVOUP (2) MOCISEVUOP (3) MOCSIEVOUP
 (4) MOCISEVOPU (5) MOCIESVOUP
4. If 'STRUCTURE' is coded as 'HGIFXGFIW' in a particular language, how will 'INVESTIGATE' be coded in that language?
 (1) RMEVHGTRZGV (2) RMEVHGRTZGV (3) RMEVGHRTZGV
 (4) REMVHGRTZGV (5) RMEVHGRTZGV
5. In a certain code, PAPER is written as SCTGW. How is MOTHER written in that code?
 (1) POXJIT (2) ORVLGW (3) PQXKJV (4) PQVJGT (5) None of these
6. If 'LEADERSHIP' is coded as 'QIISSEEAFL' in a certain language, how will 'BILATERALS' be coded in that language?

- (1) TLBRFTBLIB (2) TLBRFTBLCI (3) TLBRFTBLJB
 (4) TLBRFTBIMC (5) TLBRFBTMC
7. If 'DELIBERATE' is coded as 'EEIMECASEU' in a certain language, how will 'DISABILITY' be coded in that language?
 (1) IEATIICMYU (2) IAETICIMYU (3) IEAITCIMYU
 (4) IEATICIMYU (5) IETAICIMYU
8. If 'JURISDICTION' is coded as 'QTIHHCRBNHSM' in a certain language, how will 'PSYCHOLOGIST' be coded in that language?
 (1) XROBKNGNHRFS (2) XROBKNNGRHFS (3) XROBNKGNRHFS
 (4) XROKBNGNRHFS (5) XROBKNGNRHFS
9. If 'ADOPTION' is coded as 'BDJNPPPT' in a certain language, how will 'FORGERY' be coded in that language?
 (1) FFGPRRY (2) FFGRRRY (3) FFGPRSY (4) FFHPRRY (5) FFGPRRZ
10. If 'ANYTHING' is coded as 'BIHHONUUY' in a certain language, how will 'VIRTUAL' be coded in that language?
 (1) BIULSTW (2) BIVLSTX (3) BIVOSTW (4) BIVLSTW (5) BIVLRTW

CONCEPT TEST III

1. If 'QUALIFY' is coded as 'BUROZFF' in a certain language, how will 'ADOPTION' be coded in that language?
 (1) MLRGJLWZ (2) MMRGKLWZ (3) MLRGKMWZ (4) MLRGKLWZ (5) MLSGKLWZ
2. If 'INTERVIEW' is coded as 'XIOUSIUOO' in a certain code, how will 'PRACTICE' be coded in that language?
 (1) EQSADUJD (2) EQRADUID (3) EQSADVID (4) EPSADUID (5) None of the above

Instructions for questions 3 to 6: Answer the following questions based on the information given.

In a certain code language:-

- I. 'pib eli kej' means 'He is good'
 II. 'kej tme inr' means 'Good and bad'
 III. 'inr pib bai' means 'He and she'
 IV. 'bai tme sne' means 'She seems bad'

3. What is the code for 'is'?
 (1) Kej (2) Bai (3) Inr (4) Eli (5) Pib
4. What is the code for 'she'?
 (1) Bai (2) Eli (3) Pib (4) Kej (5) None of these
5. What is the code for 'seems'?
 (1) Kej (2) Pib (3) Sne (4) Inr (5) Eli
6. What is the code for 'good'?
 (1) Pib (2) Eli (3) Bai (4) Sne (5) Kej

7. In a certain language, 'put tir fin' means 'delicious juicy fruit'; 'tie dip sig' means 'beautiful white lily', and 'sig lon fin' means 'lily and fruit'. What is the code for 'and'?
- (1) Dip (2) Tir (3) Fin (4) Lon (5) Sig
8. In a certain language, 'ahn plt vsq' means 'monkey like banana'; 'plt slw yeo' means 'banana is fruit', and 'xsa ahn yeo' means 'monkey eat fruit'. What is the code for 'eat'?
- (1) Ahn (2) Slw (3) Yeo (4) Xsa (5) Plt
9. In a certain code language, 'rib nit ka' means 'telephone is essential', 'sin fa de' means 'regular good service' and 'rib sin' means 'essential service'. How will 'regular service' be written in that code language?
- (1) Sin fa (2) Sin de (3) Rib sin
(4) Data inadequate (5) None of these
10. In a certain code language, 'dom pul ta' means 'bring hot food'; 'pul fir sop' means 'food is good' and 'tak da sop' means 'good bright boy', which of the following means 'hot' in that language?
- (1) Dom (2) Pul (3) Ta (4) Sop (5) Cannot be determined

CONCEPT TEST IV

1. In a certain code, MAIN is written as '9364' and DEAR is written as '8532'. How is MEND written in that code?
- (1) 9548 (2) 9458 (3) 9538 (4) 9528 (5) None of these
2. In a certain code, KING is written as 119147. How will be QUEEN written in that same code?
- (1) 17205513 (2) 17215514 (3) 16215514 (4) 17215514 (5) 18205514
3. In a certain code, 15789 is written as XTZAL and 2346 is written as NPSU. How is 23549 written in that code?
- (1) NPTSL (2) NPTUL (3) NBTSL (4) PNTSL (5) NTPUL
4. If EARTH is coded as 41590 and PALE as 2134, what is the code for PEARL?
- (1) 24135 (2) 24153 (3) 54312 (4) 43215 (5) 12345
5. If 'ACE' is written as '135', 'FEED' is written as '6554', then how will 'HIDE' be written in that code language?
- (1) 7945 (2) 7865 (3) 7845 (4) 8945 (5) 8965

Instructions for questions 6 to 9: Answer the following questions based on the information given.

In a certain language, 'PETROL' is coded as '245168' and 'RAISE' is coded as '19374'.

Answer the following questions based on the above information.

6. '731584269' is the code for which word?
- (1) SRITLPEOA (2) SIRTLEPOA (3) SIRTLPPOA (4) SITRLEPOA (5) SIRTLEPAO
7. What is the code for 'TRAIL'?
- (1) 61938 (2) 15938 (3) 51983 (4) 51938 (5) 51738
8. Which letters are respectively represented by the digits 1 and 7?
- (1) R and A (2) A and S (3) P and S (4) R and S (5) None of these

9. Once the code is applied to the words PORT and RISE, what is the sum of the codes thus obtained?
 (1) 3889 (2) 4989 (3) 3989 (4) 3498 (5) None of these
10. If LIVED is DEVIL, then what is 4689?
 (1) 9864 (2) 8964 (3) 4698 (4) 6984 (5) None of these

CONCEPT TEST V

1. In a language, if 'rat' is called 'cat', 'cat' is called 'dog', 'dog' is called 'lion', 'lion' is called 'tiger', then which of these drinks milk?
 (1) Rat (2) Cat (3) Dog (4) Lion (5) Tiger
2. In a language, if 'red' is called 'pink', 'pink' is called 'blue', 'blue' is called 'orange', 'orange' is called 'yellow', then what is the colour of sky?
 (1) Red (2) Pink (3) Blue (4) Orange (5) Yellow
3. In a language, if 'hand' is called 'leg', 'leg' is called 'stomach', 'stomach' is called 'kidney', 'kidney' is called 'throat', then which organ is used for walking?
 (1) Hand (2) Leg (3) Stomach (4) Kidney (5) Throat
4. In a language, 'eating' is called 'munching', 'munching' is called 'swallowing', 'swallowing' is called 'ingesting', 'ingesting' is called 'drinking', then what will a person do when he is having lunch?
 (1) Eating (2) Munching (3) Swallowing (4) Ingesting (5) Drinking
5. In a language, 'floor' is called 'walls', 'walls' is called 'ceilings', 'ceilings' is called 'window', 'window' is called 'doors', then what is a room's top surface?
 (1) Floor (2) Walls (3) Ceilings (4) Window (5) Doors
6. In a language, 'January' is called 'May', 'May' is called 'December', 'December' is called 'April', 'April' is called 'June', then if a person is celebrating Christmas then which month is he talking about?
 (1) January (2) May (3) December (4) June (5) April
7. In a language, 'I' is called 'We', 'We' is called 'You', 'You' is called 'He', 'He' is called 'She', 'She' is called 'Us', then what term is used to refer to myself?
 (1) I (2) She (3) We (4) He (5) Us
8. If cloud is called white, white is called rain, rain is called green, green is called air, air is called blue and blue is called water, where will the birds fly?
 (1) Cloud (2) White (3) Blue (4) Air (5) Water

Instructions for questions 9 to 13: Answer the following questions based on the information given. Interpret the symbols given to solve the questions that follow.

$A \alpha B$ means the addition of A and B.

$A \beta B$ means the difference between A and B.

$A \theta B$ means the product of A and B.

$A \div B$ means the remainder when A is divided by B.

3. Statements: $D \spadesuit E$, $E \% U$, $U \times V$

Conclusions:

- I. $V \spadesuit E$
- II. $D \spadesuit U$
- III. $V \$ D$

- (1) None is true
- (2) Only III is true
- (3) Only II is true
- (4) Only I is true
- (5) Only I and II are true

4. Statement: $H \% R \spadesuit F \$ Q$

Conclusions:

- I. $F \% H$
- II. $Q \times R$
- III. $Q \times H$

- (1) None is true
- (2) Only III is true
- (3) Only II is true
- (4) Only I is true
- (5) Only II and III are true

5. Statement: $D \$ Y$, $Y \times W$, $W \spadesuit G$

Conclusions:

- I. $G \times Y$
- II. $D \spadesuit W$
- III. $Y \times G$

- (1) None is true
- (2) Only I is true
- (3) Only II is true
- (4) Only III is true
- (5) Only II and III are true

Instructions for questions 6 to 10: Answer the following questions based on the information given.

In the following question, the symbols +, *, @, # and & are used with the following meaning illustrated.

'A + B' means 'A is not smaller than B'.

'A * B' means 'A is not greater than B'.

'A @ B' means 'A is neither greater than nor equal to B'.

'A # B' means 'A is neither smaller than nor equal to B'.

'A & B' means 'A is neither greater than nor smaller than B'.

In each of the following questions assuming the given statements to be true, find out which of the three conclusions I, II and III given below them is/are definitely true.

6. Statements: $J \& O$, $O * E$, $E @ B$

Conclusions:

- I. $B \# J$
- II. $E \& J$
- III. $E \# J$

- (1) Only I is true
- (2) Only either II or III is true
- (3) Only I and either II or III are true
- (4) Only III is true
- (5) None of these

7. Statements: $T \# K$, $K @ F$, $F + Z$

Conclusions:

- I. $T \# Z$
- II. $Z @ K$

III. F # T

- (1) None is true (2) Only I is true (3) Only II is true
 (4) Only III is true (5) Only I and II are true

8. **Statements:** L @ H, H * D, D # W

Conclusions:

- I. W # L
 II. D # L
 III. H @ W

- (1) Only I is true (2) Only I and II are true (3) Only I and III are true
 (4) Only II and III are true (5) None of the above

9. **Statements:** O * P, P & Q, Q # R

Conclusions:

- I. R @ P
 II. R @ O
 III. Q + O

- (1) Only I and II are true (2) Only I and III are true (3) Only II and III are true
 (4) All are true (5) None of these

10. **Statements:** A * B, B & C, C + D

Conclusions:

- I. B + A
 II. D & A
 III. D * B

- (1) Only I is true (2) Only II is true (3) Only III is true only
 (4) Only I and III are true (5) None of these

CONCEPT TEST X

Instructions for questions 1 to 4: Answer the following questions based on the information given.

Given below are some symbols and letters and their corresponding codes. Read the rules given below and code the series given in questions by applying all the rules at the most once.

A	#	E	D	P	O	\$	M	~	J
9	5	0	6	4	1	8	2	7	3

- If the series contains any two consecutive letters of the alphabet together, then the first two numbers of the coded series are replaced by 10.
- If a vowel and a symbol occur together in any order in the series, then both of them are interchanged.
- If the series contains exactly two symbols, then the codes for those two symbols are interchanged.
- If the series starts and ends with a consonant, then the last 3 numbers of the coded series are reversed. This rule is applied only after all the other rules are applied.

1. PO\$DAJ

- (1) 101639 (2) 101396 (3) 108396 (4) 108693 (5) 101693

2. DAM~\$P

- (1) 692874 (2) 692784 (3) 692478 (4) 892746 (5) 892476

3. JDO#~M

- (1) 361752 (2) 367251 (3) 361257 (4) 367152 (5) 362157

4. P#DEM\$

- (1) 486025 (2) 106028 (3) 451028 (4) 481025 (5) 106025

Instructions for questions 5 to 8: Answer the following questions based on the information given.

In each of the questions given below, a group of digits is given followed by four combinations of letters/symbol numbered (1), (2), (3), (4). You have to find out which of the four combinations correctly represents the group of digits based on the letter/symbol codes and the conditions given below. If none of the four combinations represents the group of digits correctly, mark option (5), i.e. 'None of these' as the answer.

Digits	3	9	6	4	2	5	1	8	7
Letters/Symbol	@	G	\$	%	D	&	H	!	Y

Conditions:

- If the first digit is even and the last digit is odd, the codes for the first and the last digit are to be interchanged.
- If the first as well as the last digit is odd, both are to be coded by the code for the last digit.
- If the first as well as the last digit is even, both are to be coded by the code for the first digit.

5. 6 8 5 3 7 4

- (1) \$!&@Y% (2) \$!&@Y\$ (3) %!&@Y% (4) \$!&GY\$ (5) None of these

6. 7 5 2 6 4 1

- (1) Y&D\$%H (2) H&D\$%Y (3) Y&D\$%Y (4) H&D%\$H (5) None of these

7. 8 1 4 5 7 9

- (1) GH%&Y! (2) !H%&YG (3) !H%&Y! (4) GH%@Y! (5) None of these

8. 2 5 6 3 1 8

- (1) !&\$@H! (2) D&\$@H! (3) D&G@HD (4) D&\$@HD (5) None of these

LOGICAL PUZZLES

CONCEPT TEST I

- How many meaningful three-letter words can be formed using the first, third, fifth, eighth and tenth letter of the word 'PERCEPTION' exactly once?
 (1) One (2) Two (3) Three (4) Four (5) More than four
- How many meaningful three-letter words can be formed using the second, fourth, eighth and eleventh letter of the word 'SENTIMENTAL' exactly once?
 (1) One (2) Two (3) Three (4) Four (5) More than four
- How many meaningful four-letter words can be formed using the third, seventh, tenth and thirteenth letter of the word 'OUTPERFORMANCE' exactly once?
 (1) One (2) Two (3) Zero (4) Three (5) Four
- How many meaningful three-letter words can be formed using the first, fourth, fifth and tenth letter of the word 'LAPAROSCOPY' exactly once?

- (1) One (2) Two (3) Three (4) Four (5) More than four
5. How many pairs of letters in the word ARGENTINA' have as many letters between them in the word as in the alphabet?
 (1) None (2) One (3) Two (4) Three (5) Four
6. How many pairs of letters in the word 'PRESENCE' have as many letters between them in the word as in the alphabet?
 (1) None (2) One (3) Two (4) Three (5) Four
7. How many pairs of letters in the word 'CREATIVE' have as many letters between them in the word as in the alphabet?
 (1) None (2) One (3) Two (4) Three (5) Four
8. How many pairs of letters in the word 'PROPHECY' have as many letters between them in the word as in the alphabet?
 (1) None (2) One (3) Two (4) Three (5) Four
9. In the word 'CONSPIRACY', the fifth letter is interchanged with the seventh letter, the third letter is interchanged with the ninth letter and the first letter is interchanged with the tenth letter. Which letter would come just before the letter 'R' in the newly formed word?
 (1) P (2) S (3) C (4) A (5) N
10. In the word 'MESOPOTAMIA', the fourth letter is interchanged with the seventh letter, the second letter is interchanged with the fifth letter and the first letter is interchanged with the eleventh letter. Which letter would come just before the letter 'T' in the newly formed word?
 (1) M (2) I (3) P (4) A (5) S

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

The following questions are based on the five three-digit numbers given below.

675 647 616 689 631

1. If the position of the first and second digit of each number is interchanged, which of the following will now be the unit's digit of the second lowest number?
 (1) 6 (2) 7 (3) 1 (4) 4 (5) 9
2. If the position of the first and last digit of each number is interchanged, which of the following will now be the second lowest number?
 (1) 675 (2) 647 (3) 616 (4) 689 (5) 631
3. If the position of the second and last digit of each number is interchanged, which of the following will now be the second highest number?
 (1) 675 (2) 647 (3) 616 (4) 689 (5) 631
4. If the square of the last digit of each number is added to the number, what is the last digit of the smallest number thus obtained?
 (1) 2 (2) 6 (3) 0 (4) 9 (5) 4

5. The sum of the square of the first and second digit is the largest for which number?
 (1) 675 (2) 647 (3) 616 (4) 689 (5) 631

Instructions for questions 6 to 8: Answer the following questions based on the information given.

Answer the questions based on the following information:

In a gym, there are 5 different persons A, B, C, D and E having different weights.

- i. E is heavier than A and lighter than D.
- ii. B is heavier than E.
- iii. C is lighter than A.
- iv. B is the second heaviest person.

The weights are measured in pounds and all of them have integral values.

6. Who is the heaviest person?
 (1) A (2) B (3) C (4) D (5) E
7. Who is the second lightest person?
 (1) A (2) B (3) C (4) D (5) E
8. Who holds the middle position if the weights are in ascending order?
 (1) A (2) B (3) C (4) D (5) E
9. Ashish is ranked eleventh from the top and thirty seventh from the bottom in a class. How many students are there in this class?
 (1) 45 (2) 51 (3) 53 (4) 48 (5) None of these
10. In a row of boys, Nitesh is 7th from the left and Chandan is 25th from the right. If they interchange their positions, Nitesh becomes 16th from the left. How many boys are there in the row?
 (1) 41 (2) 40 (3) 39 (4) 42 (5) 38

CONCEPT TEST III

1. Each vowel of the word 'AUTHOR' is replaced by the next letter in the alphabet and each consonant is replaced by the letter just preceding it. Now, the substituted letters are arranged in alphabetical order. Which of the following will now be the third letter from the left?
 (1) P (2) Q (3) B (4) G (5) V
2. How many such digits are present in the number '746915' each of which if replaced by the unit digit of the square of that digit does not change its position?
 (1) 1 (2) 2 (3) 3 (4) 4 (5) None
3. Select the combination of numbers so that the letters arranged accordingly will form a meaningful word.
 E Y I R L S E U L
 1 2 3 4 5 6 7 8 9
 (1) 5, 3, 7, 6, 8, 4, 1, 9, 2 (2) 8, 6, 1, 5, 7, 4, 3, 9, 2 (3) 9, 7, 3, 6, 8, 4, 1, 5, 2
 (4) 4, 1, 9, 3, 6, 7, 8, 5, 2 (5) None of these
4. How many pairs of letters in the word 'SCHWARTZEL' have as many letters between them in the word as in the alphabet?
 (1) One (2) Two (3) Three (4) Four (5) Nil

5. How many pairs of letters in the word 'NERVES' have as many letters between them in the word as in the alphabet?
 (1) One (2) Two (3) Three (4) Four (5) Nil
6. How many pairs of letters in the word 'ENFRANCHISE' have as many letters between them in the word as in the alphabet?
 (1) One (2) Two (3) Three (4) Four (5) More than four
7. How many pairs of letters in the word 'OMNIVOROUS' have as many letters between them in the word as in the alphabet?
 (1) One (2) Two (3) Three (4) Nil (5) More than three
8. How many pairs of letters in the word 'SEASONAL' have as many letters between them in the word as in the alphabet?
 (1) One (2) Two (3) Three (4) Four (5) More than four
9. How many pairs of letters in the word 'DEFICIT' have as many letters between them in the word as in the alphabet?
 (1) Nil (2) One (3) Two (4) Three (5) More than three
10. If it is possible to make only one valid four-letter English word using the first, fourth, seventh and ninth letters of the word MUNIFICENT exactly once, which of the following will be the third letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
 (1) N (2) I (3) C (4) X (5) Y

CONCEPT TEST IV

1. If it is possible to make only one valid three-letter English word using the third, fifth and eighth letters of the word PROFANITY exactly once, which of the following will be the second letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
 (1) O (2) A (3) T (4) X (5) Y
2. If it is possible to make only one valid five-letter English word using the second, fourth, sixth, seventh and eighth letters of the word SKIRMISH exactly once, which of the following will be the last letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
 (1) K (2) R (3) I (4) X (5) Y
3. If it is possible to make only one valid four-letter English word with the first, fourth, fifth and seventh letters of the word POSTAGE exactly once, which of the following will be the first letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
 (1) P (2) A (3) T (4) X (5) Y
4. If it is possible to make only one valid four-letter English word using the first, fourth, sixth and eighth letters of the word COERCION exactly once, which of the following will be the third letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
 (1) N (2) I (3) C (4) X (5) Y

5. If it is possible to make only one valid three-letter English word using the third, sixth and eighth letters of the word CHRISTIAN exactly once, which of the following will be the second letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
- (1) T (2) R (3) A (4) X (5) Y
6. If it is possible to make only one valid five-letter English word using the first, second, third, ninth and eleventh letters of the word FLORESCENCE exactly once, which of the following will be the fifth letter of that word? If no such word can be made, give 'X' as the answer and if more than one such word can be made, give 'Y' as the answer.
- (1) L (2) O (3) N (4) X (5) Y

Instructions for questions 7 to 11: Answer the following questions based on the information given. The following questions are based on the five three-digit numbers given below.

394 662 723 546 835

7. If the first and second digit of each number is added, the resulting sum of which of the following numbers will not be exactly divisible by 3?
- (1) 546 (2) 723 (3) 835 (4) 394 (5) 662
8. If the position of the first and the second digit within each number is interchanged, which of the following will now be the second highest number?
- (1) 394 (2) 723 (3) 662 (4) 546 (5) 835
9. If 2 is added to the last digit of each number and then the position of the first and the third digit is interchanged, which of the following will now be the second smallest number?
- (1) 394 (2) 662 (3) 723 (4) 546 (5) 835
10. If 2 is added to each number, which of the following is the second digit of the second highest number?
- (1) 9 (2) 6 (3) 7 (4) 2 (5) 3
11. For which of the following pairs is the sum of the second and third digit equal?
- (1) 394 and 662 (2) 662 and 723 (3) 546 and 835 (4) 835 and 662 (5) 723 and 546

CONCEPT TEST V

Instructions for questions 1 to 3: Answer the following questions based on the information given. The following questions are based on the five three-digit numbers given below.

794 736 782 775 718

1. If the position of the second and last digit of each number is interchanged, which of the following will now be the second highest number?
- (1) 794 (2) 736 (3) 782 (4) 775 (5) 718
2. If the cube of the last digit of each number is added to the same number, then which of the following will now be the highest number?
- (1) 794 (2) 736 (3) 782 (4) 775 (5) 718
3. If the square of the second digit of each number is subtracted from the same number, then which of the following will now be the smallest number?

- (1) 794 (2) 736 (3) 782 (4) 775 (5) 718

Instructions for questions 4 to 8: Answer the following questions based on the information given.

The following questions are based on the five three-digit numbers given below.

642 854 327 565 493

4. If 100 is subtracted from the even numbers and 100 is added to the odd numbers, which of the following will now be the second highest number?
 (1) 642 (2) 854 (3) 327 (4) 565 (5) 493
5. If 500 is subtracted from the highest number, 400 is subtracted from the second highest number and so on, which of the following will now be the second lowest number?
 (1) 642 (2) 854 (3) 327 (4) 565 (5) 493
6. If the position of the first and last digit of each number is interchanged, which of the following will now be the highest number?
 (1) 642 (2) 854 (3) 327 (4) 565 (5) 493
7. If the sum of digits is taken for each number, which of the resultant sums will not be exactly divisible by 4?
 (1) 642 (2) 854 (3) 327 (4) 565 (5) 493
8. Which of the following is the last digit of the second lowest number?
 (1) 2 (2) 4 (3) 7 (4) 5 (5) 3

CONCEPT TEST VI

Instructions for questions 1 to 6: Answer the following questions based on the information given.

Answer the questions based on the following information:

Four friends, Ram, Shyam, Mohan and Sohan, started playing a game with some money with them. The player who loses a round doubles the money of the other three players.

They play four rounds. Sohan, Mohan, Shyam and Ram each lose one game in that order. After the end of the fourth round, all have Rs. 40 with them.

1. Who started with the least amount?
 (1) Ram (2) Shyam (3) Mohan (4) All started with the same amount
2. Who had the highest amount after round 2?
 (1) Ram (2) Shyam (3) Mohan (4) Sohan
3. The difference in money between the player with the maximum amount and the player with the minimum amount was the greatest in the same round after which round?
 (1) After round 1 (2) After round 3
 (3) After round 1 and round 3 (4) After round 1, round 2 and round 3
4. What was the highest amount with Mohan after any round?
 (1) Rs. 75 (2) Rs. 80 (3) Rs. 85 (4) Rs. 90 (5) Rs. 100
5. Who had the maximum amount after any round and how much?
 (1) Ram, 100 (2) Shyam, 110 (3) Mohan, 90 (4) Sohan, 85 (5) Ram and Shyam, 110

6. 5 friends were comparing the cost of their watches. The cost of Yesha's watch is less than that of Rajvi's. Cost of Foram's watch is less than that of Priya's. Cost of Rajvi's watch is less than that of Priya's but more than that of Tanvi. Who's watch is costliest?
- (1) Tanvi (2) Yesha (3) Rajvi (4) Foram (5) Priya

Instructions for questions 7 and 8: Answer the following questions based on the information given.

Astronomers were trying to find the weights of 6 planets Mars, Venus, Pluto, Jupiter, Mercury and Saturn. They found that the number of planets lighter than Mars was equal to the number of planets heavier than Venus. Saturn was heavier than Mars and Mercury was heavier than Pluto. Venus was lighter than Mars. Saturn was not the heaviest planet.

7. Which is the third lightest planet among the given 6 planets?
- (1) Mars (2) Jupiter (3) Saturn (4) Mercury (5) Venus
8. If Jupiter is the heaviest planet, then which is the lightest planet among the 6 planets?
- (1) Venus (2) Mercury (3) Pluto (4) Mars (5) Cannot be determined

Instructions for questions 9 and 10: Answer the following questions based on the information given.

Five friends: Ajay, Binoy, Charak, Deepak and Goldy had recently written a high school examination. The following statements are known about their results:

1. Ajay did not secure 1st rank. Binoy did not secure 2nd rank.
2. Deepak did not secure 2nd rank. Goldy did not secure 3rd rank.
3. Charak had secured a rank among top three. Deepak did not secure rank among top three.
4. Ajay had secured rank among top three. Charak did not secure rank among top three.
5. Deepak had secured rank among top three. Goldy had secured rank among top three.

In each of the five statements above one statement is true and the other one is false, not necessarily in that order.

9. Who among the following secured 3rd rank?
- (1) Ajay (2) Binoy (3) Charak (4) Deepak (5) Indeterminate
10. Who among the following had secured 1st rank?
- (1) Ajay (2) Binoy (3) Charak (4) Deepak (5) Goldy

CONCEPT TEST VII

1. In a row of 26 boys; when Rajiv was shifted by six places towards the right, he became the 15th person from the left end. What was his earlier position from the right end of the row?

(1) 9 (2) 11 (3) 18 (4) 17 (5) 19

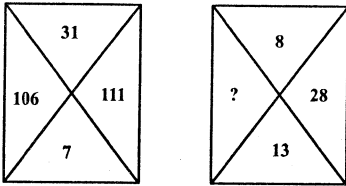
2. In a row of boys Lalit is 14th from the left and Feroz is 21st from the right. When they both interchange their position, Feroz becomes 35th from the right. What is the position of Lalit from left after interchanging positions?

(1) 22 (2) 25 (3) 28 (4) 31 (5) 34

3. In a queue, Ramesh is 16th from the front while Daya is 37th from the end. Suraj is exactly between the two. If there are 74 people in the queue, what position does Suraj occupy from the front?

(1) 26 (2) 27 (3) 28 (4) 29 (5) 30

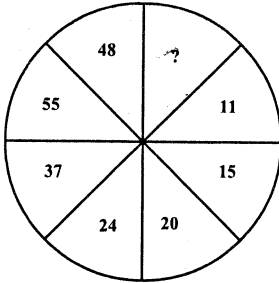
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What is the missing number?

- (1) 88 (2) 76 (3) 78 (4) 67 (5) 68

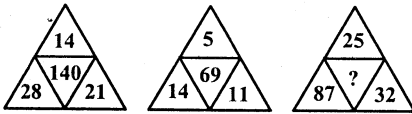
5.



Which of the following can be the missing number?

- (1) 10 (2) 12 (3) 8 (4) 2 (5) 6

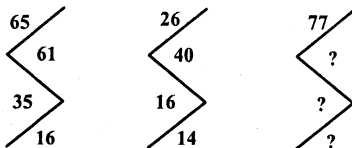
6.



What is the missing number?

- (1) 350 (2) 360 (3) 370 (4) 250 (5) 450

7.



Which of the following triplet of numbers will be placed in the missing places?

- (1) 73, 36, 12 (2) 19, 9, 12 (3) 49, 21, 16 (4) 98, 17, 16 (5) 37, 15, 12

8.

1	3	7
4	9	19
12	25	?

Mark the appropriate alternative that completes the figure.

- (1) 51 (2) 41 (3) 31 (4) 37 (5) None of these

9. Each period in a school lasts for 45 minutes. A bell indicating the start of the period rang at 8:10 am. After some time, a boy asked one of his classmate "How much time is it before the period

gets over?" Then, his classmate replied that it there were still 17 minutes. At what time did the boy ask this question to his classmate?

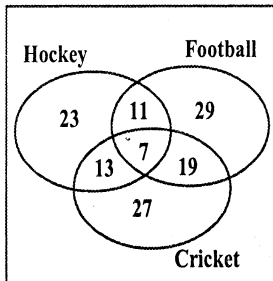
- (1) 8:33 am (2) 8:38 am (3) 8:28 am (4) 8:33 am (5) None of these
10. Maria remembers that one of her teacher's birthday was certainly after the 13th but before the 17th of April. Her friend remembers that the same teacher's birthday was definitely after the 9th but before the 15th of April. On which date of April was Maria's teacher's birthday?
- (1) 13th (2) 14th (3) 15th (4) None of these (5) Data inadequate
11. Three actresses were asked their age in an interview. But since they didn't want the public to know their age, one of the smart actresses, Sneha put forward a puzzle in front of the journalists. She said that she was the youngest unless Mahek is, and that if Tanya isn't the youngest then she was the eldest. Who was the actress who is neither the youngest, nor the eldest?
- (1) Tanya (2) Sneha (3) Mahek (4) Inadequate data

VENN DIAGRAMS

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

150 students were surveyed to know the sport they follow.



Some of the students surveyed did not follow any of the sports.

- How many students follow exactly one sport?

(1) 86 (2) 79 (3) 77 (4) 69 (5) None of these
- How many students follow hockey or football but not cricket?

(1) 63 (2) 52 (3) 61 (4) 59 (5) 57
- What is the difference between the number of students who follow all three sports and those who follow a maximum of two sports?

(1) 122 (2) 136 (3) 102 (4) 88 (5) 143
- The number of students who do not follow any game is what percentage of the total number of students?

(1) 19.33 % (2) 15.33% (3) 14% (4) 12.67% (5) 8.67%
- What is the ratio of the number of students following exactly two sports to the number of students following exactly one sport.

(1) $\frac{43}{69}$ (2) $\frac{32}{79}$ (3) $\frac{32}{63}$ (4) $\frac{43}{79}$ (5) $\frac{41}{79}$

Instructions for questions 6 to 10: Answer the following questions based on the information given.

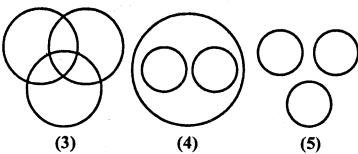
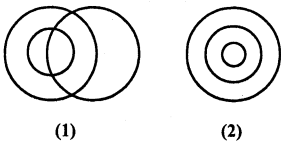
Out of a group of 245 pilgrims, 105 visited Badrinath, 95 visited Kedarnath and 95 visited Somnath. Fifteen of them visited all three shrines, while 190 visited exactly one of the three shrines. The number of pilgrims who visited exactly two out of the three shrines is three times as many as those who did not visit any one of the three shrines.

6. How many pilgrims have not visited any one of the three shrines?
 (1) 20 (2) 10 (3) 15 (4) 25 (5) None of these
7. How many pilgrims visited not more than one shrine?
 (1) 50 (2) 100 (3) 150 (4) 200 (5) None of these
8. If the number of pilgrims who have visited at least one of the two shrines Kedarnath and Somnath is 165, then how many pilgrims visited only Kedarnath and Somnath?
 (1) 20 (2) 30 (3) 10 (4) 15 (5) 25
9. If 180 pilgrims visited at least one of the two shrines Kedarnath and Badrinath, then how many pilgrims visited only Somnath?
 (1) 55 (2) 40 (3) 35 (4) 60 (5) 50
10. If there is nobody who visited only Badrinath and Somnath, how many people visited only Kedarnath?
 (1) 80 (2) 90 (3) 70 (4) 60 (5) 50

CONCEPT TEST II

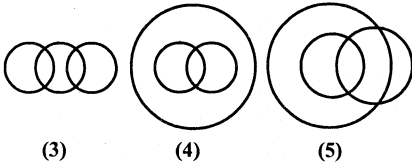
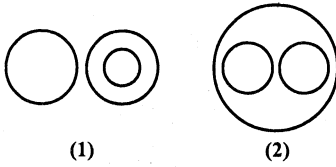
Instructions for questions 1 to 5: Answer the following questions based on the information given.

Each of the questions below contains three groups of elements. Choose from the following diagrams, the diagram that depicts the correct relationship among the three elements in each question.



1. Cricket fans, Tennis fans, Football fans
2. Asia, India, Mumbai
3. Earth, Mars, Sun
4. Blue, Jeans, Clothes
5. Cold drinks, Coca-Cola, Fanta

Instructions for questions 6 to 10: Answer the following questions based on the information given. Each of the questions below contains three groups of elements. Choose from the following diagrams, the diagram that depicts the correct relationship among the three elements in each question.



6. Males, Engineers, Fathers
7. Human beings, Females, Married people
8. Circle, Quadrilateral, Rectangle
9. Toothpaste, Colgate, Pepsodent
10. Flower, Pink, T-shirt

NUMERICAL LOGIC

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

- Input: age road own wire tire ink pen uni dice eat
 Step I: Uni age road own wire tire ink pen eat dice
 Step II: Uni Own age road wire tire ink eat pen dice
 Step III: Uni own ink age wire tire eat road pen dice
 Step IV: Uni own ink eat age wire tire road pen dice
 Step IV is the last step of the rearrangement

As per the rules followed in the above steps, find out in each of the following questions the appropriate steps for the given input.

Input: gem stat ace cast omit fan rate uncut era input

1. Which of the following would be the final arrangement?
 - (1) Cast gem fan rate stat uncut omit input era ace
 - (2) Uncut omit input era ace cast fan gem rate stat
 - (3) Uncut omit input era ace stat rate gem fan cast
 - (4) Uncut omit input era ace stat fan gem rate cast
 - (5) None

2. In Step III, which of the following word would be the 6th from left?

(1) rate	(2) ace	(3) stat	(4) gem	(5) None
----------	---------	----------	---------	----------

3. Which step number would correspond to the following output?
Uncut omit gem stat ace rate era input fan cast
(1) II (2) III (3) V (4) IV (5) None
4. In step IV of the rearrangement, if omit is related to era and rate is related to fan in a certain way, to which of the following would ace be related to, following the same pattern?
(1) rate (2) input (3) stat (4) gem (5) None of these
5. Which of the following would be step VII?
(1) Uncut omit input era ace stat rate gem fan cast.
(2) Uncut omit input era ace rate stat fan gem cast.
(3) Uncut omit input era ace cast fan gem rate stat.
(4) Uncut omit input era stat ace rate gem fan cast.
(5) There will be no such step as the input gets rearranged before step VII

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Study the following information carefully and answer the questions which follow:

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule. Following is an illustration of input and the rearrangement

Input: flight 37 delay an 53 87 hour 19 by 46

Step I: 87 flight 37 delay 53 hour 19 by 46 an

Step II: 87 53 flight 37 delay hour 19 46 by an

Step III: 87 53 46 flight 37 hour 19 delay by an

Step IV: 87 53 46 37 hour 19 flight delay by an

Step V: 87 53 46 37 19 hour flight delay by an

Step V is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:

24 cross 82 road 93 safe 13 jam halt 46

6. Which of the following would be the second step after the rearrangement?
(1) 93 82 46 24 13 safe road jam halt cross (2) 93 82 46 24 road safe 13 jam halt cross
(3) 93 82 24 road safe 13 jam 46 halt cross (4) 93 24 82 road safe 13 jam halt 46 cross
(5) None of these
7. Which of the following would be the final arrangement?
(1) 93 82 46 24 13 safe road jam halt cross (2) 93 82 46 13 24 safe road jam halt cross
(3) 13 24 46 82 93 safe road jam halt cross (4) 93 82 46 24 13 cross halt jam road safe
(5) safe road jam halt cross 93 82 46 24 13
8. Which of the following will be step VI of the above input?
(1) 93 24 82 road safe 13 jam halt 46 cross (2) 93 82 24 road safe 13 jam 46 halt cross
(3) 93 82 46 24 road safe 13 jam halt cross (4) 93 82 46 24 13 safe road jam halt cross
(5) There will be no such step as it gets arranged before Step VI
9. In step III, which of the following would be the third word/number from the left?
(1) safe (2) 46 (3) 13 (4) road (5) None

10. Which step would the following arrangement correspond to?

93 24 82 road safe 13 jam halt 46 cross

- (1) I (2) II (3) III (4) IV (5) V

CONCEPT TEST II

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

Input: lightning never strikes twice in the same place

Step I: in lightning never strikes twice the same place

Step II: in lightning never place strikes twice the same

Step III: in lightning never place same strikes twice the

Step IV: in lightning never place same strikes the twice

Step IV is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:

Input: never put off until tomorrow what you can do today

1. In how many steps will the input be rearranged?

- (1) 2 (2) 4 (3) 3 (4) 1 (5) 5

2. What is the third word in the third step?

- (1) Out (2) Off (3) Never (4) Can (5) Do

3. Which step would the following arrangement correspond to:

can do never put off until tomorrow what you today

- (1) V (2) IV (3) III (4) II (5) I

4. Which of this is the fourth step?

- (1) can do off never put today until tomorrow what you
 (2) can do put never off today until tomorrow what you
 (3) can do never off put today until tomorrow what you
 (4) can do never off what put today until tomorrow you
 (5) can do never put today until tomorrow off what you

5. Which of this is the final arrangement?

- (1) can do you never off put today tomorrow until what
 (2) can do never off today tomorrow until what you put
 (3) can do until never off put today tomorrow what you
 (4) can do never off put today tomorrow until what you
 (5) can do what never off put today tomorrow until you

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

Input: success has many fathers while failure is an orphan

Step I: an success has many fathers while failure is orphan

Step II: an is success has many fathers while failure orphan
 Step III: an is has success many fathers while failure orphan
 Step IV: an is has many success fathers while failure orphan
 Step V: an is has many while success fathers failure orphan
 Step VI: an is has many while orphan success fathers failure
 Step VII: an is has many while orphan failure success fathers
 Step VIII: an is has many while orphan failure fathers success
 Step VIII is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:
 Input: he who fights and runs away may live to fight another day

6. In how many steps will the input be rearranged?
 (1) 7 (2) 5 (3) 8 (4) 6 (5) 4
7. What is the third word in the fourth step?
 (1) Day (2) To (3) Who (4) He (5) And
8. Which step would the following output correspond to?
 He to and day may who live runs fights away fight another
 (1) V (2) IV (3) VI (4) VII (5) This output is not valid
9. Which of this is the sixth step?
 (1) he to and day may away who live runs fights fight another
 (2) he to and day may live runs fights away who fight another
 (3) he to and runs day may who live fights away fight another
 (4) he to and may who live runs fights day away fight another
 (5) he to and day may who away live fights runs fight another
10. Which of this is the final arrangement?
 (1) to and day who live runs away may fight fights another
 (2) to and day may who live runs away fight fights another
 (3) to and day may who live runs away fights another fight
 (4) to and day may who live runs fight away fights another
 (5) None of the above

CONCEPT TEST III

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word and number arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

Input: 1625	34	42	51	
Step I: 37	29	25	20	26
Step II: 53	54	59	62	77
Step III: 61	63	73	70	91
Step IV: 60	54	64	70	90
Step V: 54	60	64	70	90

Step V is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:

Input: 14 23 37 53 72

1. In how many steps will the input be rearranged?
 (1) 7 (2) 4 (3) 5 (4) 3 (5) 6
2. What is the third number in the third step?
 (1) 58 (2) 133 (3) 109 (4) 51 (5) None of these
3. The arrangement below corresponds to which step?
 31 36 95 87 125
 (1) IV (2) I (3) II (4) III (5) V
4. Which of this is not a number in any of the steps?
 (1) 17 (2) 36 (3) 16 (4) 58 (5) 95
5. Which of these is the last number in the final arrangement?
 (1) 98 (2) 95 (3) 33 (4) 102 (5) 124

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word and number arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

Input: 29 45 67 71 86
 Step I: 11 9 13 8 14
 Step II: 92 34 62 9 50
 Step III: 9 34 62 92 50
 Step IV: 9 34 50 92 62
 Step V: 9 34 50 62 92

Step V is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:

Input: 19 27 35 46 62

6. In how many steps will the input be rearranged?
 (1) 7 (2) 4 (3) 5 (4) 3 (5) 6
7. What is the third number in the fourth step?
 (1) 10 (2) 58 (3) 46 (4) 72 (5) None of these
8. Which step would be the following output?
 12 58 33 46 91
 (1) IV (2) VI (3) II (4) III (5) V
9. Which of this is a number in the output of any of the steps?
 (1) 10 (2) 33 (3) 16 (4) 58 (5) 8
10. Which of this is the last number in the final arrangement?
 (1) 58 (2) 72 (3) 33 (4) 10 (5) 91

CONCEPT TEST IV

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Study the following information to answer the given questions:

A word and number arrangement machine when given an input line of words rearranges them following a particular rule. The following is an illustration of input and rearrangement.

Input: 12 15 18 13 25 35
 Step I: 3 6 9 4 7 8
 Step II: 8 14 20 10 16 18
 Step III: 27 45 63 33 51 57
 Step IV: 9 15 21 11 17 19
 Step V: 100 169 256 121 529 1089

Step V is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions based upon the input:

1. What would be step I for the input
 21 52 36 43 34 22
 (1) 3 7 9 7 7 4 (2) 3 7 7 9 7 4
 (3) 3 7 9 7 4 4 (4) 3 7 9 7 4 7
 (5) None of these

2. If step V of the input is 169 289 100 1089 81,
 what will be step I of the input?
 (1) 15 12 19 35 11 (2) 15 19 12 35 11
 (3) 6 1 3 8 2 (4) Cannot be determined
 (5) None of these

3. If step IV of the input is 15 5 7 19 21 13, what will be step II of the input?
 (1) 16 4 6 18 20 12 (2) 14 4 6 18 20 12
 (3) 12 2 4 16 18 10 (4) Cannot be determined
 (5) None of these

4. Which of this is not a number in step III for the following input-
 21 17 28 23 35 41
 (1) 27 (2) 69 (3) 57 (4) 39 (5) 17

5. What is the final output for the input sequence in question 34?
 (1) 361 576 225 441 1089 1521
 (2) 361 1089 676 441 1521 225
 (3) 441 225 676 361 1089 1521
 (4) 361 225 676 441 1089 1521
 (5) 361 225 1521 441 1089 576

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Study the following information carefully and answer the questions which follow:

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule. Following is an illustration of input and the rearrangement

Input: home 7 sweet 27 a 16 of bear 31 key

Step I: 7 home sweet 27 a 16 of bear 31 key

Step II: 7 16 home sweet 27 a of bear 31 key

Step III: 7 16 27 home sweet a of bear 31 key

Step IV: 7 16 27 31 home sweet a of bear key

Step V: 7 16 27 31 a home sweet of bear key

Step VI: 7 16 27 31 a bear home sweet of key

Step VII: 7 16 27 31 a bear home key sweet of

Step VIII: 7 16 27 31 a bear home key of sweet

Step VIII is the last step of the arrangement of the above input as the intended rearrangement is obtained.

As per the rules followed in the above steps, answer the following questions:

6. Input : great 151 sour boat 31 61 live
How many steps are required to get the final output for the above input?
(1) 7 (2) 5 (3) 6 (4) 8 (5) None of these
7. Input : world 132 lie 51 and 19 june 36
What is the step IV for the above input?
(1) 19 36 51 132 world lie and june
(2) 19 132 51 36 world and lie june
(3) 51 36 19 132 and lie world june
(4) 19 36 51 132 world june and lie
(5) None of these
8. If step III of an input is '7 13 most 16 more 1988 saves 2017 9119', then which of the following will definitely be the input?
(1) 7 13 most 16 more 1988 saves 2017 9119
(2) 7 13 most 16 more 1988 saves 2017 9119
(3) 7 13 most 16 more 1988 saves 2017 9119'
(4) Cannot be determined
(5) None of these
9. Input : like tea 121 1251 eat 165 gate
For the above input, which of these will be the final step?
(1) 121 165 12151 eat gate like tea
(2) 121 165 12151 like tea eat gate
(3) 121 165 12151 like eat tea gate
(4) Like tea 121 1251 eat 165 gate
(5) none of these
10. If a given input is 'get 111 1225 say 1111 four 151 hire', then which of the following is step I of the given input?
(1) get 1111 1225 say 111 four 151 hire'
(2) 151 get 111 1225 say 1111 four hire'
(3) 111 get 1225 say 1111 four 151 hire'
(4) get 151 1225 say 1111 four 111 hire'
(5) say 111 1225 get 1111 four 151 hire'

CONCEPT TEST V

Instructions for questions 1 to 5: Answer the following questions based on the information given.

A large cube is painted on all sides with the same colour and then it is cut into 343 small identical cubes. Answer the following questions:-

1. How many of the smaller cubes have no faces painted at all?
 (1) 145 (2) 125 (3) 100 (4) 150 (5) None of these
2. How many of the smaller cubes have exactly one face painted?
 (1) 200 (2) 125 (3) 150 (4) 175 (5) 100
3. How many of the smaller cubes have exactly two faces painted?
 (1) 75 (2) 150 (3) 100 (4) 125 (5) 60
4. How many of the smaller cubes have exactly three faces painted?
 (1) Zero (2) 5 (3) 11 (4) 8 (5) None of these
5. If it was estimated that it would take 3 litres of paint to paint all the faces of the original cube, then how much paint is the original cube, then how much paint is required to paint all the faces of all the smaller cubes?
 (1) 11 litres (2) 12 litres (3) 21 litres (4) 14 litres (5) 16 litres

Instructions for questions 6 to 10: Answer the following questions based on the information given.

A string of numbers is fed into a computing machine. It processes the input and gives an output in the following manner:

Input: 88, 56, 32, 15, 61

Step 1: 89, 60, 41, 31, 86

Step 2: 89, 120, 123, 124, 430

Step 3: 430, 124, 123, 120, 89

Output: 1, 1, 0, 0, 2

6. If the input string is '34, 65, 3, 24, 89', what will be the output?
 (1) 0, 1, 0, 1, 0 (2) 2, 2, 1, 1, 0 (3) 0, 1, 1, 0, 2 (4) 0, 1, 0, 0, 2 (5) 0, 0, 1, 0, 2
7. If the input string is '84, 48, 17, 71, 55', then what is the value of $2k + 1$, if k is the 5th number of the output string?
 (1) 0 (2) 1 (3) 3 (4) 5 (5) None of these
8. Which of the following if given, the unique input string can be found?
 (1) Step 2 (2) Step 3 (3) Step 4
 (4) More than one of the above (5) None of these

Instructions for questions 9 to 12: Answer the following questions based on the information given.

A string of words is fed into a computing machine. It processes the input and gives an output in the following manner:

Input: Orange and green is a very good combination.

Step 1: A orange and green is very good combination.

Step 2: A is orange and green very good combination.

Step 3: A is and orange green very good combination.

Step 4: A is and good orange green very combination.

Step 5: A is and good very orange green combination.

Output: A is and good very green orange combination.

9. If the input string is 'Life is like a song', then in how many steps will the output be obtained?
 (1) 1 (2) 2 (3) 3 (4) 4 (5) 5
10. If the input string is 'I want to be a millionaire anyways', then what will be the output string?
 (1) A I be to want anyways millionaire.
 (2) I a be to want anyways millionaire.
 (3) I a to be want anyways millionaire
 (4) I want to be a anyways millionaire
 (5) I want to be a millionaire anyways
11. If the input statement is 'The quick brown fox jumps over a lazy dog', what is the sixth word in Step 5?
 (1) the (2) lazy (3) over (4) brown (5) fox
12. If the input string is 'Walk while you talk is the new age mantra', which word is at the centre in the output string?
 (1) talk (2) new (3) the (4) you (5) walk
13. What is the minimum number of cuts required to cut a cube into 343 smaller equal cubes?
 (1) 24 (2) 20 (3) 14 (4) 18 (5) 21
14. A cube is formed of 125 smaller cubes. If the larger cube is cut across both its diagonals, then how many smaller cubes will be cut?
 (1) 45 (2) 50 (3) 25 (4) 10 (5) 5
15. There are 277 chocolates, each of 20 gms, which are to be divided among all the students of a class. All the chocolates except one weigh the same. None of the students want that chocolate for the fear of it being lesser in weight. What is the minimum number of iterations of weighing required to find that chocolate if a spring balance is used?
 (1) 8 (2) 9 (3) 10 (4) 11 (5) 12

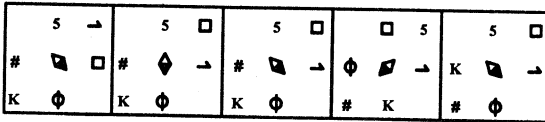
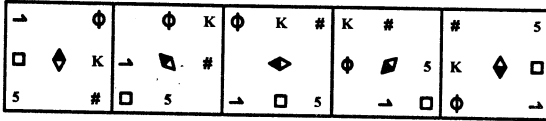
VISUAL REASONING

CONCEPT TEST I

Instructions for questions 1 to 6: Answer the following questions based on the information given.

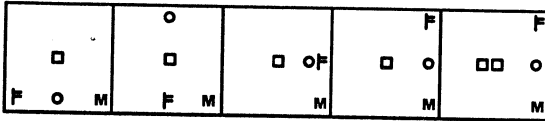
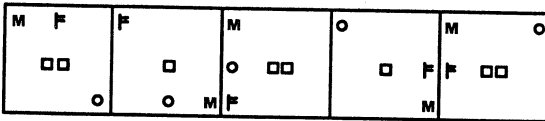
Given below are two sets of figures, the 'Problem Figures' and the 'Answer Figures' marked 1, 2, 3, 4 and 5. Which figure from 1, 2, 3, 4 and 5 should be in place of the question mark to continue the series?

1.



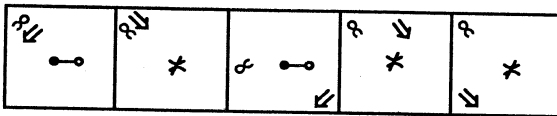
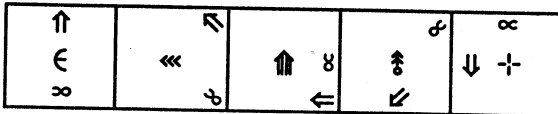
(1) (2) (3) (4) (5)

2.



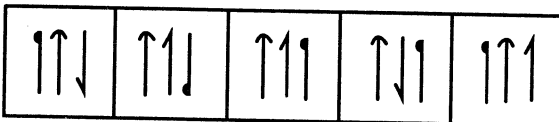
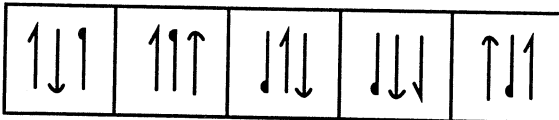
(1) (2) (3) (4) (5)

3.



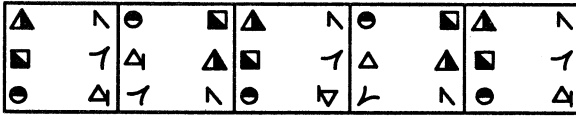
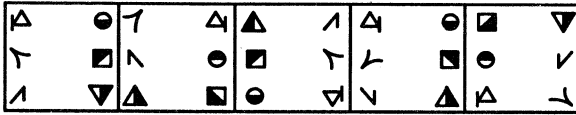
(1) (2) (3) (4) (5)

4.



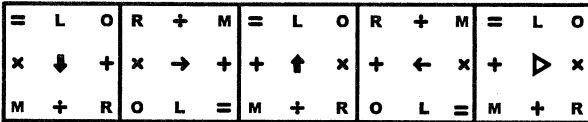
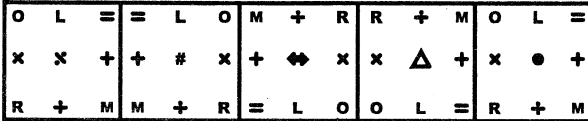
(1) (2) (3) (4) (5)

5.



(1) (2) (3) (4) (5)

6.

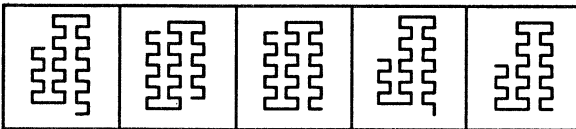
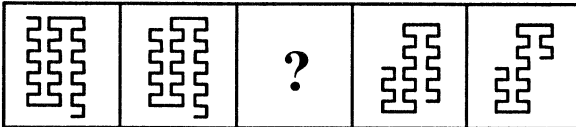


(1) (2) (3) (4) (5)

Instructions for questions 7 to 10: Answer the following questions based on the information given.

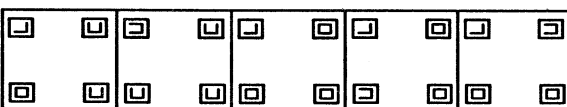
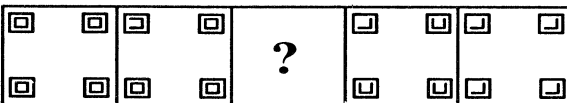
Given below are two sets of figures, the 'Problem Figures' and the 'Answer Figures' marked 1, 2, 3, 4 and 5. Which figure from 1, 2, 3, 4 and 5 should be in the place of the question mark to continue the series?

7.



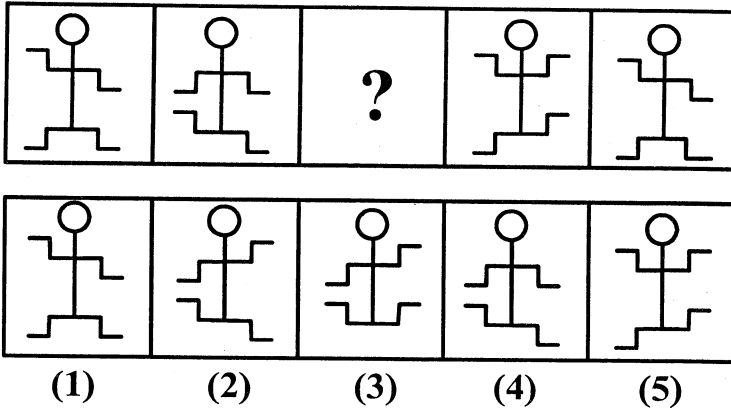
(1) (2) (3) (4) (5)

8.

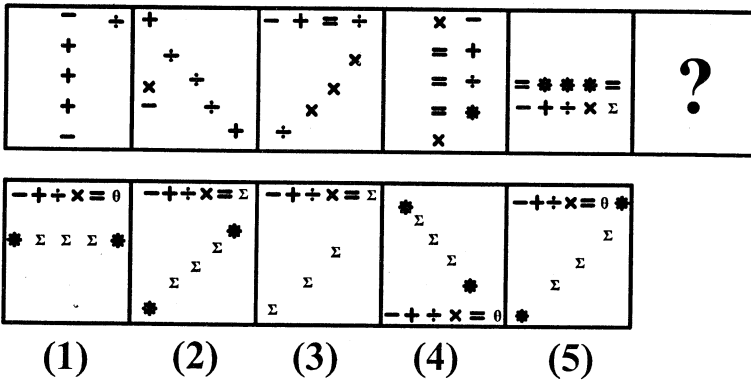


(1) (2) (3) (4) (5)

9.



10.

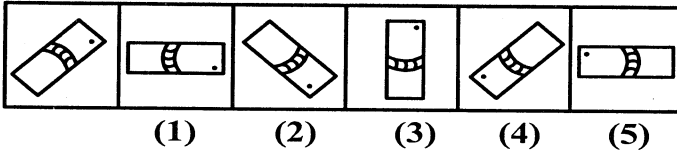


CONCEPT TEST II

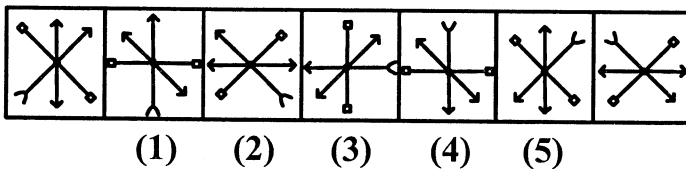
Instructions for questions 1 and 2: Answer the following questions based on the information given.

In the following question, a series is established if the position of two out of the five numbered figures is interchanged. The figures to be interchanged need not be consecutive. The position of the unnumbered figure remains the same and it indicates the beginning of the series. The earlier of the two numbered figures whose position needs to be interchanged is the answer. If no interchanging is required, then option 5 is the answer

1.



2.



3. The question below has 5 numbered frames which form a series if 2 consecutive frames are interchanged. Mark the earlier of the two frames to be interchanged as the answer. If no interchanging is required, mark option 5 as the answer.

■ α β + @ Σ	■ θ α + β @	■ Σ θ		
θ Σ ↑ β α →	Σ @ ↓ α θ ←	@ β ↑		
● @ + ● θ ■ ● β + ● Σ ■ ● α +				
(1)	(2)	(3)	(4)	(5)

Instructions for questions 4 to 8: Answer the following questions based on the information given.

In the question below, figure (B) is related to figure (A) in a certain way. Determine which of the 'Answer Figures' would come in place of question mark so as to have a similar relationship between figure (C) and (D).

4.

(a)	(b)	(c)	(d)

(1)	(2)	(3)	(4)	(5)

5.

(a)	(b)	(c)	(d)

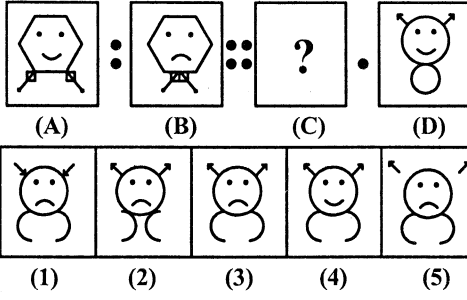
(1)	(2)	(3)	(4)	(5)

6.

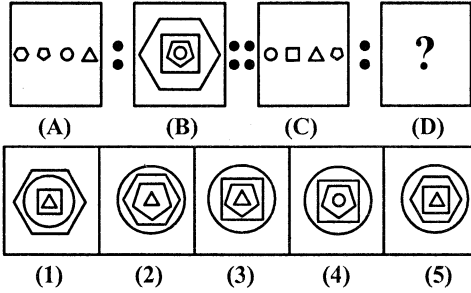
(A)	(B)	(C)	(D)

(1)	(2)	(3)	(4)	(5)

7.



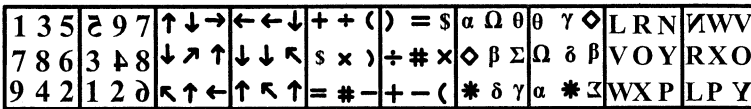
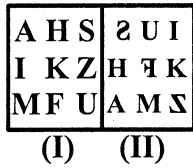
8.



Instructions for questions 9 and 10: Answer the following questions based on the information given.

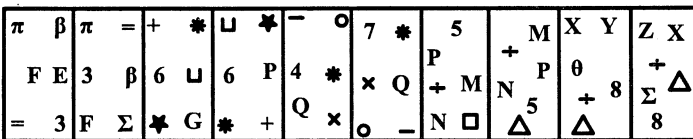
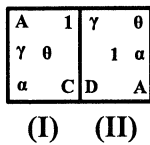
In each of the following questions, a related pair of figures is given followed by five numbered pairs. Select a pair that has a relationship similar to that of the original pair.

9.



(I) (1) (II) (1) (2) (II) (1) (3) (II) (1) (4) (II) (1) (5) (II)

10.



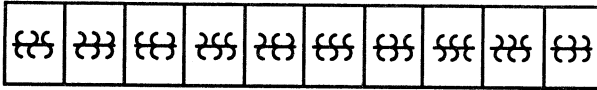
(I) (1) (II) (1) (2) (II) (1) (3) (II) (1) (4) (II) (1) (5) (II)

CONCEPT TEST III

Instructions for questions 1 to 2: Answer the following questions based on the information given.

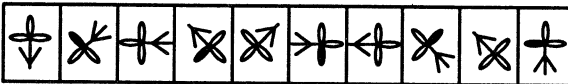
In the following questions, four out of five pairs have a similar relationship. Select a dissimilar pair among the five pairs given.

1.



(I)(I)(II) (I)(2)(II) (I)(3)(II) (I)(4)(II) (I)(5)(II)

2.

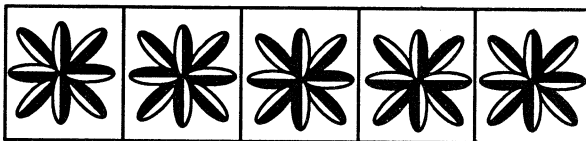


(I) (I)(II) (I) (2)(II) (I) (3)(II) (I) (4)(II) (I) (5)(II)

Instructions for questions 3 to 7: Answer the following questions based on the information given.

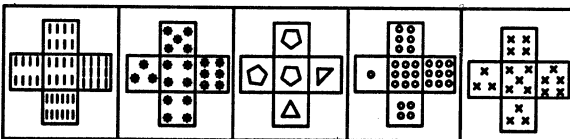
Given below are five figures, out of which four are similar in a certain manner. Find the figure which differs from all other figures.

3.



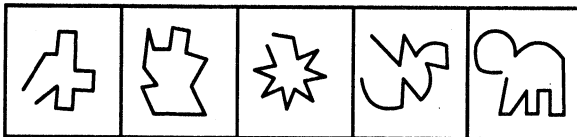
(1) (2) (3) (4) (5)

4.



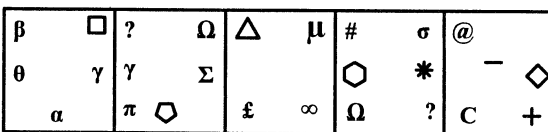
(1) (2) (3) (4) (5)

5.



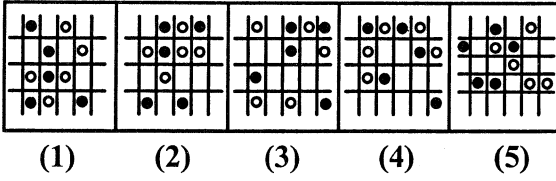
(1) (2) (3) (4) (5)

6.

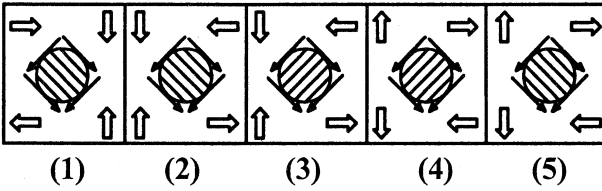
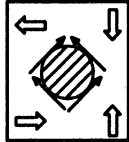


(1) (2) (3) (4) (5)

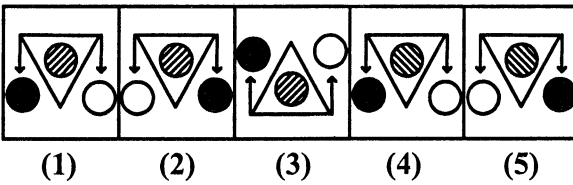
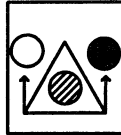
7.



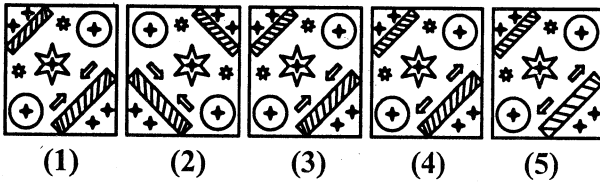
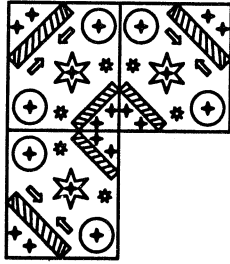
8. What is the figure obtained if a plane mirror is kept horizontally below the given figure and then kept on the right hand side?



9. What is the figure obtained if a plane mirror is kept on the right hand side and then horizontally below the given figure?



10. Which of the alternatives when placed in the blank will complete the pattern?



SELECTION CRITERIA

CONCEPT TEST I

Instructions for questions 1 to 5: Answer the following questions based on the information given.

Answer the following questions based on the information given below.

St. Mary's school has the following rules for promotions and scholarships. Should a student be eligible for more than one scholarship, the school will award him the higher of the multiple scholarships.

- (a) If a student has scored 90% or above in aggregate with a minimum of 85% in Science, minimum of 80% in Maths and minimum of 90% in English he gets promotion as well as a 50% scholarship.
- (b) If a student has scored 80% or above in aggregate with a minimum of 75% in Science, minimum of 70% in Maths and minimum of 80% in English he gets promotion as well as 25% scholarship.
- (c) If a student has scored between 50% to 79% aggregate he gets a promotion but not a scholarship.
- (d) If a student has scored less than 50% in aggregate he does not get either a promotion or a scholarship.

However,

- (e) If a student has got less than 50% in aggregate but has secured a minimum of 60% in Science and a minimum of 50% in Maths he gets a promotion but no scholarship.
- (f) If a student has scored 80% or above in aggregate without obtaining a minimum of 75% in Science and a minimum of 70% in Maths but has secured a minimum of 90% in English he gets promotion as well as 25% scholarship.
- (g) If a student has scored 90% or above in aggregate with a minimum of 95% in Science, minimum of 90% in Maths and minimum of 90% in English he gets promotion as well as a 100% scholarship.
- (h) The school has the norm of adding 2%, 5% and 6% to the student's aggregate score for any student who has represented the school in sports, musical competitions or debates respectively.
- (i) The school also has the norm of adding 1%, 2% and 4% to the student's aggregate score for any student whose attendance is in the range of 90-94%, 95-99% and 100% respectively.

1. Navin has the following results. He has an aggregate score of 47% with 58% in Science and 52% in Maths. He has also secured 55% in English. He represented the school in sports and has a 92% attendance record.

(1) Promotion with 50% scholarship	(2) Promotion with no scholarship
(3) No promotion	(4) Promotion with 25% scholarship
(5) Inadequate data	

2. Mahesh has the following results. He has 74% aggregate with 76% in Science and 80% in Maths. He has also secured 92% in English and represents his school in musical competitions. He has an 88% attendance record.

(1) Promotion with 50% scholarship	(2) Promotion with 25% scholarship
(3) Promotion with no scholarship	(4) No promotion
(5) Promotion with 100% scholarship	

3. Pravina has the following results. She has an aggregate of 87% with 86% in Science, 84% in Maths and 82% in English. She has a 100% attendance record. She represents her school in debating competitions.

(1) Promotion with 100% scholarship	(2) Promotion with 50% scholarship
(3) Promotion with 25% scholarship	(4) Promotion with no scholarship
(5) No promotion	

4. Neeraj has the following results. He has an aggregate of 88% with 92% in Science, 90% in Maths and 95% in English. He has a 96% attendance record.

(1) Promotion with 100% scholarship	(2) Promotion with 50% scholarship
(3) Promotion with 25% scholarship	(4) Promotion with no scholarship
(5) No promotion	

5. Sarvesh has the following results. He has an aggregate of 48% with 62% in Science and 48% in Maths. He has also secured 60% in English. He has an attendance record of 94%. He represents his school in Quiz contests.

(1) Promotion with 100% scholarship	(2) Promotion with 50% scholarship
(3) Promotion with 25% scholarship	(4) Promotion with no scholarship
(5) No promotion	

Instructions for questions 6 to 10: Answer the following questions based on the information given.

Answer the following questions based on the information given below.

Neptune travels was looking for a booking agent. The eligibility criteria for the same are as follows:-

- (a) The person should be 21 to 35 years of age
- (b) The person should have proper knowledge of MS office
- (c) The person should be well versed with the usage of internet
- (d) The person should have minimum 60% in class 12
- (e) The person should have minimum 55% in his/her graduation
- (f) The candidate must have minimum 1 year of work experience in the relevant field

However,

- (g) If (b) or (c) is not satisfied, then the candidate is referred to the technical expert.
- (h) If (d) is not satisfied but the candidate has 5 years or more of relevant work experience then the candidate is referred to the Director
- (i) If (f) is not satisfied but the candidate and the candidate have a certified degree in the field of travel booking then the candidate is referred to the Chairman

Give answer:-

- (1) If the candidate is to be selected
- (2) If the candidate is to be referred to technical expert
- (3) If the candidate is to be referred to the Director
- (4) If the candidate is to be referred to the Chairman
- (5) If the candidate is to be rejected

The current date is 01.06.2012

6. Nitesh was born on 10.06.1987. He scored 85% in his class 12 and 75% in his graduation. He has proper knowledge of MS office and knows how to use internet. He has a work experience of 2 years as a booking agent in Happy Travels.
7. Chandan was born on 10.06.1986. He scored 70% in his class 12 and 68% in his graduation. He has proper knowledge of MS office but does not know how to use internet. He has a work experience of 1.5 years as a booking agent in other travel agency.
8. Rajesh was born on 21.01.1992. He scored 65% in his class 12 and 55% in his graduation. He has proper knowledge of MS office and knows well how to use internet. He has no prior work experience.
9. Padmini was born on 06.10.1989. She scored 55% in her class 12 and 62% in her graduation. She has proper knowledge of MS office and knows well how to use internet. She has a total work experience of 6 years as a booking agent in a travel agency.
10. Janaki was born on 10.01.1988. She scored 83.2% in her class 12 and 75% in her graduation. She has proper knowledge of MS office and knows well how to use internet. She has no prior work experience but has done a certification course on travel booking from a prestigious organisation.

2

Concept Test Solutions

DATA INTERPRETATION AND ANALYSIS

CONCEPT TEST I

1. Amount put in by Varsha = 0.15×25000
= Rs. 3,750

Amount put in Nilesh = 0.30×25000
= Rs. 7,500

So, the required percentage
= $(3750/7500) \times 100 = 50\%$

Hence, **option 1**.

Alternatively,

Since the percentage contribution of Varsha and Nilesh is known, the actual cost of the air conditioner is not required.

Varsha's contribution = $15x$

Nilesh's contribution = $30x$

\therefore Percentage = $(15x/30x) \times 100 = 50\%$

Hence, **option 1**.

Note: Observe from the pie chart that the percentage contribution of Varsha is half the percentage contribution of Nilesh. Thus, the answer can be directly marked as 50%.

2. Using the data from the previous question, cost of the air conditioner = Rs. 25,000

\therefore Cost of the refrigerator = 1.2×25000
= Rs. 30,000

Sonal's contribution for the refrigerator is 10 percentage points more than her contribution for the air conditioner.

Sonal has put in 20% of the total money contributed for the air conditioner.

Hence, she has contributed 30% of the money put in for the refrigerator

So, amount contributed by Sonal
= $0.3 \times 30000 = 9000$

Hence, **option 4**.

3. Varsha has contributed 15% of the total cost of the air conditioner. Since this proportion is constant across all products, Varsha has contributed 15% of the total cost.

Total cost = Rs. 150000

\therefore Varsha's contribution = 0.15×150000
= Rs. 22,500

Hence, **option 2**.

4. Malvika contributed 10% of the amount required to buy the air conditioner.

Since her contribution for the microwave oven is 5 percentage points more than her contribution for the air conditioner, her contribution for the microwave is 15%.

This 15% corresponds to Rs. 1,200.

So, cost of the microwave oven

= $(1200 \times 100)/15 = \text{Rs. } 8,000$

Hence, **option 4**.

5. Cost of the air conditioner = Rs. 25000

Cost of the Television = 0.84×25000

= Rs. 21,000

Rohit had spent $2/7^{\text{th}}$ of this amount for the television.

\therefore Rohit spent $(2/7) \times 21000 = \text{Rs. } 6,000$

Hence, **option 3**.

6. Average interest on loans paid during the given period

= $(23.4 + 32.5 + 41.6 + 36.4 + 49.4)/5$

= $183.3/5 = 36.66$ lakhs

Hence, **option 4**.

7. Total bonus paid

= $3.00 + 2.52 + 3.84 + 3.68 + 3.96 = 17.00$

Total salary paid

= $288 + 342 + 324 + 336 + 420 = 1710$

\therefore Required percentage = $(17/1710) \times 100$
 $\approx 1\%$

Hence, **option 3**.

8. Total expenditure in 1998

= $288 + 98 + 3 + 23.4 + 83 = 495.4$

Total expenditure in 2002

= $420 + 142 + 3.96 + 49.4 + 98 = 713.36$

\therefore Required percentage

= $(495.4/713.36) \times 100 \approx 69\%$

Hence, **option 3**.

9. Total expenditure

= $324 + 101 + 3.84 + 41.6 + 74 = \text{Rs. } 544.44$
lakhs

Hence, **option 1**.

10. Total expenditure on taxes

= $83 + 108 + 74 + 88 + 98 = 451$

Total expenditure on fuel and transport

= $98 + 112 + 101 + 133 + 142 = 586$

\therefore Required ratio = $451 : 586 \approx 10 : 13$

Hence, **option 2**.

CONCEPT TEST II

1. Average marks obtained in Physics by all the seven students

$$= [(0.9 + 0.8 + 0.7 + 0.8 + 0.85 + 0.65 + 0.5) \times 120] / 7 = (5.2 \times 120) / 7 = 89.14$$

Hence, **option 2.**

2. Note that the question does not ask for the actual marks scored by the students, but for their percentage. So, the values can be directly observed from the table. From the table it is clear that Sajal and Rohit have got at least 60% marks in each of the six subjects.

Hence, **option 2.**

3. Total marks obtained by Sajal

$$= (90\% \text{ of } 150) + (60\% \text{ of } 130) + (70\% \text{ of } 120) + (70\% \text{ of } 100) + (90\% \text{ of } 60) + (70\% \text{ of } 40) \\ = (0.9 \times 150) + (0.6 \times 130) + (0.7 \times 120) + (0.7 \times 100) + (0.9 \times 60) + (0.7 \times 40) \\ = 135 + 78 + 84 + 70 + 54 + 28 = 449.$$

Hence, **option 5.**

4. We shall find the overall percentage (for all the seven students) with respect to each subject.

The overall percentage for any subject is equal to the average of percentages obtained by all the seven students since the maximum marks for any subject is the same for all the students.

Therefore, overall percentage for:

- (i) Maths

$$= \left[\frac{1}{7} \times (90 + 100 + 90 + 80 + 80 + 70 + 65) \right] \% \\ = \left[\frac{1}{7} \times 575 \right] \% = 82.14\%$$

- (ii) Chemistry

$$= \left[\frac{1}{7} \times (50 + 80 + 60 + 65 + 65 + 75 + 35) \right] \% \\ = \left[\frac{1}{7} \times 430 \right] \% = 61.43\%$$

- (iii) Physics

$$= \left[\frac{1}{7} \times (90 + 80 + 70 + 80 + 85 + 65 + 50) \right] \% \\ = \left[\frac{1}{7} \times 520 \right] \% = 74.29\%$$

- (iv) Geography

$$= \left[\frac{1}{7} \times (60 + 40 + 70 + 80 + 95 + 85 + 77) \right] \% \\ = \left[\frac{1}{7} \times 507 \right] \% = 72.43\%$$

- (v) History

$$= \left[\frac{1}{7} \times (70 + 80 + 90 + 60 + 50 + 40 + 80) \right] \%$$

$$= \left[\frac{1}{7} \times 470 \right] \% = 67.14\%$$

- (vi) Computer Science

$$= \left[\frac{1}{7} \times (80 + 70 + 70 + 60 + 90 + 60 + 80) \right] \%$$

$$= \left[\frac{1}{7} \times 510 \right] \% = 72.86\%$$

Clearly, this percentage is highest for Maths.

Hence, **option 3.**

5. Aggregate marks obtained by Tarun

$$= [(65\% \text{ of } 150) + (35\% \text{ of } 130) + (50\% \text{ of } 120) + ((77\% \text{ of } 100) + (80\% \text{ of } 60) + (80\% \text{ of } 40))] \\ = 97.5 + 45.5 + 60 + 77 + 48 + 32 = 360$$

The maximum marks (of all the six subjects) = 150 + 130 + 120 + 100 + 60 + 40 = 600.

∴ Overall percentage of Tarun

$$= \left(\frac{360}{600} \times 100 \right) \% = 60\%$$

Hence, **option 3.**

6. Since one of the answer options is "None of these", the total exports need to be found for all the years.

Total exports of X, Y and Z together for each year are:

$$1993: 30 + 80 + 60 = \text{Rs. } 170 \text{ crores.}$$

$$1994: 60 + 40 + 90 = \text{Rs. } 190 \text{ crores.}$$

$$1995: 40 + 60 + 120 = \text{Rs. } 220 \text{ crores.}$$

$$1996: 70 + 60 + 90 = \text{Rs. } 220 \text{ crores.}$$

$$1997: 90 + 80 + 60 = \text{Rs. } 230 \text{ crores.}$$

$$1998: 50 + 100 + 80 = \text{Rs. } 230 \text{ crores.}$$

$$1999: 120 + 140 + 100 = \text{Rs. } 360 \text{ crores.}$$

Though the total exports are equal for the pair 1995-1996 as well as 1997-1998, only 1995-1996 is given in the options. Hence, that is to be marked as the answer.

Hence, **option 4.**

7. Average annual exports for company Y during the given period

$$= (80 + 40 + 60 + 60 + 80 + 100 + 140) / 7 \\ = 560 / 7 = \text{Rs. } 80 \text{ crores}$$

Average annual exports for company Z during the given period

$$= (60 + 90 + 120 + 90 + 60 + 80 + 100) / 7 \\ = 600 / 7 = \text{Rs. } 85.71 \text{ crores}$$

$$\therefore \text{ Required percentage} = (80 / 85.71) \times 100 \\ = 93.34\%$$

Hence, **option 4.**

8. The difference between the exports from companies X and Y during the various years is:

$$1993: 80 - 30 = \text{Rs. } 50 \text{ crores.}$$

$$1994: 60 - 40 = \text{Rs. } 20 \text{ crores.}$$

$$1995: 60 - 40 = \text{Rs. } 20 \text{ crores.}$$

$$1996: 70 - 60 = \text{Rs. } 10 \text{ crores.}$$

$$1997: 90 - 80 = \text{Rs. } 10 \text{ crores.}$$

$$1998: 100 - 50 = \text{Rs. } 50 \text{ crores.}$$

$$1999: 140 - 120 = \text{Rs. } 20 \text{ crores.}$$

Clearly, the difference is the least in 1996 as well as 1997.

Hence, **option 5.**

9. Average exports of the three companies in 1993

$$= (80 + 60 + 30)/3 = \text{Rs. } (170/3) \text{ crores}$$

Average exports of the three companies in 1998

$$= (100 + 80 + 50)/3 = \text{Rs. } (230/3) \text{ crores}$$

$$\therefore \text{ Required difference} = (230/3) - (170/3) = (60/3)$$

$$= \text{Rs. } 20 \text{ crores}$$

Hence, **option 3.**

10. Average annual exports of company Z during the given period = $(60 + 90 + 120 + 90 + 60 + 80 + 100)/7 = 600/7 = \text{Rs. } 85.71 \text{ crores}$

From the graph, the exports of company Z are more than 85.71 crores in 4 years (1994, 1995, 1996 and 1999).

Hence, **option 3.**

CONCEPT TEST III

1. The fertilizer production has decreased from 60000 tonnes in 1997 to 45000 tonnes in 1998.

$$\therefore \% \text{ decrease} = \frac{(60000 - 45000)}{60000} \times 100$$

$$= 25\%$$

Hence, **option 4.**

2. Note that that the average production for all possible pairs of years is not to be found. It is to be found only for the pairs mentioned in the options.

Secondly, since we have a combination of two years in each option, note that if any two years have the same total production, their average production will also be the same. So, we don't need to find the average production. We just need the total production. The total production for each pair is given in '000 tonnes.

$$1996 \text{ and } 1997: 40 + 60 = 100$$

$$2000 \text{ and } 2001: 50 + 75 = 125$$

$$1999 \text{ and } 2000: 65 + 50 = 115$$

$$1998 \text{ and } 2000: 45 + 50 = 95$$

$$1995 \text{ and } 2001: 25 + 75 = 100$$

Since the total production in 1996 and 1997 is the same as the total production in 1995 and 2001, their average production is the same.

Hence, **option 4.**

3. Fertilizer production in 1995 and 2002 (in '000 tonnes) was 25 and 80 respectively.

$$\therefore \text{ Required \%} = \frac{(80 - 25)}{25} \times 100 = 220\%$$

Hence, **option 3.**

4. Since the question explicitly asks for a percentage increase, the years 1998 and 2000 can be directly ignored as the production decreases in these years compared to their previous years.

The percentage growth for each year is:

$$1996: (40 - 25)/25 \times 100 = 60\%$$

$$1997: (60 - 40)/40 \times 100 = 50\%$$

$$1999: (65 - 45)/45 \times 100 = 44.44\%$$

$$2001: (75 - 50)/50 \times 100 = 50\%$$

$$2002: (80 - 75)/75 \times 100 = 6.66\%$$

Thus, the percentage increase is maximum in 1996.

Hence, **option 4.**

5. Average production (in '000 tonnes) over the given period is

$$\frac{1}{8} \times (25 + 40 + 60 + 45 + 65 + 50 + 75 + 80) = 55$$

The fertilizer production in four years (1997, 1999, 2001 and 2002) was more than the average production over the period.

Hence, **option 4.**

6. Printing cost and royalty form 20% and 15% respectively of the cost per book.

Thus, Rs. 30,600 is 20% of the total cost per book. So, amount of royalty paid is $(15/20) \times 30600 = \text{Rs. } 22,950$

Hence, **option 3.**

7. Royalty corresponds to 15% of the total expenditure on a book.

$$\therefore \text{ Central angle corresponding to royalty} = (15/100) \times 360 = 54 \text{ degrees}$$

Hence, **option 3.**

8. Marked price of a book = 120% of cost price

$$\therefore \text{ Cost price of one book} = 180/1.2 = \text{Rs. } 150$$

Also, paper cost = 25% of the cost price

$$\therefore \text{ Paper cost of one book} = 0.25 \times 150 = \text{Rs. } 37.5$$

Hence, **option 2.**

9. The transportation cost of 5500 books is Rs. 82,500.
 \therefore Transportation cost of 1 book
 $= 82500/5500 = \text{Rs. } 15$
 This amount is 10% of the total cost of a book.
 \therefore Total cost price of 1 book $= 15 \times 10$
 $= \text{Rs. } 150$
 For a 25% profit, S.P. per book = C.P. per book $\times 1.25$
 \therefore Selling price per book $= 150 \times 1.25$
 $= \text{Rs. } 187.50$
 Hence, **option 1**.

10. Since the difference of the royalty and printing cost is being compared to the printing cost, the printing cost is the base for the percentage calculation.

Let the cost price of a book be Rs. 100. So, the royalty and printing cost of a single book is Rs. 15 and Rs. 20 respectively.

$$\therefore \text{Required \%} = \frac{(20 - 15)}{20} \times 100 = 25\%$$

Hence, **option 4**.

CONCEPT TEST IV

1. The required difference for each year is:

$$1995: 200 - 120 = \text{Rs. } 80 \text{ lakhs}$$

$$1996: 300 - 225 = \text{Rs. } 75 \text{ lakhs}$$

$$1997: 500 - 375 = \text{Rs. } 125 \text{ lakhs}$$

$$1998: 400 - 330 = \text{Rs. } 70 \text{ lakhs}$$

$$1999: 600 - 525 = \text{Rs. } 75 \text{ lakhs}$$

$$2000: 460 - 420 = \text{Rs. } 40 \text{ lakhs}$$

Thus, the difference was maximum in 1997.

Hence, **option 3**.

2. Value of finished goods in 1999

$$= \text{Rs. } 600 \text{ lakhs}$$

Total amount invested in raw materials in

$$1997, 1998 \text{ and } 1999 = 375 + 330 + 525$$

$$= \text{Rs. } 1230 \text{ lakhs}$$

$$\therefore \text{Required percentage} = (600/1230) \times 100 = 48.78\%$$

The closest value is option 5.

Hence, **option 5**.

3. Average amount invested in raw materials during the given period

$$= (120 + 225 + 375 + 330 + 525 + 420)/6$$

$$= \text{Rs. } 332.5 \text{ lakhs}$$

Average value of goods during the given period

$$= (200 + 300 + 500 + 400 + 600 + 460)/6$$

$$= \text{Rs. } 410 \text{ lakhs}$$

$$\therefore \text{Required difference} = 410 - 332.5$$

$$= \text{Rs. } 77.5 \text{ lakhs}$$

Hence, **option 4**.

4. Consider the amount invested in raw materials. The required percentage change is:

$$1996: (225 - 120)/120 \times 100 = 87.5\%$$

$$1997: (375 - 225)/225 \times 100 = 66.67\%$$

$$1998: (330 - 375)/375 \times 100 = -12\%$$

$$1999: (525 - 330)/330 \times 100 = 59.09\%$$

$$2000: (420 - 525)/525 \times 100 = -20\%$$

Now, consider the value of finished goods.

The required percentage change is:

$$1996: (300 - 200)/200 \times 100 = 50\%$$

$$1997: (500 - 300)/300 \times 100 = 66.67\%$$

$$1998: (400 - 500)/500 \times 100 = -20\%$$

$$1999: (600 - 400)/400 \times 100 = 50\%$$

$$2000: (460 - 600)/600 \times 100 = -23.33\%$$

Thus, the percentage change is the same in 1997.

Hence, **option 2**.

5. Since the question explicitly asks for a percentage increase (and not for percentage change), the years 1998 and 2000 can be ignored as there is a decrease in these years.

Hence, options 3 and 5 can be eliminated.

The percentage increase for the remaining years has already been calculated in the previous question.

Observe from the solution to the previous question that the percentage increase is maximum in 1996.

Hence, **option 1**.

6. Average sales (in '000s) during the given period

$$= \frac{15 + 20 + 23 + 30 + 22 + 19 + 20}{7}$$

$$= 21.28.$$

Hence, **option 3**.

7. The phrase "absolute change" means two things - one that the percentage value of the change is not required and two that the value of this change can be positive or negative. Here, only the value of the change is important. So, for this question, a change of +10 is the same as a change of -10.

The magnitude of change for each year is;

$$2002: 20 - 15 = 5$$

$$2003: 23 - 20 = 3$$

$$2004: 30 - 23 = 7$$

$$2005: 30 - 22 = 8$$

$$2007: 20 - 19 = 1$$

Thus, the absolute change is highest in 2005.

Hence, **option 5**.

8. This question can be answered directly by observing the graph. The sales have decreased only in 2005 and 2006. Among these, only 2005 is given in the options.

Hence, **option 5.**

$$9. \text{Percentage change} = \frac{30 - 20}{20} \times 100 = 50\%$$

Hence, **option 4.**

10. Since it is not known whether the given TV brand is the only brand in the industry, the growth rate of the industry cannot be found.

Hence, **option 5.**

Note: Had this been the only TV brand in the industry, the growth of the industry would have been $(20 - 15)/15 \times 100 = 33.33\%$

TABLES AND CASELETS

CONCEPT TEST I

1. The number of cars purchase in Kolkata in 2007 and 2009 is 140 and 155 respectively.

$$\therefore \text{Required percentage} = (140/155) \times 100 = 90.32\%$$

Hence, **option 2.**

2. Total number of cars purchased in Mumbai and Delhi together in 2005 = 102 + 134 = 236

Total number of cars purchased ni Mumbai and Delhi together in 2008 = 109 + 147 = 256

$$\therefore \text{Required difference} = 256 - 236 = 20$$

Hence, **option 3.**

3. Take the total of all cars purchase either on year-wise or city-wise basis.

$$2005: 120 + 102 + 134 + 182 + 165 + 160 = 863$$

$$2006: 135 + 105 + 140 + 195 + 175 + 179 = 929$$

$$2007: 140 + 107 + 142 + 205 + 184 + 185 = 963$$

$$2008: 150 + 109 + 147 + 208 + 197 + 195 = 1006$$

$$2009: 155 + 113 + 152 + 218 + 205 + 207 = 1050$$

$$\therefore \text{Total number of cars purchased} = 863 + 929 + 963 + 1006 + 1050 = 4811$$

Hence, **option 5.**

$$4. \% \text{ increase} = \frac{205 - 195}{195} \times 10 = \frac{10}{195} \times 100$$

$$= 5.13\%$$

Hence, **option 5.**

5. Number of cars purchased in Delhi over the give period = 134 + 140 + 142 + 147 + 152 = 715

Number of cars purchased in Chennai over the given period

$$= 165 + 175 + 184 + 197 + 205 = 926$$

$$\therefore \text{Required ratio} = 715 : 926$$

Hence, **option 4.**

6. There are two ways to solve such a set. The first is to find all the missing data together and then solve the questions faster. The second way can be used if you have very limited time left to solve the set. Here, you look at each question and find only the data that is relevant to that question. The advantage of the second method is that it allows to at least answer 2-3 questions if you have very little time left. However, if you do have sufficient time left, it is recommended that you fill the entire table first.

Total number of girls in all three schools in 2006 = 115

Total number of boys in all three schools in 2006 = 242 - (85 + 72) = 85

$$\therefore \text{Total number of students in 2006} = 115 + 85 = 200$$

Hence, **option 4.**

7. Number of girls in school C in 2006

$$= 92 - (25 + 22) = 45$$

Number of boys in school A in 2007

$$60 - (20 + 15) = 25$$

$$\therefore \text{Required Percentage} = \frac{45}{25} \times 100 = 180\%$$

Hence, **option 1.**

8. Consider the solution to the first question of the set. Number of students in all three schools in 2006 = 200

Number of students in all three schools in 2007 = 102 + 72 = 174

$$\therefore \text{Required Ratio} = \frac{200}{174} = \frac{100}{87}$$

Hence, **option 5.**

9. This data is directly given in the problem.

The total number of boys and girls in school A is 60 and 75 respectively.

So, the required ratio is 60 : 75 = 4 : 5

Hence, **option 3.**

10. Consider the solutions to the previous questions.

The total number of students across all 3 schools in 2006 and 2007 is 210 and 174 respectively.

Since the number of students in 2007 is less than that in 2006, 2007 cannot be the answer.

Hence, options 1 and 3 can be eliminated.

Total number of students in 2005 = $85 + 65 = 150$
 This value is also less than the value for 2006.
 Hence, options 4 and 5 can be eliminated.
 Hence, **option 2**.

CONCEPT TEST II

- The number of boys studying Finance is 432, which is 40% of the boys in the institute.
 \therefore Total number of boys studying in the institute = $(432 \times 100)/40 = 1080$
 Since 40% of the total students studying in the institute are girls, the remaining 60% are boys.
 \therefore Total number of girls studying in the institute = $(1080 \times 40)/60 = 720$
 \therefore Total number of students in the institute = $1080 + 720 = 1800$
 Number of boys and girls studying Finance is in the ratio 4 : 1.
 \therefore Number of girls studying Finance = $432/4 = 108$
 \therefore Total number of students studying Finance = $432 + 108 = 540$
 25% of the girls in the institute study HR.
 \therefore Number of girls studying HR = $720/4 = 180$
 \therefore Number of girls studying Marketing = $720 - (180 + 108) = 432$
 35% of the boys in the institute study Marketing
 \therefore Number of boys studying Marketing = $0.35 \times 1080 = 378$
 \therefore Number of boys studying HR = $1080 - (432 + 378) = 270$
 Finally, total number of students studying HR = $270 + 180 = 450$
 and, total number of students studying Marketing = $378 + 432 = 810$
 Thus, 432 girls study Marketing in this institute.
 Hence, **option 2**.
- Consider the solution to the first question.
 Number of girls studying Finance and Marketing is 108 and 432 respectively.
 \therefore Required percentage = $(108/432) \times 100 = 25\%$
 Hence, **option 3**.
- Consider the solution to the first question.
 The number of boys studying HR is 270 and the number of girls studying HR is 180
 \therefore Required ratio = $270 : 180 = 3 : 2$
 Hence, **option 4**.

- Consider the solution to the first question.
 The total number of students in the institute is 1800
 Hence, **option 5**.
- Consider the solution to the first question.
 The number of girls studying Marketing is 432 and the number of boys studying Marketing is 378
 \therefore Required ratio = $432 : 378 = 8 : 7$
 Hence, **option 1**.
- Total number of students who appeared for the examination in 2008 = $325 + 312 + 768 + 690 + 614 = 2709$
 Total number of students who appeared for the examination in 2009 = $430 + 325 + 815 + 716 + 576 = 2862$
 \therefore Required ratio = $2709 : 2862 = 301 : 318$
 Hence, **option 2**.
- The pass percentage of each school in 2010 is given below:
 School A = $(390/412) \times 100 = 94.66\%$
 School B = $(290/345) \times 100 = 84.05\%$
 School C = $(714/845) \times 100 = 84.49\%$
 School D = $(596/728) \times 100 = 81.86\%$
 School E = $(354/542) \times 100 = 65.31\%$
 Thus, School A had the highest pass percentage.
 Hence, **option 1**.
- For school C, the passing percentage for each year is
 2006 : $(448/745) \times 100 = 60.13\%$
 2007 : $(426/712) \times 100 = 59.83\%$
 2008 : $(321/768) \times 100 = 41.79\%$
 2009 : $(756/815) \times 100 = 92.76\%$
 2010 : $(714/845) \times 100 = 84.49\%$
 2011 : $(628/932) \times 100 = 67.38\%$
 Thus, the pass percentage for school C was the lowest in 2008.
 Hence, **option 3**.
- Total number of students who appeared from all the schools together in 2011 = $365 + 334 + 932 + 744 + 522 = 2897$
 Total number of students who passed from all the schools together in 2011 = $340 + 305 + 628 + 686 + 104 = 2063$
 \therefore The required percentage = $(2063/2897) \times 100 = 71.21\%$
 Hence, **option 4**.
- Average number of students that passed from school B over the given period = $(264 + 270 + 272 + 276 + 290 + 305) / 6 = 279.5$

Average number of students that passed from school D over the given period
 $= (320 + 380 + 455 + 648 + 596 + 686) / 6$
 $= 514.2$

\therefore The required ratio $= 279.5 : 514.2 \approx 28 : 51$
 Hence, **option 2**.

Note: Since the total number of years is the same in both the case, the average need not be taken. The ratio of the total number of students passing from schools B and D respectively will also give the same answer.

CONCEPT TEST III

1. The average score in Mathematics

$$= \frac{\text{Total marks scored}}{\text{Number of students}}$$

$$= \frac{90 + 92 + 81 + 71 + 80}{5}$$

$$= \frac{414}{5} = 82.8$$

Hence, **option 3**.

2. The total for each student in all the Science subjects taken together is:

- A $\Rightarrow 81 + 75 + 90 = 246$
- B $\Rightarrow 83 + 70 + 92 = 245$
- C $\Rightarrow 70 + 90 + 81 = 241$
- D $\Rightarrow 90 + 68 + 71 = 229$
- E $\Rightarrow 66 + 95 + 80 = 241$

Hence, C and E have the same total in all the Science subjects taken together.

Hence, **option 5**.

3. The sum total of the curricular subjects i.e. English, Physics, Chemistry and Mathematics, for each of the students is:

Student Name	Total
A	306
B	318
C	316
D	311
E	316

From the totals, we see that B is the topper whereas C and E both have the same marks.

So, the fourth position will be taken by D as C and E are sharing the second position. There is no third position in this case.

Hence, **option 2**.

Note: You do not need to add the marks of all 4 subjects again for this question. You already have the total of the Science subjects for each student in the previous question. So, you just

need to add the English marks to the total marks of the Science subjects.

4. The average score across all the subjects

$$= \frac{\text{Total marks scored}}{\text{Number of subjects}}$$

The total number of subjects including Physical Education is 5.

The total score for each student across all subjects is:

- A : 386
- B : 393
- C : 384
- D : 399
- E : 387

Since D has the highest aggregate across all subjects, D's average also has to be the highest.

Hence, we can eliminate options 2, 3 and 4.

However, we still need to calculate the average because if D's average is not 78.8, the answer becomes "None of these".

D's average score is $399/5 = 79.8$

Hence, **option 5**.

5. F's average score for all the Science subjects is 80. So, his total score in the Science subjects is 240.

His combined score for English and Physical Education is $410 - 240 = 170$.

Therefore, even if F scores 100 in English, he will still score 70 in Physical Education, which is 2 marks more than what C scored.

\therefore Statement (i) is true.

Hence, we can eliminate options 2, 3 and 5.

Now, options 1 as well as 4 consider statement (iii) to be true.

Hence, we cannot eliminate one of these two options based on statement (iii).

Hence, consider statement (ii).

The combined score of F in English and Physical Education is 170.

So, F has scored the highest in English and Physical Education taken together.

However, the maximum he can score in English is 100, while his minimum score will be 70. Likewise, it is true for his score in Physical Education.

Hence, we cannot say for sure that the scores he obtained for these two subjects are the highest in the group.

\therefore Statement (ii) need not necessarily be true.

Hence, we can eliminate option 4.

Hence, **option 1**.

6. The production cost is Rs.20 per unit for the first 40000 units, and Rs.25 per unit thereafter.

∴ The total production cost
 = $40000 \times 20 + 10000 \times 25 = \text{Rs.}10,50,000$

Besides, the company also incurs other fixed costs for electricity, transportation and other expenses.

∴ Total fixed costs
 = $1,50,000 + 30,000 + 20,000 = \text{Rs.} 2,00,000$

∴ The total cost incurred by the company
 = $10,50,000 + 2,00,000 = \text{Rs.} 12,50,000$

Hence, **option 2.**

7. The total cost incurred by the company for 75000 belts

= $(40000 \times 20) + (35000 \times 25) + 200000$
 (fixed costs) = **Rs. 18,75,000**

i.e. The total C.P of 75000 belts
 = **Rs. 18,75,000**

40% of 75000 belts = $(2/5) \times 75000 = 30000$
 belts

∴ The total S.P of 30000 belts = (30000×24)
 = **Rs.7,20,000**

Let the total S.P of the rest of the stock (45,000 belts) be Rs. x

To operate at break-even point (i.e. without any profit or loss), the total C.P should be equal to the total S.P

i.e. $720000 + x = 1875000$

$x = \text{Rs.}11,55,000$

∴ The cost price for each unit of the rest of the stock is $1155000/45000 = \text{Rs.}25.67$ per belt.

Hence, **option 3.**

8. The total revenue earned by the sale of 55000 fan belts is $55000 \times 30 = \text{Rs.}16,50,000$

The total cost incurred by the company for 60000 fan belts

= $(40000 \times 20) + (20000 \times 25) + 200000$
 = **Rs. 15,00,000.**

∴ The net profit = $(16,50,000 - 15,00,000)$
 = **Rs. 1,50,000**

i.e. The profit per unit sold = $150000/55000$
 = $30/11 = \text{Rs.} 2.73.$

Hence, **option 3.**

9. Here, the variable cost is the production cost.

Production cost for 45000 belts
 = $(40000 \times 20) + (5000 \times 25) = \text{Rs.} 9,25,000$

The fixed cost is the electricity bills, transportation and other expenses.

∴ Total fixed cost = $150000 + 30000 + 20000$
 = **Rs. 2,00,000**

∴ Required ratio = $925000 : 200000 = 37 : 8$

Hence, **option 1.**

10. Based on the classification in the previous problem, total fixed cost = **Rs. 2,00,000**

Total production cost for 40000 belts
 = $40000 \times 20 = \text{Rs.} 8,00,000$

∴ Total cost = $800000 + 200000$

= **Rs. 10,00,000**

∴ Required percentage

= $(200000/1000000) \times 100 = 20\%$

Hence, **option 3.**

11. Total number of students = **2400**

The ratio of girls to boys is **7 : 5**

∴ Total numbers of girls = $(2400 \times 7) / 12$
 = **1400**

and, total number of boys = $(2400 \times 5) / 12$
 = **1000**

30% of the boys take table-tennis classes

So, the total number of boys taking table-tennis classes = $(30 \times 1000)/100 = 300$

One-fourth of the girls take carom classes

So, the total number of girls taking carom classes = $1400/4 = 350$

The total number of students taking carom classes is **650.**

∴ The total number of boys taking carom classes = $650 - 350 = 300$

One-fifth of the boys take chess classes.

So, the total number of boys taking chess classes are = $1000/5 = 200$

∴ The total number of boys taking badminton classes are

= $1000 - 300 - 300 - 200 = 200$

The number of girls taking chess classes is thrice the number of boys taking chess classes.

∴ The total number of girls taking chess classes = $3 \times 200 = 600$

The number of girls taking badminton classes is three - fifth of the number of boys taking the same.

∴ The total number of girls taking badminton classes = $(3 / 5) \times 200 = 120$

∴ The total number of girls taking table-tennis classes = $1400 - 350 - 600 - 120 = 330$

Thus, the final table becomes,

Classes	Girls	Boys
Chess	600	200
Badminton	120	200
Table - Tennis	330	300
Carom	350	300

Hence, the required ratio
 = $330 : 200 = 33 : 20$

Hence, **option 3.**

12. Consider the table obtained in the solution to the first question.

Number of girls taking carom classes = 350
Total number of children in the school = 2400

$$\therefore \text{Required percentage} = (350 / 2400) \times 100 = 14.58\%$$

Hence, **option 1.**

13. Consider the table obtained in the solution to the first question.

The total number of children taking badminton classes = 120 + 200 = 320

Hence, **option 3.**

14. Consider the table obtained in the solution to the first question.

The total number of girls taking table-tennis classes = 330

Hence, **option 3.**

15. Consider the table obtained in the solution to the first question.

The game chosen by the maximum number of girls is Chess as 600 girls take up Chess.

Hence, **option 1.**

$$= (75x + 70x + 85x + 90x) = 320x$$

Average weight of all boys

$$= 320x / 4x = 320 / 4$$

Similarly, let the number of girls in each class be y .

So, total number of girls = $4y$.

\therefore Total weight of all girls

$$= (50y + 45y + 40y + 60y) = 195y$$

Average weight of all girls

$$= 195y / 4y = 195 / 4$$

\therefore Required ratio = $(320/4) : (195/4)$

$$= 320 : 195 = 64 : 39$$

Hence, **option 5.**

5. In class B, the average weight of boys is 70 and the average weight of girls is 45

So, the required percentage

$$= (70 - 45) / 45 \times 100 = (25/45) \times 100$$

$$= 55.55\%$$

Hence, **option 3.**

6. Price of the commodity in 2002 and 2004 is 52 and 55 respectively.

\therefore Percentage increase = $(55 - 52) / 52 \times 100$

$$= 300 / 52 \approx 5.77\%$$

The closest option is option 3 i.e. 6%.

Hence, **option 3.**

7. Since the percentage increase is required over the given period, the increase is to be considered from 2002 to 2010.

Price of the commodity in 2002 and 2010 is 52 and 78 respectively.

\therefore Percentage increase = $(78 - 52) / 52 \times 100$

$$= 50\%$$

Hence, **option 4.**

8. The price of the commodity in 2002, 2006 and 2010 is 52, 61 and 78 respectively.

\therefore Percentage growth in 2002-2006

$$= (61 - 52) / 52 \times 100 = 17.31\%$$

And, percentage growth in 2006-2010

$$= (78 - 61) / 61 \times 100 = 27.87\%$$

\therefore Percentage point difference

$$= 27.87 - 17.31 = 10.56$$

Hence, **option 1.**

9. The price difference between 2008 and 2010 = 78 - 69 = 9

The price difference between 2004 and 2006 = 61 - 55 = 6

\therefore Required ratio = 9 : 6 = 3 : 2

Hence, **option 2.**

10. The average annual growth rate over the given period is the simple average of the growth rate over the given period.

CHARTS AND DIAGRAMS

CONCEPT TEST I

1. The average weight of boys in class A when expressed as a percentage of the average weight of boys in class B is

$$(75 - 70) / 70 \times 100 = (50/7)\%$$

The average weight of boys in class C when expressed as a percentage of the average weight of boys in class B is

$$(85 - 70) / 70 \times 100 = (150/7)\%$$

Difference between the two

$$= (150/7) - (50/7) = 100/7 = 14.28$$

Hence, **option 2.**

2. The average weight of girls in class D and A is 60 and 50 respectively.

$$\therefore \text{Percentage decrease} = (60 - 50) / 60 \times 100 = 16.67\%$$

Hence, **option 1.**

3. The difference between the average weight of boys and girls in class B = 70 - 45 = 25

The difference between the average weight of boys and girls in class C = 85 - 40 = 45

$$\therefore \text{Required ratio} = 25 : 45 = 5 : 9$$

Hence, **option 5.**

4. Let the number of boys in each class be x .

So, total number of boys = $4x$.

$$\therefore \text{Total weight of all boys}$$

From the solution to the second question of the set, the growth rate over the given period = 50%.

$$\therefore \text{Average annual growth rate} = (50/8)\% = 6.25\%$$

Hence, **option 2**.

CONCEPT TEST II

1. The angle subtended by brand D is 75° .

Since 360° corresponds to 100%, 75° corresponds to $[(75 \times 100)/360]\%$

Since the total number of people is 720, the number of people who eat brand D = $(75 \times 100)/360 \times (720/100) = 150$

Hence, **option 3**.

2. 360° corresponds to 100% i.e. to 720 people.

The angle subtended for brands A and C is 90° and 45° respectively.

$$\therefore \text{Number of people eating brand A} = (90/360) \times 720 = 180$$

and, number of people eating brand C = $(45/360) \times 720 = 90$

$$\therefore \text{Required difference} = 180 - 90 = 90$$

Hence, **option 4**.

3. 360° corresponds to 100%

The angle subtended for brand E is 135°

$$\therefore \text{Required percentage} = (135/360) \times 100 = 37.5\%$$

Hence, **option 1**.

4. 360° corresponds to 100% i.e. 720 people

The angle subtended for brand C is 45°

So, number of people who currently eat brand C = $(45/360) \times 720 = 90$

Now, 80 more people eat brand C.

So, total number of people eating brand C is $90 + 80 = 170$

However, the size of the total market is still the same i.e. 720 people.

\therefore Angle subtended at the centre for brand C

$$= (170/720) \times 360 = 85^\circ$$

Hence, **option 5**.

5. 360° corresponds to 100% i.e. to 720 people.

Now, the angle subtended by B increase from 75° to 80° .

This increase of 5° is caused by the additional people joining B.

So, number of people added in B = $(5/360) \times 720 = 10$

Hence, **option 2**.

6. This question can be directly solved by observing the graph, because it just asks for number of boxes (given in the graph). From the graph, we see that an equal number of

boxes of Nutchox and Fruitchox (i.e. 40000 boxes each) were sold only in June.

Hence, equal number of boxes of Nutchox and Fruitchox were sold only in 1 month.

Hence, **option 2**.

7. In May, a total of 80000 boxes were sold (30000 boxes of Fruitchox and 50000 boxes of Nutchox).

Out of these, 50000 boxes contained Nutchox.

\therefore The required percentage

$$= (50000/80000) \times 100$$

$$= 62.5\%$$

Hence, **option 3**.

8. Note that the question here asks for number of bars and not number of boxes. So, this cannot be solved directly by observation.

In February, 10000 boxes of Fruitchox and 20000 boxes of Nutchox were sold.

One box of Fruitchox has 120 bars while one box of Nutchox has 100 bars.

\therefore The number of Fruitchox bars sold in February = $10000 \times 120 = 1200000$

\therefore The number of Nutchox bars sold in February = $20000 \times 100 = 2000000$

\therefore Total number of bars sold in February = $1200000 + 2000000 = 3200000$

\therefore Required percentage

$$= (1200000/3200000) \times 100 = 37.5\%$$

Hence, **option 2**.

9. We need to calculate only for the 4 months given as answer options.

The number of bars sold in these 4 months for the two types is as follows.

January:

Nutchox: $30000 \times 100 = 3000000$ and

Fruitchox: $10000 \times 120 = 1200000$

February:

Nutchox: $20000 \times 100 = 2000000$ and

Fruitchox: $10000 \times 120 = 1200000$

March:

Nutchox: $40000 \times 100 = 4000000$ and

Fruitchox: $50000 \times 120 = 6000000$

April:

Nutchox: $60000 \times 100 = 6000000$ and

Fruitchox: $50000 \times 120 = 6000000$

\therefore Only in April, an equal number of bars of both types was sold.

Hence, **option 4**.

Alternatively,

\therefore A box of Nutchox contains 100 bars and a box of Fruitchox contains 120 bars, the number of bars/box = 5 : 6.

∴ Directly look for a month where the ratio of number of boxes sold is 6 : 5 (i.e. 6 boxes of Nutchox sold for every 5 bars of Fruitchox). This condition is satisfied only in April.
Hence, **option 4**.

10. A box of Nutchox is sold for Rs. 480 and a box of Fruitchox is sold for Rs. 640, the income/box is in the ratio 3 : 4.

Hence, we can directly look for months where the number of Fruitchox boxes sold was more than $(3/4)^{\text{th}}$ of the number of Nutchox boxes sold. This happens in March, April and June, i.e. 3 months.

Hence, for 3 months, the revenue from Fruitchox was more than the revenue from Nutchox.

Hence, **option 4**.

Note: The actual revenue can be calculated for each month if this approach is not very clear. That becomes the longer but simpler method.

CONCEPT TEST III

1. Since the answer options mention the figure in terms of rupees, we need to refer to the first pie chart.

Market share of Brand A

$$= (100/360) \times 11800$$

$$= \text{Rs. } 3,277.78 \text{ Crores}$$

Market share of Brand F = $(40/360) \times 11800$

$$= \text{Rs. } 1,311.11 \text{ Crores}$$

$$\therefore \text{Difference} = 3277.78 - 1311.11$$

$$= \text{Rs. } 1,966.67 \text{ Crores}$$

Hence, **option 2**.

Alternatively,

The difference in the market share of brands A and F has to be proportional to the difference subtended by them on the pie chart.

$$\text{Brand A} = 100^\circ$$

$$\text{Brand F} = 40^\circ$$

$$\text{Difference} = 60^\circ$$

Hence, difference in market share

$$= \left(\frac{60}{360} \right) \times 11800$$

$$= \text{Rs. } 1,966.67 \text{ crores}$$

Hence, **option 2**.

2. Market share of Brand C

$$= (70/360) \times 11800$$

$$= \text{Rs. } 2294.44 \text{ Crores}$$

Number of mobile phones manufactured by

$$\text{Brand C} = (20/100) \times 2 = 0.4 \text{ Crores}$$

$$\therefore \text{Cost of one mobile phone} = (2294.44/0.4)$$

$$= \text{Rs. } 5,736.10$$

Hence, **option 3**.

3. Here, the cost of one mobile phone is to be calculated for all brands. Hence, the data given in the two pie charts should be represented in terms of a table.

From the pie charts, the market share, number of mobiles and cost per mobile are as shown in the table below:

Brands	Market Share (In Crores)	Number of Mobiles (In Crores)	Cost of one Mobile (In Rupees)
Brand A	3277.78	0.80	4097.23
Brand B	2950.00	0.50	5900.00
Brand C	2294.44	0.40	5736.10
Brand D	1638.89	0.16	10243.06
Brand E	327.78	0.04	8194.50
Brand F	1311.11	0.10	13111.10

From the table,

A single phone of brands D and F costs more than Rs. 10,000 each.

Hence, **option 2**.

4. From the table in the solution to the previous question

The most expensive mobile phone is of Brand F (Average cost = Rs. 13,111.10).

Hence, **option 5**.

5. Total mobile phone market = Rs. 11,800 crores and total number of mobile phones in market = 2 crores

$$\therefore \text{Average cost of all mobile phones} = 11800/2 = \text{Rs. } 5,900$$

From the table obtained earlier,

$$\text{Cost of one mobile phone of Brand B} = \text{Rs. } 5,900$$

Hence, Brand B's phone has a cost equal to the average cost of all mobile phones taken together.

Hence, **option 2**.

6. Total newspaper subscribers in August 2007 = 46.18 + 47.23 = 93.41 million

Additions during August 2007

$$= 0.36 + 1.16 + 1.36 = 3.5 \text{ million}$$

$$\therefore \text{Total newspaper subscribers in July 2007} = 93.41 - 3.5 = 89.91 \text{ million}$$

$$= 93.41 - 3.5 = 89.91 \text{ million}$$

Hence, **option 2**.

7. Total English newspaper subscribers in August 2007 = 47.23 million

Additions in English newspaper base in August 2007 = 1.24 + 0.6 = 1.84 million

∴ Total English newspaper subscribers in July 2007 = $47.23 - 1.84 = 45.39$ million

TOI subscribers in July 2007 = 36.28 million

∴ HT subscribers in July 2007 = $45.39 - 36.28 = 9.11$ million

HT subscribers at the beginning of November 2007 = $9.11 + 0.6 + 0.6 - 0.48 = 9.83$ million

Hence, **option 1**.

8. From the figure we can see that there are only additions in the Hindi newspaper subscriber base.

Hence, the Hindi newspaper subscriber base for any month is more than the base for the previous month.

Hence, statement 1 is not true.

From the second graph, we can see that TOI subscribers are added consistently but not uniformly.

Hence, statement 2 is not true.

For option 3, let x be the number of HT subscribers at the beginning of September 2007.

∴ The number of HT subscribers at the end of September 2007 = $x + 0.6$

The number of HT subscribers at the beginning of October 2007 = $x + 0.6$

HT subscriber's at the end of October 2007 = $x + 0.6 - 0.48 = x + 0.12$

∴ The number of HT subscribers at the end of October 2007 is still more than the number of subscribers at the beginning of September 2007.

Hence, statement 3 is definitely true.

Hence, **option 3**.

9. Since the original number of subscribers in any of the categories is not known, the percentage change cannot be found.

Hence, **option 4**.

10. Total subscribers to Hindi newspapers in the given period = $46.18 + 47.32 + 49.24 = 142.74$ million

Total subscribers to English newspapers in the given period = $47.23 + 48.32 + 49.02 = 144.57$

∴ Required percentage

= $(142.74/144.57) \times 100 = 98.73\%$

Hence, **option 2**.

RELATIONSHIPS

CONCEPT TEST I

1. There are 4 males and 4 females in the group. A, B, P and R are the males while L, M, N and S are the females. Since the occupation of a few people is given, map the occupations as far as possible.

The people directly mapped to their occupations (along with the genders) are:

A - Student - Male

N - Manager - Female

S - Homemaker - Female

R - Travel Agent - Male

L - MBA - Female

Now, the only female whose occupation is not directly known is M. However, it is known that the teacher is the wife of R. Thus, the teacher is female. Since the remaining 3 females (L, N and S) are not teachers, M has to be the teacher.

So, M - Teacher - Female

Similarly, B and P are the only males whose occupation is not known. However, one of them has to be a broker and the other has to be a businessman.

Now, note that there are three couples. We have already found that M (the teacher) is married to R (the travel agent). So, M-R is one couple.

It is given that S is married to B. So, S-B is the second couple. Finally, N is married to the broker. Since one of B and P is a broker and B is married to S, P has to be married to N. So, P-N is the third couple.

Thus, the three couples are R-M, B-S and P-N.

Now, consider three pieces of data:

- B is the only mother-in-law
- A is the grandson of the businessman
- L is the only daughter of B

What this means that B and S are the oldest couple, L is their only daughter and because L is not part of the three couples mentioned, A's father has to be the son of B and S.

It is given that B and R are fathers. So, R has to be A's father. Thus, A is R and M's son.

Finally, P is the brother-in-law of the wife of R i.e. P is the brother-in-law of M. So, P has to be the brother of R as P has to belong to the same family. (If P had been the husband of R's sister, P would belong to a separate family.)

Thus, the entire family tree is as shown below:

From the figure above, M is the teacher.

Hence, **option 4**.

2. Consider the family tree obtained in the solution to the first question. Observe that B is the husband of S.

Hence, **option 2**.

3. Consider the family tree obtained in the solution to the first question. Among the options given, only B-S is a couple.

Hence, **option 1**.

4. Consider the family tree obtained in the solution to the first question. N is the wife of P.

Hence, **option 3**.

5. Consider the family tree obtained in the solution to the first question. P and R are the siblings of L.

Hence, **option 3**.

6. Anmol and Aditya are first cousins. Also, Aditya's paternal grandmother is Anmol's maternal grandmother. So, Aditya's father is the brother of Anmol's mother. Pawan is Aditya's paternal uncle. So, Pawan is the brother of Aditya's father as well the brother of Anmol's mother. However, Pawan has only one sister i.e. Sonal. So, Sonal is Anmol's mother. Now, Sonal and Pawan have two more brothers called Ramesh and Navin. So, Aditya's father is either Ramesh or Navin. Also, Aryan is the paternal first cousin of Aditya and Nikunj such that Aditya and Nikunj don't have the same parents and their fathers are brothers. So, Aditya, Aryan and Nikunj are the sons of Navin, Ramesh and Pawan, in no specific order. The only condition here is that Pawan is Aditya's uncle. Finally, Bhawer is Nikunj's paternal grandfather and Sushila is his wife. So, Bhawer and Sushila are the parents of Navin, Ramesh, Pawan and Sonal.

Thus, the family tree is as shown below:

From the family tree, Bhawer has four grandchildren

- Aditya, Anmol, Aryan and Nikunj.

Hence, **option 4**.

7. Consider the family tree obtained in the solution to the first question. Sonal is Bhawer's daughter.

Hence, **option 2**.

8. Consider the family tree obtained in the solution to the first question. Aditya is Nikunj's first cousin. Also, Pawan is Aditya's paternal uncle. So, Aditya is Pawan's nephew.

Hence, **option 1**.

Note: The question can be solved without drawing the family tree. It is directly given in the data that Pawan is Aditya's paternal uncle. So, Aditya is Pawan's nephew. So, options 2, 3 and 4 can be eliminated. Also, it is given that the fathers of Aditya and Nikunj are brothers. This makes them first cousins. This also eliminates **option 5**.

9. Consider the family tree obtained in the solution to the first question. Either Ramesh or Navin can be Aditya's father.

Hence, **option 5**.

10. Consider the family tree obtained in the solution to the first question. Anmol is Sonal's child.

Hence, **option 1**.

Note: Even this question can be solved without drawing the entire family tree.

CONCEPT TEST II

1. A*B means B is the wife of A.

B@C means that C is the sister of B.

C+D means that D is the son of C.

D-E means that E is the father of D.

Thus, E and C are the parents of D such that C is the sister of B.

Thus, B is the sister-in-law of E.

Hence, **option 3**.

2. A%B means B is the brother of A. B + C means C is the son of B. C/D means that D is the mother of C. So, D and B are the mother and father of C respectively. D-E means that E is the father of D. Thus, E is the father of C's mother. Thus, E is C's maternal grandfather.

Hence, **option 4**.

3. P@Q means that Q is the sister of P. Q - R means that R is the father of Q. Thus, R is the father of both, P and Q. R+S means that S is the son of R. So, S is the brother of Q. S+T means that T is the son. So, Q is T's aunt and T is S's nephew.

Hence, **option 4**.

4. For Q to be the uncle of T, Q should be male. In option 3, Q is the mother of P.

Hence, option 3 can be eliminated.

Consider option 1: Q is the husband of P and so Q is male. R is the brother of Q. S is the wife of R and T is the daughter of S. So, T is also the daughter of R, who is Q's sibling. So, Q is the uncle of T.

Hence, **option 1**.

Note: Once the relationship is established in this option, there is no need to check the remaining options in the exam. For practice, you can check the remaining options.

5. For U to be the daughter-in-law of P, U should be female. Note that in all the options given, U is the wife of T. So, we cannot eliminate any option. However, also observe that in each option, T is the brother of S.

Now, consider options 1 to 4. In each of these S is the daughter of So, T is the son of R. So, R is either the father-in-law or mother-in-law of P. Whatever the gender of R, P is definitely the daughter-in-law of R in all four options.

Hence, **option 5**.

6. M/N means that M is N's mother. N+P means that N is the sister of P. So, M is P's mother as well. P@Q means that P is Q's son. So, M and Q are P's parents and M is Q's wife. Q@R means that Q is R's son. Thus, M is the wife of R's son. Hence, **option 1**.

7. D#A means that D is the brother of A. A+B means that A is the daughter of B. B/C means that B is the mother of C. So, B is the mother of D, A and C. C-E means that C is the father of E. So, A's mother i.e. B is the grandmother of E. This means that A's father is the grandfather of E.

Hence, **option 3**.

8. X#Y means that X is the brother of Y. Y-Z means that Y is the father of Z. Z@A means that Z is the son of A. So, A is the wife of Y. Since X and Y are brothers, X's mother is also Y's mother. So, X's mother is the mother-in-law of A.

Hence, **option 5**.

9. P/Q means that P is the mother of Q. Q+R means that Q is the sister of R. R-S means that R is the father of S. So, P is the mother of Q and R; and the grandmother of S.

Hence, **option 4**.

10. C/A means that C is the mother of A. A@B means that A is the son of B. So, B is the father of A. B-D means that B is the father of D. D#E means that D is the brother of E. So, A, D and E are siblings and A is male. So, A is the brother of E.

Hence, **option 2**.

CONCEPT TEST III

1. There are two fathers in the family. Since S is the father of P, S is one of them. Since S is also the grandfather of U, U's father has to be the other. Since R is the sister of U, R or U cannot be the second father. Q is the brother of T's husband. Since U's father is the second father, this person also has to be T's husband. Thus, neither T nor Q are the second father. So, the second father is P who is the husband of T. R and U are their children. Thus, Q and P are brothers. The family tree is Thus, the family tree is as shown below:

From the figure, the people who are brothers are: P, Q and U (brother of R).

Hence, **option 3**.

Note: From the data given, we already know that Q is a brother. So, options 4 and 5 can be directly eliminated before making the family tree.

2. Consider the family tree obtained in the solution to the first question. T is the mother. Hence, **option 4**.
3. Consider the family tree obtained in the solution to the first question. P is T's husband. Hence, **option 1**.
4. Consider the family tree obtained in the solution to the first question. The two fathers are S and P. Hence, **option 4**.

Note: From the data given, we already know that S is a father and T is female. So, options 2, 3 and 5 can be directly eliminated before making the family tree.

5. The woman's brother's wife is the woman's sister-in-law. So, the daughter of this sister-in-law is the woman's niece. Since the woman has an only brother and the niece has an only cousin, this cousin could be the child of the woman herself. However, this is true only if the child is a cousin on the girl's paternal side. If the child is a cousin on the girl's maternal side, he will be unrelated to the woman under consideration. So, the exact relationship cannot be determined. Hence, **option 5**.
6. Ajay's mother's only son is Ajay himself. So, Pradeeba is the wife of Ajay. Hence, **option 3**.

7. The only son of Rajesh's paternal grandfather is Rajesh's father. So, the girl's mother is the only daughter of Rajesh's father.

- Hence, **option 1**.
8. The initial data in the question is meant to confuse you. In relationship based questions, if it is given that Bhavya and Kriti are sisters, Bhavya's mother and Kriti's mother is the same person. Kriti's father's mother's husband is Kriti's paternal grandfather. This grandfather's only daughter Trisha is, therefore, Kriti's paternal daughter. So, Trisha is the sister-in-law of Bhavya and Kriti's mother.
Hence, **option 2**.
9. Nimit's father's wife is Nimit's mother. Her brother's father is her father as well. So, her father's wife is her mother and her mother's only daughter is Nimit's mother herself. So, the lady under consideration is Nimit's mother.
Hence, **option 3**.
10. Here, depending on my gender, there are two cases possible.
If I am male, my mother's husband's only son is me. So, the lady is my wife.
However, if I am female, my mother's husband's only son is my only brother. His wife becomes my sister-in-law. Since my gender is not known, the data is not adequate to find the exact relationship.
Hence, **option 5**.

CONCEPT TEST IV

1. Here, Jia is irrelevant to the solution. Since the relationship between Kathan and Gunjan is to be found, start with Kathan. Kathan's wife's father is Kathan's father-in-law. This father-in-law's son is Kathan's brother-in-law and this brother-in-law's brother is also Kathan's brother-in-law. This person is given to be Gunjan. So, Gunjan is Kathan's brother-in-law.
Hence, **option 3**.
2. Julie's father's son-in-law can be either Julie's husband or her brother-in-law. However, Julie is unmarried. Hence, her father's son-in-law can only be her brother-in-law. Hence, the son-in-law's son's maternal grandmother is Julie's sister's mother i.e. Julie's mother.
Hence, Khushi is Julie's mother. Hence Julie is Khushi's daughter.
Hence, **option 2**.
3. Jesal is the father of Jenil. So, Jenil's mother's mother-in-law is Jesal's mother. Jesal's mother's grandchild is Jenil and Jenil's father

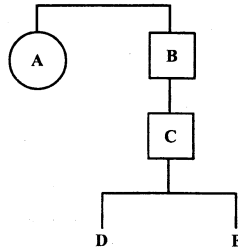
is Jesal. Finally, Jesal's father-in-law is the father of Jenil's mother.

Hence, **option 5**.

4. My brother's mother's husband means my mother's husband i.e. my father. My father's sister is my aunt and her husband is my uncle. My uncle's only son's sister is my cousin. Thus, A and B are cousins.
Hence, **option 5**.
5. B's mother's husband is B's father. B's father's father is B's grandfather. B's grandfather's wife is B's grandmother. B's grandmother's only daughter is B's aunt. Thus, A is B's aunt.
Hence, **option 4**.

6. Here, finding the gender of A and E is not of use.

The relationship among the various people mentioned is as shown below:



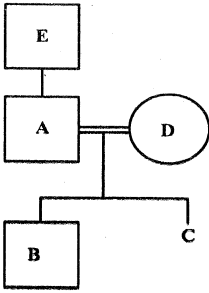
From the family tree, it can be seen that A belongs to the first generation of the family while E belongs to the third generation.

Hence, the difference between their generations is 2.

Hence, **option 3**.

7. Since the relation of A with C is to be found, first find A's gender.
A/E means A is E's mother.
Hence, A is female.
Hence, options 2 and 4 can be eliminated.
E+B means E is B's sister.
Hence, A is B's mother as well.
B#C means B is C's brother.
Hence, A is C's mother as well.
Hence, **option 1**.

8. The relationship among the various people mentioned in the question can be shown by a following family tree:



From this, we know that E is C's grandfather and B is C's brother.

So options (1) and (3) are true.

But D is A's wife and not A's husband.

So option (2) is not true.

Hence, **option 2.**

9. Since B is to be the mother-in-law of C, B has to be female.

Note that A symbol B implies Relationship of A with respect to B.

Hence, in such a case, the gender of A can be known for sure, but the gender of B cannot not be found. The exception to this is as when A symbol B states that A is the husband/wife of B. In such a case, if the gender of one person is known, the gender of the other person is found automatically.

Using this logic, it is not possible to find the gender of B in options 1 and 2.

Hence, options 1 and 2 can be eliminated.

Consider option 3:

B/A means B is A's mother.

A-E means A is E's father.

Hence, B is E's paternal grandmother.

E#D means E is D's brother.

Hence, B is D's paternal grandmother.

D@C means D is C's son.

Hence, C can be D's father or mother.

However, A is E and D's father.

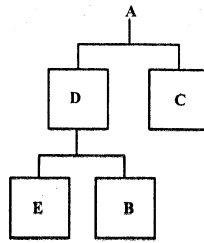
Hence, C has to be A's wife and E and D's mother.

Hence, B has to be the mother-in-law of C.

Hence, **option 3.**

10. First find the relationship between E and A in E#B@D#C@A. Also determine the gender of A.

The relationship between E and A in the above expression is shown in the following family tree:



Hence, as per the family tree, E is the grandson of A.

Hence, the answer options, where E is female or the gender of E cannot be found, can be eliminated.

In option 1, the gender of E is unclear.

Hence, option 1 can be eliminated.

In option 3, E+D means E is D's daughter.

Hence, E is female.

Hence, option 3 can be eliminated.

In option 4, A-E means A is E's father.

Hence, option 4 can be eliminated.

Consider option 2.

A@B means A is B's son.

B#C means B is C's brother.

Hence, A is C's nephew

C/E means C is E's mother.

Hence, A is E's cousin.

E#D means E is D's brother.

Hence, A is D's cousin

Hence, option 2 can be eliminated.

Hence, none of the expressions show the same relationship between A and E as that in the original relationship.

Hence, **option 5.**

DIRECTIONS AND ARRANGEMENTS

CONCEPT TEST I

1. Number the nine seats as 1-9 from left to right.

Since E sits at the centre, E is on seat 5.

Now, look for conditions that directly give the position of some other seat compared to E. D sits three places to the right of E. Since all the people are facing north, D is on seat 8.

A is two places to the left of D. So, A is on seat 6. Also, A is next to H. So, H can be on either seat 5 or seat 7. However, S is already on seat 5. So, H is on seat 7.

Now, H is equidistant from both I and E. Since E and H are on seats 5 and 7 respectively, I has to be on seat 9.

Now, F and I are on corner seats. Since I is on seat 9, F has to be on seat 1.

The people and seats left now are B, C and G and 2, 3 and 4. G is between B and C and so, G is on seat 3. Since C is closer to E, C is on seat 4 and B is on seat 2.

So, the final arrangement is as shown below:

F B G C E A H D I

Thus, the sixth person from the right end is C.

Hence, **option 2**.

2. Consider the final arrangement obtained in the solution to the first question. There are four people between G and D (C, E, A and H).

Hence, **option 2**.

3. Consider the final arrangement obtained in the solution to the first question. The immediate neighbours of E are A and C.

Hence, **option 1**.

4. Consider the final arrangement obtained in the solution to the first question. Among the pairs given, only A and B are not sitting next to each other.

Hence, **option 3**.

5. Consider the final arrangement obtained in the solution to the first question. If the positions are interchanged as per the conditions given, the new arrangement is:

E H G C F A B D I

Now, G is between C and H.

Hence, **option 5**.

6. Number the seats as 1-8 and let A be on seat 1.

Since everyone is facing the centre and E is three positions to the left of A, E is on seat 4.

Since G is farthest from E, G has to be opposite to E i.e. on seat 8.

Also, E is equidistant from A and D. Since the distance between E and A is 3 seats, the distance between E and D should also be 3 seats. So, D should be on seat 7.

Now, D is to positions to the left of H. So, H should be on seat 5.

F and E are adjacent to C. Since E is on seat 4, F and C have to be on seats 2 and 3 respectively.

B has to take the only remaining seat i.e. seat 6.

Thus, the order (clockwise) in which the people sit is AFCEHBDG.

Thus, E is 3 places to the left of A (or 5 places to the right of A).

Hence, **option 4**.

7. Consider the final arrangement obtained in the solution to the first question. B is on seat 6 and F is on seat 2. So, F is opposite B.

Hence, **option 4**.

8. Consider the final arrangement obtained in the solution to the first question. A and C are the immediate neighbours of F.

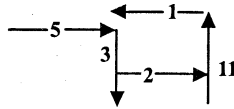
Hence, **option 4**.

Note: One of the conditions in the data explicitly mentions that F is adjacent to C. So, C has to be one of the immediate neighbours of F. So, in this case, you can directly eliminate options 1 and 3 before making the final arrangement.

9. Consider the final arrangement obtained in the solution to the first question. The distance between A and C in the arrangement as well as in the alphabet is 2. So, this pair satisfies the given condition.

Hence, **option 3**.

10. The path traced by Raghav can be depicted by the figure below.



The horizontal distance between Raghav's original and final position is $5 + 2 - 1 = 6$ km.

The vertical distance between Raghav's original and final position is $-3 + 11 = 8$ km.

So, the distance between Raghav's original and final position is obtained by applying Pythagoras theorem i.e. $\sqrt{6^2 + 8^2} = 10$ km

Hence, **option 3**.

CONCEPT TEST II

1. Represent the various parameters by their initials and make a table as shown below. Start filling in data given directly. Also, wherever it is given that A does not like B and C, it means that A can possibly like the other elements of that group.

Name	Home city	Company	Specialization

First let us map each person to company.

It is directly given that Sonal, Nilesh, Neha and Rohit work in companies A, D, C and F respectively. Now, the companies left are B and E and the people left are Malvika and Abhro. However, it is given that Abhro does not work in company E. So, Malvika works in company E and Abhro works in company B.

Now, let us map each person to location.

It is directly given that Malvika is from Bangalore and Neha is from Mumbai.

Now, the person who works in company F is from Delhi and the person who works in company A is from Kolkata. So, Rohit is from Delhi and Sonal is from Kolkata. Finally, Abhro and Nilesh have to be Chennai and Gujarat, in no specific order. However, this cannot be found right now.

Finally, let us map each person to specialization.

It is directly given that Sonal, Nilesh and Neha specialize in Finance, Management and Communication respectively. Also, Malvika does not specialize in Engineering or Mathematics. So, Malvika has to specialize in Psychology. Finally, Abhro and Rohit have to specialize in Engineering and Management (in no specific order.)

Now, the people specializing in Engineering and Mathematics are from Delhi and Gujarat (in no specific order). Since Rohit is from Delhi, Abhro is from Gujarat. This implies that Nilesh is from Chennai.

Thus, the entire table, except the specializations of Abhro and Rohit can be filled, as shown below.

Name	Home city	Company	Specialization
Malvika	Bangalore	B	Psychology
Sonal	Kolkata	A	Finance
Nilesh	Chennai	D	Management
Neha	Mumbai	C	Communication
Rohit	Delhi	F	Engineering/ Mathematics
Abhro	Gujarat	E	Engineering/ Mathematics

Thus, Sonal is from Kolkata.

Hence, **option 5**.

2. Consider the final arrangement obtained in the solution to the first question.

Malvika specializes in Psychology.

Hence, **option 3**.

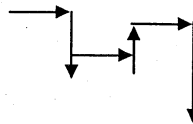
3. Consider the final arrangement obtained in the solution to the first question. Nilesh belongs to Chennai.

Hence, **option 4**.

4. Consider the final arrangement in the solution to the first question. Abhro works in company B.

Hence, **option 1**.

5. The path of the person can be as shown below:

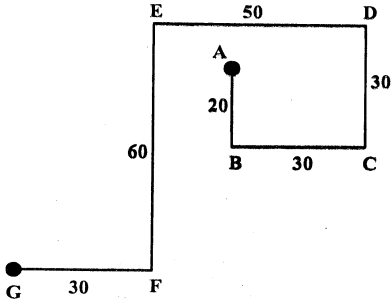


Thus, the final position is to the south-east of the original position.

Hence, **option 3**.

6. Aarav's journey to look out for his pet can be depicted by a diagram as below. In the figure all the distances shown are in metres.

Let the starting point of Aarav's journey be denoted by A and the end point be denoted by G. All the letters in between denote Aarav's position after each step.



The distance between A and G can be found by Pythagoras theorem.

The horizontal displacement between A and G is

$BC - ED - GF$ (The negative sign is because the directions are opposite to each other).

Hence, the horizontal distance between A and G is $30 - 50 - 30 = -50$.

Since, distance cannot be negative, the horizontal distance is 50 m

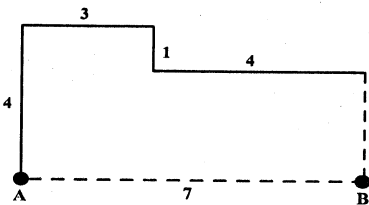
Similarly, the vertical distance between A and G = $AB - CD + EF = 20 - 30 + 60 = 50$ m

Using Pythagoras theorem,

$$AG = \sqrt{50^2 + 50^2} = 50\sqrt{2}$$

Hence, **option 3**.

7. Bunty's journey can be depicted by the diagram given below. Here, A is Bunty's house and B is his school.



Bunty first goes north for 4 kms and then takes a right.

This means that he now goes in the east and travels 3 kms.

He again takes a right and rides 1 km. This implies that he goes south for 1 km.

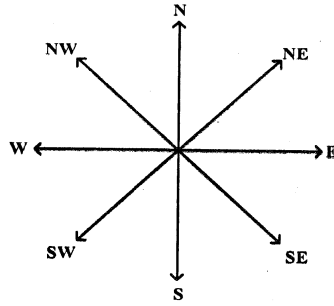
Finally, he takes a left and rides 4 km. This implies that he goes in the east for 4 km.

Bunty has travelled $3 + 4 = 7$ km horizontally. Hence, he is in the same vertical line as the school.

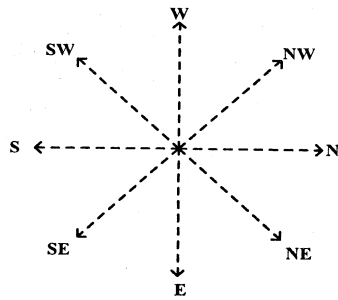
Hence, he has to take a right turn and go in the South.

Hence, **option 2**.

8. The actual change of directions is as shown below:



The direction that the sign board shows after it gets turned due to storm is as shown below:



This implies that the sign board has rotated clockwise by 90° .

Hence, in this case, if the sign board shows south, it actually means west.

Hence, he is actually walking in the West direction.

Hence, **option 5**.

9. In the morning (just after sunrise), the sun is in the East, so the shadow of an object falls towards the West.

Since Sarth's shadow falls towards his right, his right faces the West.

Hence, Sarth is facing the South.

\therefore Vineel, who is sitting on the side of the table to the right of Sarth, is facing the East.

Hence, **option 1**.

CONCEPT TEST III

1. Number the seats as 1-7 from left to right. Note that all the people are facing south. Thus, the interpretation of left and right changes. Since C is in one of the corner seats, C can be on seat 1 or seat 7. However, A sits two places to the left of C. Since everyone is facing south, this can only be possible if C is on seat 1. Therefore, C and A are on seats 1 and 3 respectively.

Since G sits in the middle, G is on seat 4.
 B sits to the immediate left of G. Since everyone faces south, B has to be on seat 5.
 Since B and F sit next to each other, F is on seat 6.
 Now, G and E have the same number of people between as B and D.
 This condition gets satisfied in both the arrangements shown below:

C E A G B F D
 AND

C D A G B F E

However, in both cases, F is second from right.

Hence, **option 1**.

2. Consider the two arrangements obtained in the solution to the first question.

In both the cases, G and F are the immediate neighbours of B.

Hence, **option 2**.

3. Consider the two arrangements obtained in the solution to the first question.

Looking south, the extreme left corresponds to seat number 7.

Either D or E could be on this seat.

Hence, the exact person cannot be identified.

Hence, **option 5**.

4. Consider the two arrangements obtained in the solution to the first question.

In both the cases, two people (G and B) are sitting between A and F.

Hence, **option 3**.

5. Consider the two arrangements obtained in the solution to the first question.

The position of D and E cannot be determined.

Hence, **option 4**.

6. Consider statements I, II and V

Since all the people are facing the west and R is to the immediate right of S, it can be depicted as shown in the figure below:

	East						
North	R	S					South
	West						

Now, consider statements III and IV
 Q is at one of the extremes and has T as a neighbour. Also, V is between U and T.
 Hence, there are two combinations possible, as shown below:

	East						
North	Q	T	V	U			South
	West						

Or

	East						
North			U	V	T	Q	South
	West						

Now, consider statements II, IV and V

Hence, the first combination is not possible because R is already seated at the second place from the north.

Hence, by combining the two figures and filling up the vacant place with the only person left, the position of P can be obtained.

The final arrangement is as shown below:

	East							
North	P	R	S	U	V	T	Q	South
	West							

Thus, all 5 statements are required to find out P's position.

Hence, **option 4**.

7. From the final arrangement given in the solution to the first question, S is sitting between R and U.

Hence, **option 2**.

8. From the arrangement in the solution to the first question, V currently sits at the third place from the southern end.

Hence, R should change places with V.

Hence, **option 1**.

9. From the arrangement in the solution to the first question, P and Q sit at the extreme ends.

Hence, **option 4**.

10. From the arrangement in the solution to the first question, V is sitting to the immediate right of T.

Hence, **option 4**.

CONCEPT TEST IV

1. There are four corner positions.

It is given that G and E are in two of these four positions.

Since C is exactly opposite E and D is diagonally opposite C, C and D are in the other corner positions.

Now, G, F and C are on one side.

Also, H is opposite A and on the same side as E.

This is only possible if G, F, C and A are on one side and H, B, D and E are on the opposite side.

At this stage, the arrangement is:

C _ _ G

E _ _ D

Now, D and B have exactly one person between them. This person has to be H.

Also, B has to be next to E.

A is opposite H.

Therefore, A is next to G and F is next to C.

Therefore, the final arrangement is as shown below:

<u>G</u>	<u>A</u>	<u>F</u>	<u>C</u>
<u>D</u>	<u>H</u>	<u>B</u>	<u>E</u>

Among the given options, only G is at one of the corner positions.

Hence, **option 2**.

2. Consider the final arrangement obtained in the solution to the first question.

G is sitting diagonally opposite E.

Hence, **option 5**.

3. Consider the final arrangement obtained in the solution to the first question.

Two people (F and A) are sitting between G and C.

Hence, **option 3**.

4. Consider the final arrangement obtained in the solution to the first question.

If A and B interchange positions, A and D become the neighbours of H.

Only A is given among the options.

Hence, **option 4**.

5. From the given data, the top floor in one of the buildings is occupied by the Reddys and in the other by the Shahs.

The Singh family occupies the ground floor in one of the buildings.

Now, the Parikhs live just above the Patels.

Hence, the Patels can be either on the ground or the first floor, while the Parikhs can be either on the first or the second floor.

The Shahs do not live in the same building as Parikhs, so the Parikhs (as well as Patels) live in the same building as the Reddys.

It is given that the Khannas live just below the Reddys.

Hence, the Khannas occupy the second floor in the building in which the Reddys occupy the top floor.

Since the Patels and Parikhs also live in the same building, they are on the ground and first floor respectively of the same building as the Khannas and the Reddys.

Hence, the order in one building, from top to bottom, is Reddy, Khanna, Parikh and Patel.

Now, the Khannas live on the same floor as the Guptas.

Hence, the Guptas live on the second floor of the other building; just below the Shahs.

The Singhs live in the same building on the ground floor.

Hence, the only remaining flat i.e. the flat on the first floor in the same building as the Shahs, the Guptas and the Singhs is occupied by the Kumars.

The final arrangement of the families can be depicted as below:

Reddy	Shah
Khanna	Gupta
Parikh	Kumar
Patel	Singh

From this arrangement, the Guptas live in the same building as the Kumars and are just above them.

Hence, **option 3**.

6. From the final table in the solution to the previous question, the Gupta, Kumar and Singh families live in the same building as the Shah family.

Of these, only the Gupta family is mentioned in the options.

Hence, **option 1**.

7. From the table in the solution to the first question, the Guptas live closest to the Shahs.

Therefore, the Parikhs should exchange their house with the Guptas so that they can live closest to the Shahs.

Hence, **option 4**.

8. The table format shown below is another way of representing data in a complex arrangement. Here, the names of the people and shows are shown as per the matrix method while the countries and months are represented as per the consolidated table approach. Ajay did not take part in the Kate Fashion show and Chetak's show was the Madonna show. The table at this point can be filled as shown below:

	Ajay	Balram	Chetak	Dhiraj	Month
Madonna	x	x	✓	x	October
Lopez			x		
Kate	x		x		
Phirangi			x		
Country					

Now, Dhiraj took part in the Lopez show and it was held in the last month of the year i.e. December. Let Atlanta, Beijing, Indonesia and Frankfurt be represented as A, B, I and F respectively. Since Dhiraj did not go to a country starting with a vowel, the Lopez show must be held in either Beijing or Frankfurt.

	Ajay	Balram	Chetak	Dhiraj	Month
Madonna	x	x	✓	x	October
Lopez	x	x	x	✓	December
Kate	x		x	x	
Phirangi			x	x	
Country				B/F	

From the table, it is clear that Ajay took part in the Phirangi show. Hence, the only show in which Balram can participate is the Kate show. It is also given that the show in Beijing was the first show of the four shows. Since Lopez was held in December and all the four shows are held in 4 consecutive months of the same year, Lopez cannot be held in Beijing. Therefore, Lopez was held in Frankfurt. The table now looks as shown below:

	Ajay	Balram	Chetak	Dhiraj	Month
Madonna	x	x	✓	x	October
Lopez	x	x	x	✓	December
Kate	x	✓	x	x	
Phirangi	✓	x	x	x	
Country				F	

Ajay and Balram had common initials with the name of the respective locations. So, Ajay's show was held in Atlanta and Balram's show in Beijing. Hence, Chetak's show (Madonna) took place in the only venue available i.e. Indonesia. The question here talks about consecutive months of a single year, so these months have to be September, October, November and December. The first show is held in Beijing. So the fashion show in which Balram took part was held in September. Therefore, Phirangi was held in November. Hence, the complete table looks like below:

	Ajay	Balram	Chetak	Dhiraj	Month
Madonna	x	x	✓	x	October
Lopez	x	x	x	✓	December
Kate	x	✓	x	x	September
Phirangi	✓	x	x	x	November
Country	A	B	I	F	

From the table above, Ajay's fashion show was held in Atlanta in the month of November. Hence, **option 4**.

9. From the table in the solution to the first question, Balram's show was held in September.
Hence, **option 4**.
10. From the table in the solution to the first question, the Madonna show was held in Indonesia.
Hence, **option 5**.
11. From the table in the solution to the first question, the last show was held in the month of December in Frankfurt.
Hence, **option 1**.
12. From the table in the solution to the first question, Madonna - October - Indonesia is the right combination.
Hence, **option 3**.

CONCEPT TEST V

1. Here, instead of trying to fill in all the data simultaneously, find a particular parameter for everyone and then move on to the next parameter.
G, F, C and D work in companies P, R, V and U respectively.
E wears white and the person who wears white works in company S.
Therefore, E works in company S.
Therefore, A and B work in companies Q and T (in no specific order).
Now, match each person to the colour.
B, E, A and D like black, white, red and blue respectively.
C does not like yellow. Therefore, C has to like either brown or green.
Now C works in company V but the person wearing brown does not work in company V or R.
Therefore, C wears green.
Therefore, F and G wear yellow and brown (in no specific order).
Since F works in company R, F cannot wear brown.
So, F and G wear yellow and brown respectively.
Therefore, the colour and company matched to each person at this stage is:
A = Red = Q/T
B = Black = Q/T
C = Green = V
D = Blue = U
E = White = S
F = Yellow = R
G = Brown = P

Now, B, C and D do not work on Tuesday, Wednesday and Thursday respectively. G and F do not work on Saturday and Sunday (in no specific order).
Therefore, E may not work on either Monday or Friday.
The person who works in company Q does not work on Monday. But E works in company S.
Therefore, E does not work on Friday and A does not work on Monday.
Therefore, A works in company Q and B works in company T.
Thus, the final arrangement is as shown below:

Person	Shirt Colour	Weekday	Company
A	Red	Monday	Q
B	Black	Tuesday	T
C	Green	Wednesday	V
D	Blue	Thursday	U
E	White	Friday	S
F	Yellow	Saturday/ Sunday	R
G	Brown	Saturday/ Sunday	P

- Thus, C's shirt is green.
Hence, **option 4**.
2. Consider the table obtained in the solution to the first question.
E does not like to work on Friday.
Hence, **option 1**.
3. Consider the table obtained in the solution to the first question.
E works in company S.
Hence, **option 4**.
4. Consider the table obtained in the solution to the first question.
F does not like to work on weekends i.e. on either Saturday or Sunday. The exact day cannot be identified.
Hence, **option 5**.
5. Construct a table with the columns having the 4 categories i.e. name of inventor, nationality, life span and invention.
Since, Al-K lived for 70 years, look for a life span that equals 70 years.
Hence, his life span must have been 780 - 850.
Since DB was 12 years older than JA, he must have been born in 1859 while JA must have been born in 1871.

Hence, the life spans of DB and JA were 1859 - 1922 and 1871 - 1948 respectively. HB had the longest life span. Hence, HB's life span would have been 1788 - 1875. Hence, WC can have the only life span left i.e. 1896 -1937.

This completely fills up the column on life span.

It is directly given that Al-K, DB and HB were from Persia, Hungary and the U.K.

Hence, fill this up in the table.

Now, JA was not from the US and WC was not from England.

This implies that JA was from England and WC was from the US.

Thus, the countries of all 5 inventors are also mapped.

Since the inventor from England invented PC, it implies that JA invented PC.

Now, the carburetor was not invented in Persia or UK.

Hence, from the two statements above, JA, Al-K and HB could not have invented the carburetor.

Hence, either DB (from Hungary) or WC (from the US) could have invented the carburetor.

Since WC was from the US, he invented Nylon.

Hence, DB invented the carburetor.

It is not clear as to who among Al-K and HB invented Modern Algebra and Stainless Steel.

Hence, the completed table is as shown below:

Inventor	Nationality	Life Span	Invention
Al-K.	Persia	780-850	
J.A.	England	1871-1948	Portland Cement
D.B.	Hungary	1859-1922	Carburetor
H.B.	U.K.	1788-1875	
W.C.	U.S.A.	1896-1937	Nylon

From the table the lifespan of Wallace Carothers is 1896-1937.

Hence, **option 5**.

6. From the table in the solution to the first problem, the inventor from Hungary invented the Carburetor.

Hence, **option 3**.

7. From the table in the solution to the first question, one of Al-Khwarizmi and Harry Brearley invented Modern Algebra.

Hence, a unique answer cannot be determined.

Hence, **option 5**.

8. From the table in the solution to the first question, it is not clear whether Harry Brearley invented Modern Algebra or Stainless Steel.

Hence, **option 5**.

9. From the table in the solution to the first question, the inventor from U.S.A. invented Nylon.

However, Nylon is not given in any of the answer options.

Hence, **option 5**.

SERIES AND ANALOGIES

CONCEPT TEST I

1. There seems to be no evident relationship between the numbers. However, we can observe that the series increase rapidly and that each term is marginally greater than a perfect square.

$$28 = 25 + 3 = 5^2 + 3$$

$$54 = 49 + 5 = 7^2 + 5$$

$$180 = 169 + 11 = 13^2 + 11$$

$$302 = 289 + 13 = 17^2 + 13$$

Observe that both numbers in each term are prime and themselves a form of sequence of successive prime numbers.

So, the missing term should be $11^2 + 7 = 121 + 7 = 128$

Hence, **option 4**.

2. Since the numbers increase sharply, the logic has to be based on products, powers or factorials. Also, because the numbers increase and decrease, there may be alternative addition and subtraction.

Observe that all four numbers are close to the first four factorials.

$$0 = 1! - 1$$

$$4 = 2! + 2$$

$$3 = 3! - 3$$

$$28 = 4! + 4$$

So, the next term is $5! - 5 = 120 - 5 = 115$

Hence, **option 3**.

3. Observe that the series can be broken up into three distinct parts. The first number in each term forms a series of consecutive natural

numbers. So, the first number in the missing term should be 4.

The last number in each term forms a series of consecutive natural numbers starting from 11. So, the last number in the missing term should be 14.

Hence, options 1, 2, 4 and 5 can be eliminated. Hence, **option 3**.

Note: It can be separately seen that the letters form a series of consecutive letters in the reverse alphabetical order. So, the missing letter has to be Q.

4. There are two vowels (A and O) present between Y and V.

Hence, **option 3**.

5. The prime positioned letters in the series are Q, S, N, L, H, Z, C, B, M. Thus, there are 9 letters that are deleted. However, there are no vowels in this list.

Hence **option 2**.

6. There are two digits (9 and 7) that are immediately preceded by a letter and immediately followed by a symbol. These are also underlined in the series below.

5AZ9αWXβ213QF7μESL4

Hence, **option 5**.

7. There are 4 letter (Z, X, F and L) that are immediately preceded by a letter. These are also underlined in the series below.

5AZ9αWXβ213QF7μESL4

Hence, **option 3**

8. $35 = 6^2 - 1$ and $48 = 7^2 - 1$

Also, $37 = 6^2 + 1$

So, by the same logic, the missing term should be $7^2 + 1 = 49 + 1 = 50$

Hence, **option 3**

9. Here the letter is present the number of times as its position in the alphabet. So, the correct option should have a letter which is present as many times as its position in the alphabet. The only letter that satisfies this condition is D, which is present 4 times.

Hence, correct **option is 1**

10. Here the series is:

$(n^{\text{th}} \text{ prime number} \times (n + 1)^{\text{th}} \text{ prime number}) / (n + 2)^{\text{th}} \text{ prime number}$

Here n starts from 2.

So, the missing term is $(19 \times 23) / 29 = 437 / 29$

Hence, **option 4**.

CONCEPT TEST II

1. Taking the difference between consecutive terms, we get 10, 17 and 38.

Since there are 2 terms between 50 and 143, there should be two differences between 17 and 38.

Now, the difference between 17 and 38 is 21. This implies that adding 7 thrice to 17, the difference for the last two terms can be $17 + 7 + 7 + 7 = 38$.

Hence, the difference between the 3rd and 4th term should be $17 + 7 = 24$ and that between the 4th and 5th term should be $24 + 7 = 31$.

Using this logic, the difference between the 5th and 6th term should be $31 + 7 = 38$ (which is the case).

Hence, the pattern is $23 + 10 = 33$, $33 + 17 = 50$,

$50 + 24 = 74$, $74 + 31 = 105$, $105 + 38 = 143$.

Thus, the missing term is 74.

Hence, **option 4**.

2. On observation, each term of the series can be expressed as:

$1^3 \times 10$, $2^3 \times 10$, $3^3 \times 10$, $4^3 \times 10$, $5^3 \times 10$

Hence, the next term should be $6^3 \times 10 = 2160$

Hence, **option 2**.

3. Since the terms increase sharply, it has to be a multiplicative series.

Now, $19 = (6 \times 3) + 1$ and $77 = (19 \times 4) + 1$

Hence, the series may be of the form

$(\text{Previous term} \times n) + 1$ where n starts from 3.

We apply this same logic to 77 to get the 4th term and then test the pattern on the obtained 4th term to see whether we get 2317.

4th term = $(77 \times 5) + 1 = 386$

Now, $(386 \times 6) + 1 = 2317$

Hence, the pattern is correct.

Hence, the missing term is $(77 \times 5) + 1 = 386$

Hence, **option 5**.

4. Since the series already has 11 terms, it may be a combination of 3 different series.

When we consider the 1st, 4th, 7th and 10th terms, we get a series 9, 12, 15, 18.

Similarly, when we consider the 2nd, 5th, 8th and 11th terms, we get a series 11, 13, 15, 17.

Similarly, when we consider the 3rd, 6th and 9th terms, we get a series 13, 15, 19.

Since we want the 12th term, it should follow the pattern of the 3rd series.

In the 3rd series, the difference between successive terms is 2 and 4.

Hence, the 12th term should be $19 + 6 = 25$.

Hence, **option 4**.

5. $7 + 1^3 = 8$
 $8 + 2^3 = 16$
 $16 + 3^3 = 43$
 Using this logic, the next term should be
 $43 + 4^3 = 107$
 This can be verified by checking $107 + 5^3$
 $107 + 5^3 = 232$
 Hence, **option 1.**
6. Since the terms in the series increase in size quickly, check whether it is multiplicative.
 $2 \times 1 = 2$
 $2 \times 2 = 4$
 $48 \times 5 = 240$
 Therefore, the third term should be
 $4 \times 3 = 12$
 This can be verified by checking 12×4
 $12 \times 4 = 48$
 Hence, **option 3.**
7. $5 + 2^2 = 9$
 $9 + 3^2 = 18$
 $18 + 4^2 = 34$
 Thus, the difference between consecutive terms is the square of consecutive natural numbers.
 Therefore, the next term is
 $34 + 5^2 = 59$
 Hence, **option 2.**
8. Since the terms increase from a very small value to a very large value, this may be a multiplicative series.
 $4 \times 1 = 4$
 $4 \times 1 \times 2 = 8$
 $8 \times 1 \times 2 \times 3 = 48$
 Therefore, the next term should be
 $48 \times 1 \times 2 \times 3 \times 4 = 1152$
 Hence, **option 4.**
9. Since the value of the terms increases quickly, this can be a multiplicative series
 $8 \times (2^2 - 1) = 24$
 $2280 \times (5^2 - 1) = 54720$
 Therefore, the missing term has to be
 $24 \times (3^2 - 1) = 192$
 This can be verified by checking
 $192 \times (4^2 - 1)$
 $192 \times (4^2 - 1) = 2280$
 Hence, **option 5.**
10. Consider the difference between consecutive terms.
 $237 - 235 = 2$
 $240 - 237 = 3$
 $263 - 252 = 11$

Since the difference in each case is a prime number, the missing term should be $240 + 5 = 245$

This can be verified by checking the difference between 245 and 252

$$252 - 245 = 7$$

Hence, **option 3.**

11. $5 \times 2 = 10$

$$10 \times 3 = 30$$

$$600 \times 6 = 3600$$

Therefore, the missing term is $30 \times 4 = 120$

This can be verified by checking 120×5 , which is indeed 600.

Hence, **option 4.**

12. Each term in the series is of the form $(N^3 + N)$ where N starts from 1

$$2 = 1^3 + 1 = 1 + 1$$

$$10 = 2^3 + 2 = 8 + 2$$

$$30 = 3^3 + 3 = 27 + 3$$

$$130 = 5^3 + 5 = 125 + 5$$

$$222 = 6^3 + 6 = 216 + 6$$

Therefore, the missing term should be

$$4^3 + 4 = 64 + 4 = 68$$

Hence, **option 2.**

CONCEPT TEST III

1. Consider the difference between consecutive terms.
 $7 - 3 = 4$
 $13 - 7 = 6$
 $43 - 31 = 12$
 Thus the difference between consecutive terms is a sequence of consecutive even numbers.
 Therefore, the missing term should be $13 + 8 = 21$
 Hence, **option 3.**
2. $7 \times 2 = 14$
 $14 \times 3 = 42$
 $42 \times 5 = 210$
 Thus, the product between consecutive terms forms a series of consecutive prime numbers.
 Therefore, the next term should be
 $210 \times 7 = 1470$
 Also, $1470 \times 11 = 16170$
 Hence, **option 4.**
3. Each term in the series is of the form $(N^3 - 1)$ where N starts from 2.
 $7 = 2^3 - 1 = 8 - 1$
 $26 = 3^3 - 1 = 27 - 1$
 $124 = 5^3 - 1 = 125 - 1$
 $215 = 6^3 - 1 = 216 - 1$
 $342 = 7^3 - 1 = 343 - 1$

Therefore, the missing term should be

$$4^3 - 1 = 64 - 1 = 63$$

Hence, **option 4.**

4. Consider the ratio of consecutive terms

$$22/11 = 2$$

$$4224/528 = 8$$

$$42240/4224 = 10$$

Therefore, the missing term should be $22 \times 4 = 88$

This can also be verified by checking 88×6

$$88 \times 6 = 528$$

Hence, **option 1.**

5. $6 \times 3 = 18$

$$18 \times 6 = 108$$

$$108 \times 9 = 972$$

Therefore, the missing term should be

$$972 \times 12 = 11664$$

Hence, **option 1.**

6. Each term of the series is of the form $(N! - N)$

where N starts from 1

$$0 = 1! - 1 = 1 - 1 = 0$$

$$0 = 2! - 2 = 2 - 2 = 0$$

$$3 = 3! - 3 = 6 - 3 = 3$$

$$20 = 4! - 4 = 24 - 4 = 20$$

$$714 = 6! - 6 = 720 - 6 = 714$$

Therefore, the missing term should be $5! - 5$

$$= 120 - 5 = 115$$

Hence, **option 5.**

7. Consider the position of each letter in the alphabet.

The series can be written as

$$1, 2, 6, 15, ?, 4$$

$$1 + 1^2 = 2 \text{ (B)}$$

$$2 + 2^2 = 6 \text{ (F)}$$

$$6 + 3^2 = 15 \text{ (O)}$$

$$15 + 4^2 = 31 \text{ (which is } 26 + 5 \text{ i.e. E)}$$

$$31 + 5^2 = 56 \text{ (which is } 26 + 26 + 4 \text{ i.e. D)}$$

Hence, the missing term should be E.

Hence, **option 1.**

8. While the given letters do not show any apparent pattern, it can be seen that they are the first letter of the months of a year starting from January.

Therefore, the missing term should be M (for March).

Hence, **option 5.**

9. Though the letters do not show any apparent pattern, each letter corresponds to the first letter of the days of the week.

Therefore, the missing letter should be T (for Thursday).

Hence, **option 5.**

10. $A + 3 = D$

$$P + 9 = Y$$

$$Y + 11 = J$$

Therefore, the missing term should be

$$D + 5 = I$$

This can be verified by checking that $I + 7 = P$

Hence, **option 4.**

11. $A + 2 = C$

$$E - 8 = W$$

$$W + 10 = G$$

Looking at this pattern, the missing term should be

$$C - 4 = Z$$

This can be verified by checking $Z + 6$

$$Z + 6 = E$$

Thus, the missing term is Z.

Hence, **option 3.**

12. The given letters are the first letter of the months that have 31 days i.e. January, March, May, July, August, October, December

Hence, the missing letter should be M (for May).

Hence, **option 1.**

13. $B + 2 = D$

$$D + 3 = G$$

$$S + 11 = D$$

Thus, the difference between the alphabetical position of consecutive terms is a prime number.

Therefore, the next term should be $G + 5 = L$

Hence, **option 2.**

14. $E + 1 = F$

$$K + 4 = O$$

$$O + 5 = T$$

Using this logic, the missing term should be

$$F + 2 = H$$

Hence, **option 4.**

CONCEPT TEST IV

1. The series can be expressed as:

$$1, (1 \times 2) + 1, (3 \times 2) + 2, (8 \times 2) + 3, (19 \times 2) + 4,$$

$$(42 \times 2) + 5, (89 \times 2) + 6 \text{ and so on...}$$

The wrong term in the series is 18. It should be 19.

Hence, **option 1.**

2. The digits used to form the number in each term are prime, except for 79 as 9 is a composite number.

Hence, 79 should be replaced by a number where all the digits individually are prime numbers.

Among the options, only 77 satisfies this condition.

Hence, **option 2**.

3. The pattern here is:

$$232, (232 - 7) \div 3, (75 - 6) \div 3, (23 - 5) \div 3, (6 - 4) \div 3$$

Hence, the correct term should be $2/3$.

Hence, **option 5**.

4. Apart from sky, all the other entities are water bodies.

Hence, **option 5**.

5. All except water are naturally solids.

Hence, **option 4**.

6. All the people mentioned (except students) repair and mend things as an occupation.

Hence, **option 2**.

7. All the items mentioned (apart from books) are edible.

Hence, **option 2**.

8. The analogy here can be expressed as:

$$324 : (3 \times 2 \times 4) :: 441 : (4 \times 4 \times 1)$$

Therefore, the missing term is the multiplication of the digits of the 1st number i.e. 16.

Hence, **option 1**.

9. Consider the terms of the first pair.

Each letter of the second term is two steps ahead of each corresponding letter of the first term. Also, in a single term, the case of the letters is alternated.

Hence, in the second pair, the second term should start with a small case letter and the case of the letters should alternate between small case and capitals.

Hence, we can eliminate options 4 and 5.

Also, the letters of the second term should be 2 steps of the letters of the first term.

Hence, the letters of the second term should be h, l, v and S respectively.

Hence, the second term is hlvS

Hence, **option 3**.

CONCEPT TEST V

1. To get the 2nd term 111111 is added to the 1st term in the first pair. Therefore, the missing term is

$$3587013 + 111111 = 4698124.$$

Hence, **option 2**.

2. Consider AD, WZ and FI.

All these pairs have two letters between the first letter and last letter of the pair.

Thus, an answer option where this relationship is followed has to replace the question mark.

Only RU follows this pattern.

Hence, **option 1**.

3. An altimeter shows height just as a watch shows time.

Hence, **option 4**.

4. Swarm and school are collective nouns used to denote groups of species.

There is a swarm of bees just as we have a school of fish.

Hence, **option 2**.

5. The numbers in the sequence when arranged in descending order are 9, 8, 7, 6, 5, 4, 3, 2 and 1.

Hence the 6th largest number is 4.

Hence, **option 2**.

6. In each group of elements apart from the 5th option, the elements are placed adjacent to each other in the sequence.

In the group given in the 5th option, only 2 and L are adjacent to each other.

Hence, **option 5**.

7. If all the letters and symbols are dropped, the new sequence formed is 971523468.

In this sequence 1 is immediately preceded by 7 and immediately followed by 5. Also, 7 is immediately preceded by 9 and immediately followed by 1.

Hence, two digits satisfies the required condition.

Hence, **option 1**.

8. If the last 15 elements are reversed, the series is as shown:

$$\text{£9K}\delta\text{@7A}\Pi\text{1M8F6}\mu\infty\text{\Theta} \leq \text{H4}\Omega\text{3L2}\Sigma\text{5}$$

14th element from the left end is 'μ', the 6th element to its left is 'Π', and the 10th element to its right is 'H'.

Hence, **option 4**.

9. Three letters are immediately preceded as well as followed by the same digit:

B (by 7), C (by 9) and R (by 6).

Hence, **option 3**.

10. Two digits are immediately preceded as well as followed by the same letter :

5 (by D) and 7 (by S).

Hence, **option 3**.

CODES

CONCEPT TEST I

1. Observe that to code GOVERNMENT, all the letters of the word are shifted to the right by one place. So, the code for POLITICIAN will be NPOLITICIA.

Hence, **option 1.**

2. Observe that to code SUPREME, all the letters of the word are shifted to the right by two places. So, COURTESY will be coded at SYCOURT.

Hence, **option 2.**

3. Observe that to code RAILWAY, all the letters of the word are shifted to the left by one place. So, STATION will be coded as TATIONS.

Hence, **option 3.**

4. Consider alternate letters of the word SIKKIM. The first, third and fifth letter from the start is replaced by the letter that immediately follows them in the alphabet. Thus, S, K and I are replaced by T, L and J respectively. Also, the second, fourth and last letter from the left is replaced by the letter that immediately precedes them in the alphabet. Thus, I, K and M are replaced by H, J and L respectively. Thus, SIKKIM is coded as THLJLL.

Using the same pattern, TRAINING is coded as UQBHOHOF.

Hence, **option 3.**

5. There does not seem to be any apparent pattern in the way the letters are arranged. However, observe that in 'BEHORRT', the letters are arranged alphabetically. Thus, the pattern is that the letters of a word are simply arranged alphabetically. Thus, AUTHORITY is coded as AHIORTTUY.

Hence, **option 1.**

6. Observe that the vowels within the word are arranged as a group first, followed by the consonants as a group. Also, within each group, the letters are arranged alphabetically. So, INDICATOR will be coded as AIIODNRT.

Hence, **option 5.**

7. Observe that each letter of the word PROPERTY is replaced by the letter immediately following it in the alphabet. So, INFORMATION is coded at JOGPSNBUJPO.

Hence, **option 1.**

8. Observe that each letter of the word is replaced by the letter two places ahead in the

alphabet. So, DISCIPLINE is coded as FKUEKRKNKPG.

Hence, **option 2.**

9. Observe that each letter of the word is replaced by the letter four places ahead in the alphabet. Since FSQFCE is a coded word, we need to replace each letter of the code by a letter four places behind it in the alphabet. So, the original word for FSQFCE will be BOMBYA.

Hence, **option 1.**

10. Observe that all the letters at odd positions are replaced by the next letter in the alphabet and the letters at even positions are replaced by the previous letter in the alphabet. So, DEPICTION will be coded as EDQHDSJNO.

Hence, **option 3.**

CONCEPT TEST II

1. Observe that all the vowels of the word are replaced by a letter three places ahead in the alphabet while all the consonants remain as they are. So, INDICATOR will be coded as LNDLCDTRR.

Hence, **option 4.**

2. All the vowels of the word are replaced by the next letter in the alphabet and all the consonants of the word are replaced by the previous letter in the alphabet. So, SEDATION will be coded as RFCBSJPM.

Hence, **option 5.**

3. All the vowels of the word are replaced by the next vowel in the alphabet and all the consonants of the word are replaced by the next consonant in the alphabet. So, LIBERATION will be coded as MOCISEVOUP.

Hence, **option 1.**

4. The letter are replaced by this rule

A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N

So, INVESTIGATE will be coded as RMEVHGRTZGV.

Hence, **option 2.**

5. The letters at the odd positions are replaced by letters that are three, four and five positions ahead in the alphabet while the letters at the even positions are replaced by letters that are two positions ahead in the alphabet. So, MOTHER will be coded as PQXJJT.

Hence, **option 5.**

6. First the entire word is reversed. The, starting from the first letter, alternate letters are replaced by a letter one place ahead in the alphabet. So, BILATERALS will first be reversed to form SLARETALIB. Now, alternate letters will be replaced as explained earlier to form TLBRFTBLJB.

Hence, **option 3.**

7. First, starting from the first letter, pairs of two letters are formed and these letters are interchanged. Now, all letters at even positions are replaced by the next letter in the alphabet.

So, DISABILITY is coded as IEATICIMYU.

Hence, **option 4.**

8. First, all the letters at odd places are made into pairs, then the letters within a pair are swapped and finally, each letter is replaced by the previous letter in the alphabet. So, PSYCHOLOGIST will be first be jumbled as YSPCLOHOSIGT and then coded as XROBKNGNRHFS.

Hence, **option 5.**

9. First, all the letters are arranged alphabetically and then all the vowels are replaced by the next letter in the alphabet. So, FORGERY will first be arranged as EFGORRY and then coded as FFGPRRY.

Hence, **option 1.**

10. First all the vowels are arranged alphabetically followed by consonants. Then all the letters at odd positions are replaced by the next letter in the alphabet. So, VIRTUAL will first be re-arranged as AIULRTV and then coded as BIVLSTW.

Hence, **option 4.**

CONCEPT TEST III

1. First the word is reversed and then all the letters are replaced by following the code given in the table.

A	B	C	D	E	F	G	H	I	J	K	L	M
Z	Y	X	W	V	U	T	S	R	Q	P	O	N

So, ADOPTION will first be reversed as NOITPODA and then coded as MLRGKWLZ.

Hence, **option 4.**

2. First the word is reversed and then each consonant is replaced by the next letter in the alphabet while each vowel is replaced by the next vowel. So, PRACTICE will first be arranged as ECITCARP and then ODOUESQ.

Hence, **option 5.**

3. From I and II, the common word is 'good' and the common coded word is 'kej'. So, 'good' is coded as 'kej'.

From I and III, the common word is 'he' and the common coded word is 'pib'. So, 'he' is coded as 'pib'.

From II and III, the common word is 'and' and the common coded word is 'inr'. So, 'and' is coded as 'inr'.

From II and IV, the common word is 'bad' and the common coded word is 'tme'. So, 'bad' is coded as 'tme'.

From III and IV, the common word is 'she' and the common coded word is 'bai'. So, 'she' is coded as 'bai'.

In I, the code word for 'is' is 'eli'.

In IV, the code word for 'seems' is 'sne'.

Hence, **option 4.**

4. Consider the codes obtained in the solution to the first question of the set. Here, 'she' is coded as 'bai'.

Hence, **option 1.**

5. Consider the codes obtained in the solution to the first question of the set. Here, 'seems' is coded as 'sne'. Hence, **option 3.**

6. Consider the codes obtained in the solution to the first question of the set. Here, 'good' is coded as 'kej'.

Hence, **option 5.**

7. The common word in the second and third sentence is 'lily' and the common code is 'sig'. Thus, 'lily' is coded as 'sig'. The common word in the first and third sentence is 'fruit' and the common code is 'fin'. Thus, 'fruit' is coded as 'fin'. The only word left in the third sentence is 'and' and the only code left is 'lon'. So, 'and' is coded as 'lon'.
Hence, **option 4**.
- Note:** Since the code for a single word is required, there is no need to find the code for each and every word of all the sentences.
8. The word common to the first and third sentence is 'monkey' and the common code is 'ahn'. So, 'monkey' is coded as 'ahn'. The word common to the second and third sentence is 'yeo' and the common code is 'fruit'. Now, the only word left in the third sentence is 'eat' and the only code left is 'xsa'. So, 'eat' is coded as 'xsa'.
Hence, **option 4**.
9. The word common to the second and third sentence is 'service' and the code common to both is 'sin'. So, 'service' is coded as 'sin'. Now, from the second sentence, the code for 'regular' could be 'fa' or 'de'. However, neither of these codes is present in any of the other sentences. So, the unique code for 'regular' cannot be identified. So, the given data is inadequate to answer the question.
Hence, **option 4**.
10. The word common to the first and second sentence is 'food' and the common code is 'pul'. So, 'food' is coded as 'pul'. Now, in the first sentence, 'hot' can be coded as either 'dom' or 'ta'. Since these codes are not present in any of the other sentences, the unique code for 'hot' cannot be found.
Hence, **option 5**.

CONCEPT TEST IV

1. Observe that the letter A is common to both the words and the digit 3 is common to both the codes. Also, the digit 3 is present in both words at the same position as the original letter. Thus, A is coded as 3. Similarly, each letter is coded as a random digit which is present at its position. So, M, E, N and D are coded as 9, 5, 4 and 8 respectively. So, MEND is coded as 9548. S, A is code.
Hence, **option 1**.
2. Each letter is replaced by its respective position in the alphabet. Thus, K, I, N and G are replaced by 11, 9, 14 and 7 respectively. Similarly, Q, U, E and N are replaced by 17, 21, 5 and 14 respectively. So, QUEEN is coded as 17215514.
Hence, **option 2**.
3. Observe that there is no common letter and digit in the two words. Also, there seems to no relationship between each and letter. So, the only logical option is that each letter is randomly replaced by a digit from 0 to 9. Thus, each digit is coded as:
1-X, 2-N, 3-P, 4-S, 5-T, 6-U, 7-Z, 8-A, 9-L.
So, 23549 is written as NPTSL.
Hence, **option 1**.
4. Each letter is randomly coded as a digit from 0 to 9. So, the code for the letters is: E-4, A-1, R-5, T-9, H-0, P-2, L-3. So, PEARL is coded as 24153.
Hence, **option 2**.
5. Observe that each letter is represented by its respective position in the alphabet. So, HIDE will be written as 8945.
Hence, **option 4**.
6. Each letter is coded as random digit between 0 and 9. The code for each letter is:
- | | | | | |
|-----|-----|-----|-----|-----|
| P-2 | T-5 | O-6 | A-9 | I-3 |
| E-4 | R-1 | L-8 | S-7 | |
- Thus, 731584269 is the code for SIRTLEPOA.
So, the answers are
Hence, **option 2**.
7. Consider the codes obtained in the solution to the first question. TRAIL is coded as 51938.
Hence, **option 4**.
8. Consider the codes obtained in the solution to the first question. R and S are represented by 1 and 7 respectively.
Hence, **option 4**.
9. Consider the codes obtained in the solution to the first question. PORT is coded as 2615 and RISE is coded as 1374. So, the required sum is 3989.
Hence, **option 3**.
10. LIVED when reversed becomes DEVIL. So, 4689 will become 9864.
Hence, **option 1**.

CONCEPT TEST V

1. Generally, a cat drinks milk. Since 'cat' is called 'dog', 'dog' drinks milk.
Hence, **option 3**.

CONCEPT TEST VI

2. Generally, the colour of the sky is blue. Since 'blue' is called 'orange', the colour of the sky is 'orange'.
Hence, **option 4**.
3. Generally, the 'leg' is used for walking. Since, 'leg' is called 'stomach', 'stomach' is used for walking.
Hence, **option 3**.
4. Generally, when a person has lunch, he/she is 'eating'. Since 'eating' is called 'munching', the person is 'munching' when he/she has lunch.
Hence, **option 2**.
5. A room's top surface is generally called a 'ceilings'. Since 'ceilings' is called 'window', the room's top surface is called a 'window'.
Hence, **option 4**.
6. Generally, Christmas is celebrated in December. Since 'December' is called 'April', Christmas is celebrated in 'April'.
Hence, **option 5**.
7. Generally, I is used to refer to myself. Since 'I' is called 'We', 'We' is used to refer to myself.
Hence, **option 3**.
8. Generally, birds fly in the air. Since 'air' is called 'blue', birds fly in 'blue'.
Hence, **option 3**.
9. $11 \alpha 17 \beta 4 \theta 14 B 4$
 $= 11 + 17 - 4 \times \text{remainder}(14, 4)$
 $= 11 + 17 - 4 \times 2$
 $= 11 + 17 - 8 = 20$
 Hence, **option 3**.
10. $40 B 7 \alpha 6 \theta 3 \beta 2$
 $= \text{Remainder}(40, 7) + 6 \times 3 - 2$
 $= 5 + 18 - 2 = 21$
 Hence, **option 2**.
11. $60 \beta 17 B 7 \theta 6 \alpha 4$
 $= 60 - \text{remainder}(17, 7) \times 6 + 4$
 $= 60 - 3 \times 6 + 4$
 $= 60 - 18 + 4 = 46$
 Hence, **option 2**.
12. $25 \theta 2 \alpha 9 \theta 14 B 4 \beta 5$
 $= 25 \times 2 + 9 \times \text{remainder}(14, 4) - 5$
 $= 50 + 9 \times 2 - 5$
 $= 50 + 18 - 5 = 63$
 Hence, **option 1**.
13. $10 \beta 5 \theta 2 \alpha 22 B 10$
 $= 10 - 5 \times 2 + \text{remainder}(22, 10)$
 $= 10 - 10 + 2 = 2$
 Hence, **option 4**.

1. $30 @ 6 \$ 3 \# 2 \$ 5 * 7$
 $= 30/6 \times 3 + 2 \times 5 - 7$
 $= 5 \times 3 + 10 - 7$
 $= 15 + 10 - 7 = 18$
 Hence, **option 3**.
2. $(72 @ 9 * 3 \# 11) @ 4$
 $= (72/9 - 3 + 11)/4$
 $= (8 - 3 + 11)/4$
 $= 16/4 = 4$
 Hence, **option 4**.
3. $(5 \# 6 \$ 2 * 1) @ (2 \$ 2 \# 4)$
 $= (5 + 6 \times 2 - 1)/(2 \times 2 + 4)$
 $= (5 + 12 - 1)/(4 + 4)$
 $= 16/8 = 2$
 Hence, **option 4**.
4. $(11 \$ 4 * 20) @ 4$
 $= (11 \times 4 - 20)/4$
 $= (44 - 20)/4$
 $= 24/4 = 6$
 Hence, **option 4**.
5. $25 \$ 2 \# 9 \$ 4 @ 2 * 5$
 $= 25 \times 2 + 9 \times 4/2 - 5$
 $= 50 + 9 \times 2 - 5$
 $= 50 + 18 - 5 = 63$
 Hence, **option 3**.
6. $A = B$ means $A \geq B$
 $B \times C$ means $B \leq C$
 $C + D$ means $C = D$
 So, the consolidated relationship is $A \geq B$ and $D = C \geq B$. Conclusion I: $B \times D$ means $B \leq D$. So, conclusion I follows.
 Conclusion II: $A - C$ means $A < B$. This is definitely false. So, conclusion II does not follow.
 Thus, only conclusion I follows.
 Hence, **option 1**.
7. $B + A$ means $B > A$
 $C \div D$ means $C = D$
 $B \times C$ means $B \leq C$
 So, the consolidated relationship is $A < B \leq C = D$
 Conclusion I: $A - C$ means $A < C$. This is true even if $B = C$. So, conclusion I follows.
 Conclusion II: $B \times D$ means $B \leq D$. This is true as $B \leq C$. So, conclusion II follows.
 Thus, both conclusions follows.
 Hence, **option 3**.
8. $R = S$ means $R \geq S$
 $P - Q$ means $P < Q$
 $Q + R$ means $Q > R$

So, the consolidated relationship is $Q > R \geq S$ and $Q > P$

Conclusion I: $R \div S$ means $R = S$. This may or may not be true. So, conclusion I does not necessarily follow.

Conclusion II: $P \times S$ means $P \leq S$. The relationship between P and S cannot be identified. So, conclusion II does not follow.

Thus, neither conclusion follows.

Hence, **option 4**.

9. $W + X$ means $W > X$

$X \div Y$ means $X = Y$

$Y \times Z$ means $Y \leq Z$

So, the consolidated relationship is $W > X = Y$ and $Y \leq Z$

Conclusion I: $W + Z$ means $W > Z$. However, the relationship between W and Z cannot be determined. So, conclusion I does not follow.

Conclusion II: $Z = X$ means $Z \geq X$. This is true as $Z \geq Y$ and $Y = X$. So, conclusion II follows.

Thus, only conclusion II follows.

Hence, **option 2**.

10. $E \times F$ means $E \leq F$

$F \times G$ means $F \leq G$

$G \times H$ means $G \leq H$

So, $E \leq F \leq G \leq H$

Conclusion I: $H + E$ means $H > E$. This is not necessarily true. So, conclusion I does not necessarily follow.

Conclusion II: $E + H$ means $E = H$. This is not necessarily true. So, conclusion II does not necessarily follow.

However, $H \geq E$. So, at any given time, either $H = E$ or $H > E$. So, at any instant, either of the conclusions has to be true. So, either conclusion follows.

Hence, **option 5**.

11. $P = R$ means $P \geq R$

$S + T$ means $S > T$

$Q = S$ means $Q \geq S$

So, $P \geq R$ and $Q \geq S > T$

So, the relationship between P and S or P and T cannot be found. So, neither conclusion follows.

Hence, **option 4**.

CONCEPT TEST VII

1. The alphabets are coded as shown below,

S	W	A	T	R	O	N
8	4	1	6	9	2	5

So, W is coded as 4, A as 1, R as 9 and N as 5.

Thus, the code for WARN is 4195.

Hence, **option 3**.

2. Consider the alphabetical position of each letter.

$A + L + O + K = 1 + 12 + 15 + 11 = 39$

Similarly, $N + A + Y + A + K$

$= 14 + 1 + 25 + 1 + 11 = 52$

Thus, the sum of position of each letter in the word is used to code that word.

Thus, BIMAL is coded as:

$B + I + M + A + L = 2 + 9 + 13 + 1 + 12 = 37$

Thus, BIMAL is coded as 37.

Hence, **option 2**.

3. Each consonant in the word is coded by the previous consonant in the alphabet.

The vowels A, E, I, O and U are coded as 5, 4, 3, 2 and 1 respectively.

Using this logic, the word UNORIENTAL is coded as:

$U \rightarrow 1, N \rightarrow M, O \rightarrow 2, R \rightarrow Q, I \rightarrow 3, E \rightarrow 4, N \rightarrow M, T \rightarrow S, A \rightarrow 5, L \rightarrow K$

So, the code for the word 'UNORIENTAL' is 1M2Q34MS5K.

Hence, **option 5**.

4. In the first and second statements, the common word is 'smoke' and the common code word is 'tu'.

So, 'smoke' is coded as 'tu'.

In the first and third statements, the common word is 'is' and the common code word is 'hu'.

So, 'is' is coded as 'hu'.

In the second statement, the remaining words are 'Suhas' and 'everyday' and the remaining codes are 'ka' and 'ja'.

So the word 'Suhas' could be coded as 'ka' or 'ja'.

Hence, **option 3**.

Note: Even though the exact code for 'Suhas' cannot be found, the answer is NOT "Data inadequate" as one of the options clearly says "ka or ja". Since these are the only codes possible for 'Suhas', option 3 becomes the most appropriate option.

5. In the first and second statements, the common word is 'there' and the common code is 'bd'.

So, 'there' is coded as 'bd'.

In the second and third statements, the common word is 'here' and the common code is 'gd'.

So, 'here' is coded as 'gd'.

Thus in the second statement, the remaining word is 'and' and the remaining code is 'od'.

Hence, 'and' is coded as 'od'.

Hence, **option 2**.

6. In the first and second statements, the common code word is 'foo' and the common word is 'is'.

So, 'foo' is coded as 'is'.

In the second and third statements, the common code word is 'woo' and the common word is 'Football'.

So, 'woo' means 'Football'.

Thus, in the second statement, 'good' is represented by 'xoo'.

Hence, **option 1**.

7. A person generally sleeps on a bed. But as per the given information, 'bed' is called 'fan'. So a person will sleep on 'fan'.

Hence, **option 2**.

8. Generally, water is used to quench thirst. But as per the given information, 'water' is called 'shirt'.

Thus, 'shirt' is used to quench thirst.

Hence, **option 3**.

9. The colour of blood is red. But as per the given information, 'red' means 'black'.

Hence, the colour of blood is 'black'.

Hence, **option 5**.

10. The common letter in all the words is E and the common letter in all the codes is K. So K stands for E. The letter N occurs twice in the word LINEMAN, while the letter occurring twice in its code is S. So S stands for N.

The other common letter in MONEY and ROASTED is O and the other common code letter is H. So H stands for O. The common letter between MONEY and MONSTER besides E, N and O is M and the remaining common code letter is A. So A stands for M. The only remaining letter in MONEY is Y and the only remaining letter in its code word is Z. So Z stands for Y.

Now, D occurs only in roasted and G is the only letter in the code word of ROASTED which does not occur in the code word of any other word. So G stands for D. Similarly, it can be figured out that in LINEMAN, F stands for L.

Among the remaining letters, the letter common to only MONSTER and ROASTED is S and the common code word letter occurring in only the codes of these two words is U. So U stands for S.

A occurs in RENTAL, ROASTED and LINEMAN and the common code word letter from the remaining letters among their codes is X. So X stands for A. The remaining common letter in the words RENTAL and LINEMAN is L and the remaining common letter is Q. So Q stands for L.

Now, the remaining letters are R and T, while the remaining code word letters are P and J. But since both these letters are common to all the three words RENTAL, MONSTER and ROASTED a unique representation for R and T cannot be found.

This information can be summarized as below:

Letter	E	N	O	M	Y	D	I	S	A	L	R	T
Code	K	S	H	A	Z	G	F	U	X	Q	P/J	P/J

Since a unique code for R cannot be found, it is not possible to determine the code for DONER.

Hence, **option 5**.

11. From the table obtained in the solution to the first problem, the code for MILES is AFQKU
Hence, **option 2**.

12. From the table given in the solution to the first question, the code for DAISY is GXFUZ.
Hence, **option 4**.

13. If code for T is P, then the code for R is J. Then the code for 'SLIM AND TRIM' is UQFA XSG PJFA according to the table given in the solution to the first problem.

If the code for T is J, then the code for R is P. Then the code for 'SLIM AND TRIM' is UQFA XSG JPFA.

Hence, the codes given in both the options (1) and (3) are correct.

Hence, **option 4**.

14. According to the table given in the solution to the first problem, A is coded as X.

Hence, LAEMON can never be coded as QKAHSU.

Hence, **option 5**.

15. Observe that N, Y, D and L are coded as S, Z, G and Q respectively. Also, R and T are coded as P and J (in no specific order.) Irrespective of how R and T are coded, both the original letters and both the coded letters are consonants. So, there are 6 consonants that are coded as consonants.

Hence, **option 4**.

CONCEPT TEST VIII

1. $4 \% 6 \times 5 \div 5 @ 3 = 6 \times 5 \div 5 @ 3 = 1 \div 5 @ 3 = 7 @ 3 = 16$

Consider (i):

$8 \times 9 \% 7 @ 5 \div 2 = 1 \% 7 @ 5 \div 2 = 7 @ 5 \div 2 = 32 \div 2 = 66$

Hence, the expression in (i) is not equal to the original expression.

Hence, options 1, 2 and 4 can be eliminated.

Consider (ii):

$1 @ 2 \div 7 \times 3 \% 16 = 5 \div 7 \times 3 \% 16 = 37 \times 3 \% 16 = 1 \% 16 = 16$

Hence, the expression in (ii) is equal to the original expression.

Consider (iii):

$4 \% 7 @ 4 \times 7 \div 7 = 7 @ 4 \times 7 \div 7 = 23 \times 7 \div 7 = 2 \div 7 = 16$

Hence, the expression in (iii) is equal to the original expression.

Hence, **option 3**.

2. The logic followed here is:

If the two numbers be a and b , then

$a + b = 10a + b - ab$

$\therefore 8 + 9 = 80 + 9 - (8 \times 9) = 89 - 72 = 17$

and $4 + 4 = 40 + 4 - (4 \times 4) = 44 - 16 = 28$

So, $1 + 5 = 10 + 5 - (1 \times 5) = 15 - 5 = 10$

Hence, **option 1**.

3. In such a case, it is faster to work with the answer options.

Option 1: $37 + 7 - 18 + 63 - 72 + 27 = 44 \neq 8$

Hence, option 1 is eliminated.

Option 2: $37 + 7 - 18 + 63 - 72 - 27 = -10 \neq 8$

Hence, option 2 is eliminated.

Option 3: $37 - 7 + 18 - 63 + 72 - 27 = 30 \neq 8$

Hence, option 3 is eliminated.

Option 4: $37 + 7 - 18 - 63 + 72 - 27 = 8$

Hence, **option 4**.

Note: Once option 4 is found to be true, there is no need to check option 5.

4. Applying the rules to each equation:

1. $3 \times 4 \div 12 \div 1 = 12 \div 12 \div 1 = 1 \div 1 = 1$

Hence, the first equation is correct.

2. $12 \times 12 \div 4 \div 6 = 144 \div 4 \div 6 = 36 \div 6 = 6$

Hence, the second equation is also correct.

3. $4 \div 8 \div 16 \times 12 = (1/2) \div 16 \times 12 = (1/32) \times 12 = 3/8$

Hence, the third equation is incorrect.

Hence, there is no need to check the other options at all.

Hence, **option 3**.

5. Apply the rule to each equation

Equation 1: $6 - 9 \times 3 \times 2 = 6 - 54 = -48$.

Hence, equation 1 is not correct.

Equation 2: $35 \times 6 - 3 \times 9 = 210 - 27 = 183$.

Hence, equation 2 is not correct.

Equation 3: $6 \times 4 - 9 - 6 = 24 - 15 = 9$.

Since the interchange applies on both sides, the RHS also becomes 9.

Hence, equation 3 is correct.

Hence, **option 3**.

6. M can be coded as 01, 14, 22, 32 and 43

O can be coded as 00, 11, 23, 34 and 40.

Hence, option 2 can be eliminated.

R can be coded as 55, 66, 75, 88 and 99.

Hence, option 1 can be eliminated.

A can be coded as 02, 10, 21, 33 and 44.

Hence, option 4 can be eliminated.

L can be coded as 56, 69, 77, 85 and 96.

Hence, option 3 can be eliminated.

Only option 5 contains all the correct codes.

Hence, **option 5**.

7. T can be coded as 04, 12, 20, 31 and 42.

O can be coded as 00, 11, 23, 34 and 40.

Hence, options 3 and 5 can be eliminated.

N can be coded as 59, 67, 78, 86 and 95.

Hence, options 2 and 4 can be eliminated.

E can be coded as 57, 68, 76, 89 and 98.

Only option 1 contains all the correct codes.

Hence, **option 1**.

8. K can be coded as 58, 65, 79, 87 and 97.

I can be coded as 03, 13, 24, 30 and 41.

Hence, option 1 can be eliminated.

T can be coded as 04, 12, 20, 31 and 42.

Hence, options 2, 3 and 5 can be eliminated.

Only option 4 contains all the correct codes.

Hence, **option 4**.

CONCEPT TEST IX

1. From the given statements,

$J = K \rightarrow J = K$

$K \times S \rightarrow K > S$

$S \$ P \rightarrow S \leq P$

So we have, $J = K > S \leq P$... (i)

From I, $P \times K \rightarrow P > K$, which may or may not be true,

From II, $P \times J \rightarrow P > J$, which may or may not be true,

From III, $S \# J \rightarrow S < J$

Thus, only conclusion III is true.

Hence, **option 2**.

2. From the Statements,

$A \% H \rightarrow A \geq H$

$H = L \rightarrow H = L$

$$L \times B \rightarrow L > B$$

So we have, $A \geq H = L > B$... (i)

Now, from the conclusion I. $L = A \rightarrow L = A$ and from conclusion II. $L \neq A \rightarrow L < A$

Thus, at any instant, either I or II will be true.

From III. $A \times B \rightarrow A > B$, which is true.

Thus, either of I or II and III are true.

Hence, **option 3**.

3. From the Statements,

$$D \clubsuit E \rightarrow D < E$$

$$E \% U \rightarrow E \geq U$$

$$U \times V \rightarrow U > V$$

So we have, $E > D, E \geq U > V$... (i)

Now, from conclusion I. $V \clubsuit E \rightarrow V < E$, which is true,

From II. $D \clubsuit U \rightarrow D < U$. However, the relationship between D and U is not known.

From III. $V \$ D \rightarrow V \leq D$. Again, the relationship between D and V is not known.

So, only I is true.

Hence, **option 4**.

4. From the Statements,

$$H \% R \rightarrow H \geq R$$

$$R \clubsuit F \rightarrow R < F$$

$$F \$ Q \rightarrow F \leq Q$$

So we have, $R \leq H, R < F \leq Q$... (i)

From I. $F \% H \rightarrow F \geq H$, which may or may not be true,

From II. $Q \times R \rightarrow Q > R$, which is true,

From III. $Q \times H \rightarrow Q > H$, which may or may not be true.

Thus, only conclusion II is true.

Hence, **option 3**.

5. From the Statements,

$$D \$ Y \rightarrow D \leq Y$$

$$Y \times W \rightarrow Y > W$$

$$W \clubsuit G \rightarrow W < G$$

So we have, $Y \geq D, Y > W < G$... (i)

From I, $G \times Y \rightarrow G > Y$, which is not definitely true,

From II. $D \clubsuit W \rightarrow D < W$, which is also not definitely true,

From III. $Y \times G \rightarrow Y > G$, which is also not definitely true.

So, none of the conclusions is definitely true.

Hence, **option 1**.

6. From the Statements,

$$J \& O \rightarrow J = O$$

$$O * E \rightarrow O \leq E$$

$$E @ B \rightarrow E < B$$

So we have, $J = O \leq E < B$... (i)

From I, $B \# J \rightarrow B > J$, which is true,

From II, $E \& J \rightarrow E = J$, which may or may not be true

From III, $E \# J \rightarrow E > J$, which may or may not be true

However, at any instant, $E \geq J$

Thus, conclusion I and either of conclusion II or III are true.

Hence, **option 3**.

7. From the Statements,

$$T \# K \rightarrow T > K$$

$$K @ F \rightarrow K < F$$

$$F + Z \rightarrow F \geq Z$$

So we have, $T > K < F \geq Z$... (i)

From I, $T \# Z \rightarrow T > Z$, which may or may not be true

From II. $Z @ K \rightarrow Z < K$, which may or may not be true

From III. $F \# T \rightarrow F > T$, which may or may not be true

Thus, none of the conclusions is definitely true.

Hence, **option 1**.

8. From the Statements,

$$L @ H \rightarrow L < H$$

$$H * D \rightarrow H \leq D$$

$$D \# W \rightarrow D > W$$

So we have, $L < H \leq D > W$... (i)

From I, $W \# L \rightarrow W > L$, which may or may not be true

From II. $D \# L \rightarrow D > L$, which is true,

From III. $H @ W \rightarrow H < W$, which may or may not be true.

Thus, only conclusion II is true.

Since there is no option stating 'Only II is true', the correct answer becomes option 5.

Hence, **option 5**.

9. From the Statements,

$$O * P \rightarrow O \leq P$$

$$P \& Q \rightarrow P = Q$$

$$Q \# R \rightarrow Q > R$$

So we have, $O \leq P = Q > R$... (i)

From I, $R @ P \rightarrow R < P$, which is true,

From II. $R @ O \rightarrow R < O$, which may or may not be true,

From III. $Q + O \rightarrow Q \geq O$, which is true.

Thus, only conclusions I and III are true.

Hence, **option 2**.

10. From the Statements,

$$A * B \rightarrow A \leq B$$

$$B \& C \rightarrow B = C$$

$$C + D \rightarrow C \geq D$$

So we have, $A \leq B = C \geq D$... (i)

From I, $B + A \rightarrow B \geq A$, which is true,

From II. $D \& A \rightarrow D = A$, which may or may not be true,

From III. $D * B \rightarrow D \leq B$, which is true.

Thus, only conclusions I and III are true.
Hence, **option 4**.

CONCEPT TEST X

1. In the given series, vowel 'O' and symbol '\$' occur together.
Hence, the series obtained after applying Rule 2 is P\$ODAJ.
The result on writing it in the coded form is 481693.
Since two consecutive letters 'P' and 'O' occur together, replace the first two numbers of the series by 10 according to Rule 1.
Hence, the coded series now becomes 101693.
The given series starts and ends with a consonant.
Hence, apply Rule 4 to get the final coded series as 101396.
Hence, **option 2**.
2. The series contains exactly two symbols.
Hence, Rule 3 applies and the codes for '~' and '\$' become 8 and 7 respectively.
The coded series now becomes 692874.
The original series starts and ends with a consonant.
Hence, Rule 4 applies and the last three numbers of the code are reversed.
Hence, the final coded series obtained is 692478
Hence, **option 3**.
3. In the given series, the vowel 'O' and the symbol '#' occur together.
Hence, first apply Rule 2 and interchange the vowel and symbol.
Hence, the new series obtained is JD#O~M.
This series contains exactly two symbols '#' and '~'.
Hence, interchange their codes according to Rule 3.
Hence, the coded series obtained is 367152.
This series starts and ends with a consonant.
Hence, reverse the last three numbers of the coded series according to Rule 4 to get the final coded series as 367251.
Hence, **option 2**.
4. The series contains exactly two symbols '#' and '\$'.
Hence, Rule 3 applies and the codes for '#' and '\$' become 8 and 5 respectively.
Hence, the coded series would now be 486025.
The series contains two consecutive letters 'D' and 'E'.

Therefore the first two numbers of the coded series are replaced by 10 according to Rule 1.
Hence, the final code is 106025.
Hence, **option 5**.

5. 6 8 5 3 7 4
Since the first as well as last digit is even, both are to be coded by the code for the first digit i.e. by \$.
Hence, options 1 and 3 can be eliminated.
The rest of the digits are coded as per the table.
Therefore, 6 8 5 3 7 4 is coded as \$! & @ Y \$.
Hence, **option 2**.
6. 7 5 2 6 4 1
Since the first as well as last digit is odd, both are to be coded by the code for the last digit i.e. by H.
Hence, options 1, 2 and 3 can be eliminated.
The remaining letters are coded as per the given table.
Hence, 7 5 2 6 4 1 is coded as H & D \$ % H.
Hence, option 4 can be eliminated.
Hence, **option 5**.
7. 8 1 4 5 7 9
Since the first digit is even and the last digit is odd, so the codes for the first and the last digit are to be interchanged.
Therefore, the code should start with G and end with !.
Hence, options 2 and 3 can be eliminated.
The remaining letters are coded as per the table.
Thus, 8 1 4 5 7 9 is coded as G H % & Y !
Hence, **option 1**.
8. 2 5 6 3 1 8
Since the first as well as last digit is even, both are to be coded by the code for the first digit i.e. by D.
Hence, options 1 and 2 can be eliminated.
The remaining letters are coded as per the given table.
Hence, 2 5 6 3 1 8 is coded as D & \$ @ H D.
Hence, **option 4**.

LOGICAL PUZZLES

CONCEPT TEST I

1. The first, third, fifth, eighth and tenth letters of the word are P, R, E, I and N respectively.
The three-letter words that can be formed using these letters are pin, per, nip, pen and ire.

- Since more than 4 words can be formed, the most appropriate answer option is option 5.
Hence, **option 5**.
2. The second, fourth, eighth and eleventh letters of the word are E, T, N and L respectively.
The three-letter words that can be formed using these letters are ten, net and let.
Thus, 3 such words can be formed.
Hence, **option 3**.
3. The third, seventh, tenth and thirteenth letters of the word are T, F, M and C respectively.
No meaningful word can be formed using these four letters exactly once.
Hence, **option 3**.
4. The first, fourth, fifth and tenth letters of the word are L, A, R and P respectively.
The meaningful three-letter words that can be formed using these letters are rap, lap, par and pal.
Thus, there are four such words.
Hence, **option 4**.
5. Compare the first letter of the word with each subsequent letter and check for the given condition. Repeat this process for each subsequent letter.
The only pair that satisfies this condition is GA.
Hence, **option 2**.
6. Compare the first letter of the word with each subsequent letter and check for the given condition. Repeat this process for each subsequent letter.
The pairs that satisfy these conditions are PS, RN and CE. Thus, there are three such pairs.
Hence, **option 4**.
7. Compare the first letter of the word with each subsequent letter and check for the given condition. Repeat this process for each subsequent letter.
The pairs that satisfy these conditions are CE, AE and TV. Thus, there are three such pairs.
Hence, **option 4**.
8. Compare the first letter of the word with each subsequent letter and check for the given condition. Repeat this process for each subsequent letter.
The only pair that satisfies this condition is RP.
Hence, **option 2**.

9. After the letters are interchanged as per the given conditions, the new word is YOCSRIPANC.
Now, the letter just before R is S.
Hence, **option 2**.
10. After the letters are interchanged as per the given conditions, the new word is APSTEOOAMIM.
Now, the letter just before T is S.
Hence, **option 5**.

CONCEPT TEST II

1. After the first and second digits are interchanged, the numbers become:
765 467 166 869 361
Now, the second lowest number is 361 (derived from 631).
The unit's digit of this number is 1.
Hence, **option 3**.
2. After the first and third digits are interchanged, the numbers become:
576 746 616 986 136
Now, the second lowest number is 576 (derived from 675).
Hence, **option 1**.
3. After the second and third digits are interchanged, the numbers become:
657 674 661 698 613
Now, the second highest number is 674 (derived from 647).
Hence, **option 2**.
4. The squares of the last digit of the five numbers are 25, 49, 36, 81 and 01 respectively. Now, the numbers become:
700 696 652 770 632
Now, the smallest number is 632. The last digit of this number is 2.
Hence, **option 1**.
5. The sum of the square of the first and second digit is 85, 52, 37, 100 and 45 respectively.
The largest sum is 100 (derived from 689).
Hence, **option 4**.
6. From (i)
 $A < E < D$
From (ii)
 $B > E$
From (iii)
 $C < A$
From (i) and (iii),
 $C < A < E < D$
From (iv), B is the second heaviest person
So, the correct order of weights is
 $C < A < E < B < D$

Hence, **option 4**.

7. Consider the order of weights obtained in the solution to the first question.

A is the second lightest person.

Hence, **option 1**.

8. Consider the order of weights obtained in the solution to the first question.

In ascending order, the person in the middle is E. Hence, **option 5**.

Note: Irrespective of ascending or descending order, the person in the middle will be in the middle only. So, ascending or descending order has no significance here. However, had any other person been asked for, the order would have been important.

9. The eleventh position from the top is the same as the thirty seventh position from the bottom.

So, number of students in the class
 $= 11 + 37 - 1 = 47$

Hence **option 5**.

10. The 25th position from the right is the same as the 16th position from the left.

\therefore Number of boys in the row $= 16 + 25 - 1 = 40$.

Hence **option 2**.

CONCEPT TEST III

1. After each vowel is replaced by the letter following it and each consonant is replaced by the letter preceding it, the word becomes BVSGPQ.

After arranging these letters in alphabetical order, the new word becomes BGPQSV.

Now, the third letter from the left is P.

Hence, **option 1**.

2. The squares of 7, 4, 6, 9, 1 and 5 are 49, 16, 36, 81, 01 and 25 respectively. So, their unit digits are 9, 6, 6, 1, 1 and 5 respectively. So, the new word is 966115. So, the square of 6, 1 and 5 do not change positions.

Hence, **option 3**.

3. Such a question can be best solved by checking all the options one-by-one.

Option 1: 5, 3, 7, 6, 8, 4, 1, 9, 2 = LIESURELY

Option 2: 8, 6, 1, 5, 7, 4, 3, 9, 2 = USELERELY

Option 3: 9, 7, 3, 6, 8, 4, 1, 5, 2 = LEISURELY

Option 4: 4, 1, 9, 3, 6, 7, 8, 5, 2 = RELISEULY

Only option 3 results in a meaningful word.

Hence, **option 3**.

4. Compare the position of the first letter of the word with the position of the subsequent letters.

Repeat this process for all the subsequent letters.

The pairs that satisfy the given conditions are SZ, WT and AE. i.e. 3 pairs.

Hence, **option 3**.

5. Compare the position of the first letter of the word with the position of the subsequent letters.

Repeat this process for all the subsequent letters.

The only pair that satisfies this condition is NS.

Hence, **option 1**.

6. Compare the position of the first letter of the word with the position of the subsequent letters.

Repeat this process for all the subsequent letters.

The pairs that satisfy the given conditions are EA, AC, NE, NH, HI and HE i.e. 6 pairs.

Hence, **option 5**.

7. Compare the position of the first letter of the word with the position of the subsequent letters.

Repeat this process for all the subsequent letters.

The pairs that satisfy the given condition are MR, MN, OS and NR i.e. 4 pairs.

Hence, **option 5**.

8. Compare the position of the first letter with the position of the subsequent letters.

Repeat the process for all the subsequent letters.

The pairs that satisfy the given conditions are SO, SN, SL, ON, NL and OL i.e. six pairs.

Hence, **option 5**.

9. Compare the position of the first letter of the word with the position of all the subsequent letters.

Repeat this process for all the subsequent letters.

The pairs that satisfy this condition are DE, DF, DI, EF, EI and FI i.e. 6 pairs.

Hence, **option 5**.

10. The first, fourth, seventh and ninth letters of the word 'MUNIFICENT' are M, I, C and N respectively.

No valid four-letter word can be formed using these letters exactly once.

Hence, **option 4**.

CONCEPT TEST IV

- The third, fifth and eighth letters of the word 'PROFANITY' are O, A and T respectively.
The only valid three-letter word that can be formed using these letters is OAT.
The second letter in OAT is A.
Hence, **option 2**.
- The second, fourth, sixth, seventh and eighth letters of the word 'SKIRMISH' are K, R, I, S and H.
The only valid five-letter English word that can be formed using these five letters is SHIRK.
The last letter of this word is K.
Hence, **option 1**.
- The first, fourth, fifth and seventh letters of the word 'POSTAGE' are P, T, A and E respectively.
Three valid four-letter words can be formed using these letters i.e. PATE, PEAT and TAPE.
Since more than one valid four-letter word can be formed, 'Y' is to be marked as the answer.
Hence, **option 5**.
- The first, fourth, sixth and eighth letters of the word 'COERCION' are C, R, I and N respectively.
No valid four-letter English word can be formed using these letters exactly once.
Therefore, 'X' is to be marked the answer.
Hence, **option 4**.
- The third, sixth and eighth letters of the word 'CHRISTIAN' are R, T and A respectively.
Three valid three-letter English words can be formed using these letters i.e. ART, RAT and TAR.
Since more than one valid three-letter English word can be formed, 'Y' is to be marked as the answer.
Hence, **option 5**.
- The first, second, third, ninth and eleventh letters of the word 'FLORESCENCE' are F, L, O, N and E respectively.
Only one valid five-letter English word can be formed using these letters exactly once i.e. FELON.
The fifth letter in FELON is N.
Hence, **option 3**.
- When the given operation is conducted on the five numbers, we get,

394	662	723	546	835
$3 + 9$	$6 + 6$	$7 + 2$	$5 + 4$	$8 + 3$
12	12	9	9	11

Here, 11 (derived from 835) is not divisible by 3.

Hence, **option 3**.

- When the position of the first and second digit of each number is interchanged, the new numbers are:
934 662 273 456 385
Now, 662 (derived from 662) is the second highest number.
Hence, **option 3**.
- After adding 2 to the last digit of each number, the new numbers are:
396 664 725 548 837
After interchanging the position of the first and third digit, the new numbers now are:
693 466 527 845 738
Thus, 527 (derived from 723) is now the second smallest number.
Hence, **option 3**.
- When 2 is added to each number, the new numbers are:
396 664 725 548 837
Now, 725 (derived from 723) is the second highest number and 2 is the second digit of this number.
Hence, **option 4**.
- Option 1: $9 + 4 = 13$ and $6 + 2 = 8$. $13 \neq 8$
Option 2: $6 + 2 = 8$ and $2 + 3 = 5$. $8 \neq 5$
Option 3: $4 + 6 = 10$ and $3 + 5 = 8$. $10 \neq 8$
Option 4: $3 + 5 = 8$ and $6 + 2 = 8$. $8 = 8$
Option 5: $2 + 3 = 5$ and $4 + 6 = 10$. $5 \neq 10$
Thus, the given condition is satisfied in option 4.
Hence, **option 4**.

CONCEPT TEST V

- When the position of the second and last digit of each number is interchanged, the new numbers are:
749 763 728 757 781
Now, 763 (derived from 736) is the second highest number.
Hence, **option 2**.
- When the cube of the last digit of each number is added to each number, we get:
 $794 + 64$ $736 + 216$ $782 + 8$ $775 + 125$
858 952 790 900

 $718 + 512$
1230
Now, 1230 (derived from 718) is the highest number.
Hence, **option 5**.

3. When the square of the second digit of each number is subtracted from the same number, we get:

$$\begin{array}{r} 794 - 81 \\ 713 \end{array} \quad \begin{array}{r} 736 - 9 \\ 727 \end{array} \quad \begin{array}{r} 782 - 64 \\ 718 \end{array} \quad \begin{array}{r} 775 - 49 \\ 726 \end{array}$$

$$\begin{array}{r} 718 - 1 \\ 717 \end{array}$$

Now, 713 (derived from 794) is the lowest number.

Hence, **option 1**.

4. After subtracting 100 from the even numbers and adding 100 to the odd numbers, we get:

$$542 \quad 754 \quad 427 \quad 665 \quad 593$$

Now, 665 (derived from 565) is the second highest number.

Hence, **option 4**.

5. The original numbers are:

$$642 \quad 854 \quad 327 \quad 565 \quad 493$$

After subtracting 500 from the highest number, 400 from the second highest number and so on, we get:

$$642 - 400 \quad 854 - 500 \quad 327 - 100 \quad 565 - 300$$

$$242 \quad 354 \quad 227 \quad 265$$

$$493 - 200$$

$$293$$

Now, 242 (derived from 642) is the second lowest number.

Hence, **option 1**.

6. When the position of the first and last digit of each number is interchanged, the new numbers are:

$$246 \quad 458 \quad 723 \quad 565 \quad 394$$

Now, 723 (derived from 327) is the highest number.

Hence, **option 3**.

7. When the sum of digits is taken for each number, we get:

$$\begin{array}{r} 642 \\ 6 + 4 + 2 \end{array} \quad \begin{array}{r} 854 \\ 8 + 5 + 4 \end{array} \quad \begin{array}{r} 327 \\ 3 + 2 + 7 \end{array} \quad \begin{array}{r} 565 \\ 5 + 6 + 5 \end{array}$$

$$12 \quad 17 \quad 12 \quad 16$$

$$493$$

$$4 + 9 + 3$$

$$16$$

17 (which is derived from 854) is not divisible by 4.

Hence, **option 2**.

8. 493 is the second lowest number and 3 is its last digit.

Hence, **option 5**.

CONCEPT TEST VI

1.

Name	Ram	Shyam	Mohan	Sohan
After Round 4	40	40	40	40
After Round 3	100	20	20	20
After Round 2	50	90	10	10
After Round 1	25	45	85	5
Initial Amount	12.5	22.5	42.5	82.5

The player who loses a round doubles the money of the other 3 players.

After round 4, all the players had Rs. 40 each.

Ram lost round 4.

Hence, he doubled the amount available with Shyam, Mohan and Sohan at the end of round 3.

Hence, the amount available with Shyam, Mohan and Sohan at the end of round 3 was $40/2 = \text{Rs. } 20$ each. Also, the amount available with Ram at the end of round 3 was $40 + 20 + 20 + 20 = \text{Rs. } 100$.

Now, Shyam lost round 3.

Hence, he doubled the other 3 players' money.

Hence, the amount available with Ram, Mohan and Sohan at the end of round 2 was $100/2 = 50$, $20/2 = 10$ and $20/2 = 10$ respectively.

Also, the amount available with Shyam at the end of round 2 was $20 + 50 + 10 + 10 = \text{Rs. } 90$

Using the same logic, the table can be filled up as shown above.

From the table, Ram started with the least amount i.e. Rs. 12.5

Hence, **option 1**.

2. From the table in the previous solution, Shyam had the highest amount (Rs. 90) after round 2.
Hence, **option 2**.

3.

Name	Maximum Amount	Minimum Amount	Difference
After Round 4	40	40	0
After Round 3	100	20	80
After Round 2	90	10	80
After Round 1	85	5	80

From the table observe that the difference in money between the player with the maximum amount and the player with the amount was Rs. 80 after round 1, round 2 and round 3.

Hence, **option 4**.

4. From the table in the solution to the first question, the highest amount with Mohan was Rs. 85 after round 1.

Hence, **option 3**.

5. From the table in the solution to the first question, the maximum amount (Rs.100) was with Ram after round 3.

Hence, **option 1**.

6. Let the cost of watches of Yesha, Priya, Foram, Rajvi and Tanvi be Y, P, F, R and T respectively.

The cost of Yesha's watch is less than that of Rajvi's.

$$\therefore Y < R \quad \dots (i)$$

The cost of Foram's watch is less than that of Priya's.

$$\therefore F < P \quad \dots (ii)$$

Cost of Rajvi's watch is less than that of Priya's but more than that of Tanvi

$$\therefore T < R < P \quad \dots (iii)$$

Hence, $P > R, T, F$.

Since $Y < R, P > Y$ as well.

Hence, $P > R, T, F, Y$

Hence, Priya's watch is costliest.

Hence, **option 5**.

7. Let the heaviest planet be numbered 1 and the lightest planet be numbered 6.

Hence, the third lightest planet will correspond to the number 4.

It is given that the number of planets lighter than Mars was equal to the number of planets heavier than Venus.

Note that if Mars is the lightest and Venus is the heaviest, there is no planet lighter than Mars or heavier than Venus.

Even in this case, the number of planets lighter than Mars is equal to the number of planets heavier than Venus.

Hence, the positions of Mars and Venus can be one of (1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1).

Let the weights of planets Jupiter, Mars, Mercury, Saturn, Venus and Pluto be j, ma, me, s, v and p respectively.

From the data given,

$$s > ma > v \text{ and } me > p$$

Hence, Mars cannot be the heaviest planet and the combination (1, 6) is ruled out.

Moreover, since Mars is heavier than Venus, the positional number for Mars has to be less than that of Venus.

Hence, the combinations (4, 3), (5, 2) and (6, 1) are also ruled out.

Now, Saturn is not the heaviest planet.

Hence, Mars cannot be the 2nd heaviest planet.

Hence, the combination (2, 5) is also not correct.

Hence, the correct positions of Mars and Venus are 3 and 4 respectively.

Hence, Mars is the 3rd heaviest planet, Venus is the 4th heaviest planet and Saturn is the 2nd heaviest planet.

The 4th heaviest planet is also the 3rd lightest planet.

Hence, Venus is the 3rd lightest planet.

Hence, **option 5**.

8. If Jupiter is the heaviest planet, $j = 1$.

Also, from the previous solution, $s = 2, ma = 3$ and $v = 4$.

Also, it is given that Mercury is heavier than Pluto.

Hence, $me = 5$ and $p = 6$.

Hence, Pluto is the lightest planet.

Hence, **option 3**.

9. Statements 3 and 4 contain contradictory statements regarding Charak securing a rank among the top three. Hence, this is a good starting point for assumption.

Assuming that Charak had secured a rank among top three would imply that the second part in statement 3 would be false, i.e. Deepak would then have secured a rank among top three.

From statement 4: Since the second part would be false, it implies that the first part of this statement has to be true, i.e. Ajay must have secured a rank among top three.

Hence, as per the assumption, Ajay, Charak and Deepak should be in the top three while Binoy and Goldi should not.

From statement 5: The first part would then be true thereby leading to a conclusion that Goldy did not secure rank among top three. This is in line with the above conclusion.

From statement 2: The second part has to be false, implying that the first part has to be true and hence it was Deepak who must have secured the 2nd rank.

From statement 1: Since Deepak had secured 2nd rank it implies that the second part of the statement is true thereby leading to a conclusion that the first part is false and so Ajay must have secured 1st rank.

Since Ajay, Deepak and Charak are in the top three, Charak secured the 3rd rank.

Hence, **option 3**.

10. From the solution to the previous question, Ajay secured the 1st rank.

Hence, **option 1**.

CONCEPT TEST VII

1. Original position of Rajiv from the left

$$= 15 - 6 = 9^{\text{th}}$$

Thus, there were originally 8 people to his left.

\therefore His earlier position from the right end is

$$25 - 8 + 1 = 18^{\text{th}}$$

Hence, **option 3**.

2. Position of Lalit from left after interchanging the position = Difference of positions of Feroz + initial position of Lalit

$$\therefore \text{Position of Lalit from left after interchanging the position} = (35 - 21) + 14 = 28$$

\therefore Lalit is 28th from the left after interchanging the position.

Hence, **option 3**.

Alternatively,

Feroz was originally 21st from the right and then became 35th from the left.

Thus, Feroz moved left by 14 places.

Therefore, Lalit also should have moved right by 14 places.

Therefore, Lalit's position from the left after the interchange = $14 + 14 = 28$

Hence, **option 3**.

3. Ramesh is 16th from the front while Daya is 37th from the end.

So the total number of persons between Ramesh and Daya = $74 - (16 + 37) = 21$

Since Suraj lies in the middle of these 21 people, Suraj's position is $(21 + 2) + 1 = 11^{\text{th}}$ from Ramesh, i.e. $16 + 11 = 27^{\text{th}}$ from the front.

Thus, Suraj is 27th from the front.

Hence, **option 2**.

4. In the first figure above, $31 \times 7 = 217$ and $106 + 111 = 217$

$$\text{i.e. } 31 \times 7 = 106 + 111$$

Following the same pattern in the second figure, let the missing number be x .

$$\therefore 8 \times 13 = 28 + x$$

$$x = 104 - 28 = 76$$

Hence, **option 2**.

5. The pattern followed here is as follows:

$$48: (4 \times 8) - (4 + 8) = 32 - 12 = 20$$

$$55: (5 \times 5) - (5 + 5) = 25 - 10 = 15$$

$$37: (3 \times 7) - (3 + 7) = 21 - 10 = 11$$

Using the same logic:

$$24: (2 \times 4) - (2 + 4) = 8 - 6 = 2$$

Hence, **option 4**.

6. The pattern followed here is as follows:

$$140 = (1 \times 14) + (2 \times 21) + (3 \times 28)$$

$$69 = (1 \times 5) + (2 \times 11) + (3 \times 14)$$

Following the same pattern,

$$(1 \times 25) + (2 \times 32) + (3 \times 87) = 350$$

Hence, **option 1**.

7. The pattern followed here is as follows:

For the 1st diagram,

$$1) 6^2 + 5^2 = 61$$

$$2) 6^2 - 1^2 = 35$$

$$3) 2(3 + 5) = 16$$

Similarly in the 2nd diagram,

$$1) 2^2 + 6^2 = 40$$

$$2) 4^2 - 0^2 = 16$$

$$3) 2(1 + 6) = 14$$

Following the same pattern for 77,

$$1) 7^2 + 7^2 = 98$$

$$2) 9^2 - 8^2 = 17$$

$$3) 2(1 + 7) = 16$$

Hence, **option 4**.

8. The numbers in the second column

$$= (2 \times \text{Numbers in the first column}) + 1$$

Similarly,

The numbers in the third column

$$= (2 \times \text{Numbers in the second column}) + 1$$

$$\text{Hence, the required number is } (25 \times 2) + 1 = 51$$

Hence, **option 1.**

9. A bell indicating the start of the period rang at 8:10 am and the period ends after 45 minutes. Hence, the next bell is due at 8 : 55 am.

When the boy asked his classmate, there were still 17 minutes left for the period to get over. Hence, the time when the boy asked this question = 8 : 55 - 17 = 8 : 38 am

Hence, **option 2.**

10. According to Maria, her teacher's birthday is on one day out of 14th, 15th and 16th April.

According to her friend, the teacher's birthday is on one day out of 10th, 11th, 12th, 13th and 14th April.

The only date common in both the descriptions is 14th April.

Thus, Maria's teacher's birthday has to be on 14th April.

Hence, **option 2.**

11. Sneha was the youngest unless Mahek is.

This means that Sneha was the youngest among the three only in case Mahek was not. Hence, either Sneha or Mahek have to be the youngest.

Thus Tanya can never be the youngest.

The next statement states that if Tanya isn't the youngest (which she is not), Sneha is the eldest.

Hence, the youngest actress can only be Mahek.

Hence, Tanya is the one whose is neither the youngest nor the eldest.

Hence, **option 1.**

VENN DIAGRAMS

CONCEPT TEST I

1. Number of people following exactly one sport = Number of people following only Hockey + Number of people following only Football + Number of people following only Cricket = 23 + 29 + 27 = 79.

Hence, **option 2.**

2. Number of students who follow hockey or football but not cricket = number of students who follow only hockey + number of students who follow only football + number of students who follow both hockey and football but not cricket = 23 + 29 + 11 = 63

Hence, **option 1.**

3. Number of students who follow all three sports = 7

Number of students who follow at least one sport = 23 + 11 + 29 + 7 + 13 + 19 + 27 = 129
So, number of students who do not follow any sport = 150 - 129 = 21

Number of students who follow a maximum of two sports = number of students who do not follow any sport + number of students who follow exactly one sport + number of students who follow exactly two sports = 21 + (23 + 29 + 27) + (11 + 13 + 19) = 143
So, required difference = 143 - 7 = 136

Hence, **option 2.**

Note: The number of students who follow a maximum of two sports can also be found by subtracting the number of students who follow all three sports from the total number of students.

4. Total number of students = 150 and number of students who do not follow any game = 21.

∴ Required percentage = $(21/150) \times 100 = 14\%$.

Hence, **option 3.**

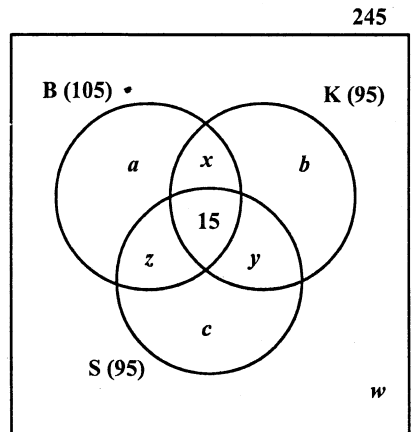
5. Number of students who follow exactly two sports = 11 + 19 + 13 = 43

Number of students who follow exactly one sport = 23 + 29 + 27 = 79

∴ Required ratio = 43/79.

Hence, **option 4.**

6.



Let a, b, c denote the number of people who visited exactly one shrine and x, y, z denote the number of people who visited exactly two shrines.

Finally w denotes the number of people who did not visit any of the three shrines.

Hence,

$$x + y + z = 3w$$

$$a + b + c = 190$$

$$\therefore (a + b + c) + (x + y + z) + 15 + w = 245$$

$$\therefore 190 + 3w + 15 + w = 245$$

$$\therefore 4w + 205 = 245$$

$$\therefore w = 40/4 = 10$$

\therefore The number of pilgrims who have not visited any one of the three shrines is 10.

Hence, **option 2**.

7. The number of pilgrims who did not visit more than one shrine

= (Number of people who did not visit any shrine) + (Number of people who visited exactly one shrine)

$$= 10 + (a + b + c)$$

$$= 10 + 190 = 200$$

Hence, **option 4**.

8. The number of pilgrims who visited only Kedarnath and Somnath is denoted by y in the Venn diagram drawn above.

The set of pilgrims who visited at least one shrine from Kedarnath and Somnath implies the union of the two sets K and S .

This set is given as:

$$S \cup K = S + K - (S \cap K)$$

$$\therefore 165 = 95 + 95 - (y + 15)$$

$$\therefore y = 190 - 15 - 165$$

$$\therefore y = 10$$

Hence, 10 people visited only Kedarnath and Somnath

Hence, **option 3**.

9. The number of pilgrims who visited only Somnath is denoted by c .

Since, 180 pilgrims visited at least one of the two shrines Kedarnath and Badrinath,

$$\therefore K \cup B = K + B - (K \cap B)$$

$$\therefore 180 = 95 + 105 - (x + 15)$$

$$\therefore x = 5$$

Now, it is already found that $x + y + z = 30$

$$\therefore y + z = 30 - 5 = 25$$

$$\text{Now, } c + (y + z) + 15 = 95$$

$$\therefore c + 25 + 15 = 95$$

$$\therefore c = 55$$

Hence, the number of pilgrims who visited only Somnath = 55

Hence, **option 1**.

10. Since no pilgrim visited only Badrinath and Somnath,

$$z = 0$$

$$\therefore x + y = 30$$

Also, the number of pilgrims who visited only Kedarnath is denoted by b .

$$b + (x + y) + 15 = 95$$

$$\therefore b + 30 + 15 = 95$$

$$\therefore b = 50$$

Hence, 50 people visited only Kedarnath

Hence, **option 5**.

CONCEPT TEST II

1. Some Cricket fans may be Tennis Fans and some may be Football fans, while some may be both.

Similarly, some Tennis fans may be Cricket fans and some may be Football fans, while some may be both.

Finally, some Football fans may be Cricket fans and some may be Tennis fans, while some may be both.

Hence, there has to be some amount of overlap between the sets of Cricket fans, Tennis fans and Football fans.

Hence, the appropriate diagram is 3.

Hence, **option 3**.

2. In question like these, previously known information or external data can be used.

Mumbai is a part of India, while India is a part of Asia.

Hence, the circle representing Mumbai should be within the circle representing India, which in turn should be within the circle representing Asia.

Hence, the appropriate diagram is 2.

Hence, **option 2**.

3. Earth, Mars and Sun are all part of the Solar System.

However, none of them have anything in common and so do not intersect with each other.

Hence, the appropriate diagram is 5.

Hence, **option 5**.

4. Jeans is a type of Cloth.

Hence, the circle representing Jeans should be within the circle representing Cloth.

Some Jeans are blue in colour.

Similarly, some clothes are blue in colour.

Hence, the circle representing Blue intersects the circles for Jeans and Cloth partially.

Therefore, the appropriate diagram is 1.

Hence, **option 1**.

5. Both Coca-Cola and Fanta are types of Cold drinks.

Hence, the circle for cold drinks should envelop the circles for both; Coca-Cola and Fanta.

But any Coca-Cola cannot be Fanta and any Fanta cannot be Coca-Cola.

So the circles representing Coca-Cola and Fanta are disjoint sets and do not intersect.

Hence, the appropriate diagram is 4.

Hence, **option 4**.

6. All Fathers are Males, but all Males are not necessarily Fathers.

Hence, the circle for fathers should be within the circle for males.

However, only some males and some fathers are Engineers.

Hence, the circle representing Engineers intersects the other two concentric circles.

Hence, the appropriate diagram is 5.

Hence, **option 5**.

7. All Females are Human beings, but all Human beings are not necessarily Females.

Similarly, all Married people are Human beings, but all Human beings are not necessarily Married people.

Finally, only some females are married.

Hence, the set of females should partially intersect the set of married people and both these sets should be completely within the set of human beings.

Hence, the appropriate diagram is 4.

Hence, **option 4**.

8. All Rectangles are Quadrilaterals, but all Quadrilaterals are not necessarily Rectangles.

Hence, the set of rectangles should be completely within the set of quadrilaterals.

A circle is completely different from a rectangle as well as from a quadrilateral.

Hence, the set of circles does not intersect the other two sets.

Hence, the appropriate diagram would be 1

Hence, **option 1**.

9. Colgate and Pepsodent are different brands of toothpaste.

Hence, there is no intersection between them. However, both are toothpastes.

Hence, the set of Colgate as well as Pepsodent should not intersect with each other and should be within the set of Toothpastes.

Hence, the appropriate diagram is 2

Hence, **option 2**.

10. Some Flowers are Pink, but all pink objects are not flowers.

Similarly, some T-shirts are Pink, but all pink objects are not T-shirts.

Moreover there is absolutely no relationship between Flower and T-shirt.

Hence, the set of T-shirts as well as that of flowers should intersect with the set of pink items, but not with each other.

Hence, the appropriate figure is 3.

Hence, **option 3**.

NUMERICAL LOGIC

CONCEPT TEST I

1. It can be observed that two words are rearranged in each step. The words starting with vowels are rearranged from the left in reverse alphabetical order and words starting with consonants are arranged from the right in alphabetical order.

Apply this pattern on the given input.

Input: gem stat ace cast omit fan rate uncut era input

Step I: uncut gem stat ace omit fan rate era input cast

Step II: uncut omit gem stat ace rate era input fan cast

Step III: uncut omit input stat ace rate era gem fan cast

Step IV: uncut omit input era stat ace rate gem fan cast

Step V: uncut omit input era ace stat rate gem fan stat

Step V is the final arrangement.

This arrangement is given in option 3.

Hence, **option 3**.

2. Consider the final arrangement obtained in the solution to the first question.

In step III, the word 'rate' is 6th from left.

Hence, **option 1**.

3. Consider the final arrangement obtained in the solution to the first question.

The given arrangement is obtained in step II.

Hence, **option 1**.

4. Consider the final arrangement obtained in the solution to the first question.

In this arrangement, there is one word between 'omit' and 'era' and there is one word between 'rate' and 'fan'. Using this pattern, 'ace' would be related to 'gem'.

Hence, **option 4**.

5. Consider the final arrangement obtained in the solution to the first question.

Since Step V is the final step, there will be no step VII.

Hence, **option 5**.

6. It can be observed that one number and one word are re-arranged in each step. In each step, the numbers are arranged in descending order from the left and the words are arranged in alphabetical order from the right.

The steps for the given input are:

Input: 24 cross 82 road 93 safe 13 jam halt 46

Step I: 93 24 82 road safe 13 jam halt 46 cross

Step II: 93 82 24 road safe 13 jam 46 halt cross

Step III: 93 82 46 24 safe 13 road jam halt cross

Step IV: 93 82 46 24 13 safe road jam halt cross

This is the final step as this is the output.

Hence, **option 3.**

7. Consider the final arrangement obtained in the solution to the first question of the set.

The final arrangement is:

93 82 46 24 13 safe road jam halt cross

Hence, **option 1.**

8. Consider the final arrangement obtained in the solution to the first question of the set.

The arrangement gets completed in step IV itself and so there is no step VI at all.

Hence, **option 5.**

9. Consider the final arrangement obtained in the solution to the first question of the set.

Here, the third word/number from the left is 46.

Hence, **option 2.**

10. Consider the final arrangement obtained in the solution to the first question of the set.

The given arrangement corresponds to step I.

Hence, **option 1.**

CONCEPT TEST II

1. Observe that one word is re-arranged in each step in alphabetical order.

Consider the given input:

Input: never put off until tomorrow what you can do today

Step I: can never put off until tomorrow what you do today

Step II: can do never put off until tomorrow what you today

Step III: can do never off put until tomorrow what you today

Step IV: can do never off put today until tomorrow what you

Step V: can do never off put today tomorrow until what you

This is the final arrangement as all the words are arranged in alphabetical order. So, the input is re-arranged in 5 steps.

Hence, **option 5.**

2. Consider the final arrangement obtained in the solution to the first question of the set.

The third word of the third step is 'never'.

Hence, **option 3.**

3. Consider the final arrangement obtained in the solution to the first question of the set.

The given arrangement corresponds to step II. Hence, **option 4.**

4. Consider the final arrangement obtained in the solution to the first question of the set.

The given arrangement corresponds to option 3.

Hence, **option 3.**

5. Consider the final arrangement obtained in the solution to the final question of the set.

The final arrangement is:

can do never off put today tomorrow until what you Hence, **option 4.**

6. The pattern here is to arrange the words first in increasing order of the number of letters in the word and then if two words have the same number of letters, they are arranged alphabetically.

Consider the given input:

Input: he who fights and runs away may live to fight another day

Step I: he to who fights and runs away may live fight another day

Step II: he to and who fights runs away may live fight another day

Step III: he to and day who fights runs away may live fight another

Step IV: he to and day may who fights runs away live fight another

Step V: he to and day may who away fights runs live fight another

Step VI: he to and day may who away live fights runs fight another

Step VII: he to and day may who away live runs fights fight another

Step VIII: he to and day may who away live runs fight fights another

As can be seen, the input is re-arranged in 8 steps.

Hence, **option 3.**

7. Consider the final arrangement obtained in the solution to the first question.

The third word in the fourth step is 'and'.

Hence, **option 5.**

8. Consider the final arrangement obtained in the solution to the first question.

The given output is not present in any of the steps.

Hence, **option 5.**

9. Consider the final arrangement obtained in the solution to the first question.

The sixth step is:

he to and day may who away live fights runs
fight another
Hence, **option 5**.

10. Consider the final arrangement obtained in the solution to the first question.

The final arrangement is:

he to and day may who away live runs fight
fights another

Hence, **option 5**.

CONCEPT TEST III

1. The logic is as follows:-

Step I: sum of squares of individual digits of number

Step II: Add input to numbers obtained in step I

Step III: Output of Step II + sum of digits of numbers obtained in step II

Step IV: Output of step III - square of the units digit of numbers obtained in Step III

Step V: Output of step IV arranged in ascending order

Apply this pattern on the given input:

Input: 14 23 37 53 72

Step I: 17 13 58 34 53

Step II: 31 36 95 87 125

Step III: 35 45 109 102 133

Step IV: 10 20 28 98 124

Since the numbers are already arranged in ascending order, this is the final step. So, the input will be re-arranged in 4 steps.

Hence, **option 2**.

2. Consider the final arrangement obtained in the solution to the first question.

The third number in the third step is 109.

Hence, **option 3**.

3. Consider the final arrangement obtained in the solution to the first question.

The given arrangement corresponds to step II.

Hence, **option 3**.

4. Consider the final arrangement obtained in the solution to the first question.

The number 16 is not present in any of the steps. Hence, **option 3**.

5. Consider the final arrangement obtained in the solution to the first question.

The last number in the final output is 124.

Hence, **option 5**.

6. The logic is as follows:-

Step I: Take the sum of digits of the number

Step II: Add the square of the units digit of the input to the output of step I

Step III onwards: Arrange the series in ascending order - one number at a time

Apply this pattern on the given input:

Input: 19 27 35 46 62

Step I: 10 9 8 10 8

Step II: 10 90 72 10 72

Step III: 10 10 90 72 72

Step IV: 10 10 72 90 72

Step V: 10 10 72 72 90

Thus, the input is arranged in 5 steps.

Hence, **option 3**.

7. Consider the final arrangement obtained in the solution to the first question.

The third number in the fourth step is 58.

Hence, **option 2**.

8. Consider the final arrangement obtained in the solution to the first question.

The given arrangement corresponds to step III.

Hence, **option 4**.

9. Consider the final arrangement obtained in the solution to the first question.

Among the numbers given, only the number 16 is not present in any of the steps.

Hence, **option 1**.

10. Consider the final arrangement obtained in the solution to the first question.

The last number in the final arrangement is 91.

Hence, **option 5**.

CONCEPT TEST IV

1. The pattern followed is:

Step I: sum of the digits of each number

Step II: (Output of step I \times 2) + 2

Step III: (Output of step II \times 3) + 3

Step IV: Divide output of step III by 3

Step V: Subtract 2 from the original input and square it

Now, given input is: 21 52 36 43 34 22

So, step I is: 3 7 9 7 7 4

Hence, **option 1**.

2. Here, apply all the rules in reverse.

Step V: 169 289 100 1089 81

Step V is directly related to the input.

For input, take the square root and add 2.

Input: 15 19 12 35 11

Now, find step I.

Step I: 6 1 3 8 2

Hence, **option 3**.

3. Again, apply the rules in reverse.

Step IV: 15 5 7 19 21 13

For step III, multiply the numbers in step IV by 3.

So, step III: 45 15 21 57 63 39

For step II, subtract 3 and then divide by 3.

So, step II: 14 4 6 18 20 12

Hence, **option 2**.

4. Input: 21 17 28 23 35 41

Step I: 3 8 10 5 8 5

Step II: 8 18 22 12 18 12

Step III: 27 57 69 39 57 39

The number 17 is not present in step III of the arrangement.

Hence, **option 5**.

5. Note that in this pattern, the final output is directly related to the input. So, there is no need to find the intervening steps.

Input: 21 17 28 23 35 41

Subtract 2 from each number and then square them.

Output: 361 225 676 441 1089 1521

Hence, **option 4**.

6. The pattern here is that the numbers are first arranged in ascending order and then the words are arranged alphabetically.

Consider the given input.

Input: great 151 sour boat 31 61 live

Step I: 31 great 151 sour boat 61 live

Step II: 31 61 great 151 sour boat live

Step III: 31 61 151 great sour boat live

Step IV: 31 61 151 boat great sour live

Step V: 31 61 151 boat great live sour

Thus, 5 steps are required for the final output.

Hence, **option 2**.

7. Input: world 132 lie 51 and 19 june 36

Step I: 19 world 132 lie 51 and june 36

Step II: 19 36 world 132 lie 51 and june

Step III: 19 36 51 world 132 lie and june

Step IV: 19 36 51 132 world lie and june

Hence, **option 1**.

8. Since the entire arrangement is based on shuffling terms, the order preceding step III cannot be found. Hence, the input cannot be found.

Hence, **option 4**.

9. The final step will have the numbers arranged in ascending order and the words arranged alphabetically.

So, the final step is:

121 165 12151 eat gate like tea

Hence, **option 1**.

10. Input: get 111 1225 say 1111 four 151 hire

Step I: 111 get 1225 say 1111 four 151 hire

Hence, **option 3**.

CONCEPT TEST V

1. Smaller cubes with no face painted

$$= (7 - 2)^3 = 5^3 = 125.$$

Hence **option 2**.

2. Smaller cubes with one face painted

$$= 6(7 - 2)^2 = 6 \times 5^2 = 150.$$

Hence, **option 3**.

3. Smaller cubes with two faces painted

$$= 12 \times (7 - 2) = 12 \times 5 = 60.$$

Hence, **option 5**.

4. Smaller cubes with three face painted

$$= 8 \times (7 - 2)^0 = 8 \times 1 = 8.$$

Hence, **option 4**.

5. Surface area of the big cube = 49×6

$$= 294 \text{ sq.cm}$$

So 3 litres are required for 294 sq.cm

So 1 litre can paint $294/3 = 98$ sq cms.

The original cube is now divided into 343 small cubes.

So, side of new cube = 1 cm and surface area

of smaller cube = 6 sq.cm

So, quantity of paint required = $(343 \times 6)/98$

$$= 21 \text{ litres}$$

Hence, **option 3**.

6. The algorithm can be expressed as

Step 1: Add n^2 to the n^{th} number of the string i.e. add 1^2 to the 1st number, 2^2 to the 2nd number and so on.

Step 2: Multiply the n^{th} number of the string with n

Step 3: Arrange the numbers obtained in Step 2 in descending order.

Output: Divide the numbers obtained in step 3 by 3 and write the remainder as the output.

Applying this algorithm to the given input, the steps obtained are as follows:

Input: 34, 65, 3, 24, 89

Step 1: 35, 69, 12, 40, 114

Step 2: 35, 138, 36, 160, 570

Step 3: 570, 160, 138, 36, 35

Output: 0, 1, 0, 0, 2

Hence, **option 4**.

7. Applying the algorithm obtained in the solution to the first question,

Input: 84, 48, 17, 71, 55

Step 1: 85, 52, 26, 87, 80

Step 2: 85, 104, 78, 348, 400

Step 3: 400, 348, 104, 85, 78

Output: 1, 0, 2, 1, 0

k is the 5th number of the output string.

$$\therefore k = 0$$

$$\therefore 2k + 1 = 1$$

Hence, **option 2**.

8. If Step 2 is given, then Step 1 can be found by dividing the n^{th} number of the string by n .

The input string can be found from Step 1 by subtracting n^2 from the n^{th} number of the string in Step 1

Therefore, if Step 2 is given, a unique input string can be found.

Now, Step 3 gives the descending order of the numbers in Step 2. So, there are several possibilities of the ways in which the numbers can be arranged in Step 2.

Therefore, if Step 3 is given, a unique input string cannot be found.

Step 4 gives the remainder when the numbers in Step 3 are divided by 3. There are again infinite possibilities of the numbers which give remainders 0, 1, or 2 when divided by 3.

Therefore, if Step 4 is given, a unique input string cannot be found.

Hence, if steps 3 or 4 are given, a unique string cannot be found.

Hence, **option 1**.

9. From the steps given in the data, observe that the words are arranged in ascending order of the number of letters in the words, shifting only one word in one step.

In a case when two words contain the same number of letters, they are arranged alphabetically.

For instance, in the above case, both 'good' and 'very' have 4 letters. Alphabetically, 'good' appears before 'very' and hence appears earlier in the output.

So for the given input string,

Input: Life is like a song.

Step 1: A life is like song.

Step 2: A is life like song.

Here, the words are already in ascending order of number of letters. Also, 'life', 'like' and 'song' are already in alphabetical order.

Hence, the output of step 2 is also the final output.

Hence, only 2 steps are required to obtain the output.

Hence, **option 2**.

10. According to the algorithm obtained in the solution to the first question, the steps are as follows

Input: I want to be a millionaire anyways.

Step 1: A I want to be millionaire anyways.

Step 2: A I be want to millionaire anyways.

Step 3: A I be to want millionaire anyways.

Output: A I be to want anyways millionaire.

Hence, **option 1**.

Alternatively,

Since the original algorithm is that the words should be in ascending order of the number of letters in each word, directly write the input string in the required order without any intermediate steps.

Hence, the input string when arranged in ascending order of number of letters in each word is:

A I be to want anyways millionaire.

Hence, **option 1**.

11. Applying the algorithm obtained in the solution to the first question,

Input: The quick brown fox jumps over a lazy dog

Step 1: A the quick brown fox jumps over lazy dog

Step 2: A dog the quick brown fox jumps over lazy

Step 3: A dog fox the quick brown jumps over lazy

Step 4: A dog fox the lazy quick brown jumps over

Step 5: A dog fox the lazy over quick brown jumps

The sixth word in step 5 is over.

Hence, **option 3**.

12. Since a word from the output string is required, only the final output is needed.

Hence, the output according to the algorithm obtained in the solution to the first question would be:

'Is age new then you talk walk while mantra.'

The word 'you' is at the centre of the output string.

Hence, **option 4**.

13. Since the number of small cubes is 343, the length of sides of the original cube should be the cube root of 343 i.e. 7.

Hence, there should be 7 cubes each (of dimensions $1 \times 1 \times 1$) along the length, breadth and the height of the larger cube because

$$343 = 7 \times 7 \times 7$$

To get 7 cubes along any plane, the minimum number of cuts to be made is 6.

Hence, 6 cuts should be made across the length, breadth and height of the larger cube.

$$\therefore \text{Total number of cuts required} = 6 + 6 + 6 = 18$$

Hence, **option 4**.

14. When the cut is made across the first diagonal, 5 cubes are cut across each row and column.

Therefore, the total number of smaller cubes cut = $5 \times 5 = 25$

Similarly 25 smaller cubes are cut when a cut is made across the other diagonal.

However, the number of smaller cubes across the length and breadth is an odd number, there is a column of 5 cubes (in the centre of the original cube) where the two diagonals meet. These 5 cubes are cut by both the diagonals.

Hence, they are to be considered only once.

Therefore, the total number of cubes cut = $25 + 25 - 5 = 45$

Hence, **option 1**.

15. The number of iterations needed will be equal to the number of times the group of chocolates can be split into two groups.

Iteration 1: Divide in two groups of 138 (with one extra chocolate) and check one group

Iteration 2: Divide in two groups of 69 and check one group

Iteration 3: Divide in two groups of 34 (with one extra chocolate) and check one group

Iteration 4: Divide in two groups of 17 and check one group

Iteration 5: Divide in two groups of 8 (with one extra chocolate) and check one group

Iteration 6: Divide in two groups of 4 and check one group

Iteration 7: Divide in two groups of 2 and check one group

Now, there are a total of 5 chocolates (A group of 2 left in the previous case and the 3 extra chocolates left earlier)

Iteration 8: Divide in two groups of 2 (with one extra chocolate) and check one group.

Iteration 9: Divide in two groups of 1 and check one group

Iteration 10: Check one of the remaining two chocolates

Now, the lighter chocolate can be identified.

Thus, 10 iterations are needed.

Hence, **option 3**.

VISUAL REASONING

CONCEPT TEST I

- In each successive frame, the central element rotates anticlockwise by 45° and all other elements move anticlockwise by half a step. Only the figure in option 3 follows this pattern.
Hence, **option 3**.
- Starting from the first figure, every alternate figure has two and one squares respectively at the centre. Therefore, the sixth figure should have one square at the centre.
Hence, option 5 can be eliminated.
The circle moves clockwise alternately by half and one step in successive figures. Therefore, from the fifth to sixth figure, it should move clockwise by half a step and should be at the centre-right position.
Hence, options 1 and 2 can be eliminated.
The flag-like element moves anticlockwise by 0.5, 1, 1.5 and 2 in successive figures.
Therefore, from the fifth to sixth figure, this element should be at the top-right corner.
Hence, option 3 can be eliminated.
Hence, **option 4**.
- The arrow (common to all frames) rotates anticlockwise by 45° in successive frames and also moves clockwise alternately by 0.5 and 1 steps in successive frames.
Therefore, in the sixth frame, this arrow should be at the top-left corner and should point towards the south-east.
Therefore, options 1, 3, 4 and 5 can be eliminated.
Hence, **option 2**.
- Between the first and second frames, the leftmost element remains constant while the central and rightmost elements interchange places. Also, the central element gets replaced by its water image.
Between the first and second frames, the rightmost element retains its place while the central and leftmost elements interchange places. Also, the central element as well as the rightmost element gets replaced by their water image.
These patterns get repeated alternately.
On applying the first pattern to the figure in frame 5, we get the figure given in option 3.
Hence, **option 3**.

5. There are two patterns applicable here.
 In each successive frame, each element moves clockwise by 1, 2, 3, 4 steps and so on.
 Also, in each successive frame, each element in the left column is replaced by its mirror image while each element in the right column is replaced by its water image.
 Thus, from the fifth frame to the sixth frame, each element of the left and right frame should be replaced by its mirror and water image respectively and should move clockwise by 5 steps.
 On doing so, the figure given in option 5 is obtained.
 Hence, **option 5**.
6. From the first frame to the second, the leftmost and rightmost columns interchange places. The central element gets replaced by a new element.
 From the second frame to the third, the topmost and bottommost rows interchange places. The central element gets replaced by a new element.
 These patterns are repeated alternately.
 Therefore, from the fifth to sixth frame, the first pattern should be followed.
 The resultant figure is the same as given in option 3.
 Hence, **option 3**.
Note: Option 5 also shows the same pattern, but the triangle in the centre has already appeared in frame 4 (though in a different alignment). So, option 5 is ignored.
7. Between the first and second frame, 2 lines get deleted from the left hand side.
 Between the fourth and fifth frame, 8 lines get deleted from the right hand side.
 Here, we see that the pattern is not consistent throughout. This implies that the pattern alternates between frames.
 Hence, between frames 2 and 3, some lines should get deleted from the right hand side while between frames 3 and 4, some lines should get deleted from the left hand side.
 The number of lines deleted in each frame may follow one of the following 2 cases: 2, 8, 2, 8 or 2, 4, 6, 8.
 Case 1 is not possible because frame 4 has only 4 lines less than frame 2 on the right hand side.
 Hence, case 2 should be followed.
 Hence, if we delete 4 lines from the right hand side between frames 2 and 3, we get option 2.

Now, if we delete 6 lines from the left hand side of option 2, we get frame 4.
 Hence, option 2 has to fit in the series.
 Hence, **option 2**.

8. Between frames 1 and 2, 1 line is deleted from the inner square at the top-left corner. The rest of the inner squares remain as they are.
 Between frames 4 and 5, 3 lines are deleted i.e. 1 each from the inner squares at the top-right, bottom-right and bottom-left corner. The inner square at the top-left corner remains as it is.
 This pattern is repeated in alternate frames.
 Hence, apply the pattern observed in frames 4 and 5 to frame 2.
 Hence, 1 line should reduce from all inner squares apart from the square at the top-left (which should remain as it is).
 Only, option 2 satisfies this condition.
 Now, apply the pattern observed in frames 1 and 2 to option 2.
 Hence, 1 line should reduce from the square at the top-left corner. The other 3 squares should remain as they are.
 Hence, we get frame 4.
 Hence, option 2 properly completes the series.
 Hence, **option 2**.
9. Between frames 1 and 2, the water image of only the left hand and the left leg is taken. The right hand and the right leg remain as they are.
 Between frames 4 and 5, the water image of only the right hand and the right leg is taken. The left hand and the left leg remain as they are.
 Hence, the frames follow an alternate pattern.
 Hence, apply the pattern seen between frames 4 and 5 to frame 2.
 Hence, we need to take the water image of the right hand and right leg. The left hand and left leg should remain as they are.
 Only option 3 satisfies this condition.
 Now apply the pattern seen between frames 1 and 2 to option 3.
 Hence, we need to take the water image of the left hand and left leg. The right hand and right leg should remain as they are.
 On doing so, we get frame 4.
 Hence, option 3 correctly forms the series.
 Hence, **option 3**.

10. The total number of elements in each frame increases by 1.

Hence, the number of elements in the sixth frame should be 11.

Option 3 has only 9 elements. Hence, option 3 can be eliminated.

An element is repeated thrice in each frame. This element is the new element which is added in the previous frame.

This new element moves to the end of the sequence in the next frame.

In option 2, 'Σ' is repeated four times. Hence, option 2 can be eliminated.

In alternate steps, all the elements rotate anticlockwise by 45° and clockwise by 90°.

Hence in the sixth frame, all the elements should rotate anticlockwise by 45° and '*' should be added at the ends.

Hence, options 1 and 4 can be eliminated.

Hence, **option 5**.

CONCEPT TEST II

1. In successive frames, the rectangle rotates clockwise by 45°.

The dot moves from one corner of the rectangle to the diagonally opposite corner in each frame.

If we see the overall rotation of the rectangle, the alignment of the rectangle is correct in each frame.

However, if we note the shape of the band in the unnumbered frame, the continuity gets broken in frame 1.

Also, there is no continuity between the shape of the band between frames 1 and 2.

The shape of the band remains consistent with the direction of rotation from frames 2 to 4.

However, the pattern again breaks from frame 4 to 5.

Hence, frames 1 and 5 are out of their position.

Hence, frames 1 and 5 need to be interchanged.

Now, the pattern is continuous.

Hence, **option 1**.

2. In successive frames the figure is rotated anticlockwise by 45°.

We can see that that from frames 4 to 5, the 2 sided arrow is aligned diagonally instead of vertically. The 2 sided arrow is vertical in frame 5.

Similarly, from frames 4 to 5, the line with two squares at the end is horizontal instead of

being aligned diagonally. The same line is diagonal in frame 5.

Hence, frames 4 and 5 need to be interchanged.

Hence, **option 4**.

3. We observe that each frame has 9 elements and that all 9 elements appear in all 5 frames.

Hence, the pattern here is of movement.

If we number the elements in the first frame then we get the next frame using the following pattern (say X):

1	2	3		9	8	5
4	5	6	→	3	2	6
7	8	9		7	4	1

Also, in successive frames, element 6 (the arrow) rotates clockwise by 90°.

All the frames follow this pattern X.

Hence, a logical series already exists.

Hence, no interchange is required.

Hence, **option 5**.

4. Here, the elements in figure (a) shift their position and move to figure (b) as follows:

The top right element shifts to the bottom centre,

The central element shifts to the top left

The centre left element shifts to the top centre, and

The bottom left element shifts to the centre right.

If we apply this logic to the elements in figure (c), we get the figure given in option 2.

Hence, **option 2**.

5. Consider figure (a).

The inner elements of the figure rotate anticlockwise by one step. At the same time, the outer elements of the figure rotate clockwise by one step.

This becomes figure (b).

If the same logic is applied to the elements of figure (c), we get the figure in option 5.

Hence, **option 5**.

6. Here, since (D) is known and we need to find (C), we need to first find the pattern between (A) and (B), and then apply this pattern in reverse on (D).

We observe that the actual elements in (D) are completely different from those in (A) and (B). Hence, the pattern is based on movement and on change in number of elements as per position.

From figure (A) to figure (B), the change in the actual number of the elements at various positions as well as the change in their position is as given below:

Top Left - 6 to 2 and move to Bottom Right
 Top Right - 5 to 7 and move to Top Left
 Bottom Left - 8 to 6 and move to Top Right
 Bottom Right - 6 to 9 and move to Bottom Left
 This movement can be depicted as per the table shown below:

1	2	→	2	3
3	4		4	1

Hence to get figure (C), this pattern should be reversed.

Hence, there should be $9 - 2 = 7$ circles at the top right in (C). Hence, option 5 can be eliminated.

Similarly, there should be $5 + 2 = 7$ '+' signs at the bottom left in (C). Hence, option 3 can be eliminated.

Also, there should be $10 - 3 = 7$ 'L' signs at the bottom right in (C). Hence, option 2 can be eliminated.

Finally, there should be $3 + 4 = 7$ '+' signs at the top left in (C). Hence, option 4 can be eliminated.

Hence, **option 1.**

7. From figure (A) to (B), the curve inside the closed figure gets reversed. Also, the two parts below the closed figure move towards each other and intersect at a common point on the closed figure. The upper part of the figure remains as it is in both (A) and (B).

Since, we are already given (D) and want to find (C); we need to now apply this pattern in reverse on (D).

Hence, in (C), the curve within the circle should be reversed. Hence, we can eliminate option 4.

Also, the two curves of the smaller circle at the bottom should be separated and should move towards the extremes. However, they should retain their orientation. Hence, we can eliminate option 2.

Finally, the two arrows above the circle in (D) should remain as they are. Hence, we can eliminate options 1 and 5.

Hence, **option 3.**

8. Here, number the 4 figures from left to right as 1, 2, 3 and 4 respectively.

Hence, the pattern here is that figure 1 becomes the outermost figure, the number of

sides in figure 4 increases by 1 and the new figure appears inside figure 1. Figure 2 appears within figure 4 and figure 3 becomes the innermost figure.

Hence, in (D), the circle should be the outermost figure. Hence, we can eliminate option 1.

The number of sides of the pentagon should increase by 1 i.e. it should become a hexagon and appear within the circle. Hence, we can eliminate options 3 and 4.

Finally, the square should appear within the hexagon and the triangle should appear within the square. Hence, we can eliminate option 2.

Hence, **option 5.**

9. We can number the position of all the elements in figures (I) and (II) as follows:

1	2	3	10	11	12
4	6	5	13	14	15
7	8	9	16	17	18

The element at position 1 is shifted to position 16.

The element at position 2 is shifted to position 13.

The element at position 3 is shifted to position 10 and its mirror image is taken.

The element at position 4 is shifted to position 12.

The element at position 5 is shifted to position 15.

The element at position 6 is shifted to position 18 and its mirror image is taken.

The element at position 7 is shifted to position 17.

The element at position 8 is shifted to position 14 and its mirror image is taken.

The element at position 9 is shifted to position 11.

The only option that satisfies all these conditions is option 4.

Hence, **option 4.**

10. Here, we observe that the elements in the answer options do not seem to follow any specific positional pattern.

Hence, we see that in the original pair the number of elements remains the same and one element is replaced.

In all the answer options, the first condition is satisfied i.e. the number of elements remains the same in (I) and (II).

However, in option 5, two elements ('Y' and 'θ') are replaced from figure (I) to figure (II). Hence, option 5 is dissimilar to the other options.

Hence, **option 5**.

CONCEPT TEST III

1. Here, in each figure, there are 3 curves each above and below the line.

From (I) to (II), we take the mirror image of 2 curves which are above the line and at the extremes. We also take the mirror image of the central curve below the line.

The rest of the curves remain as they are.

In option 4, the mirror image of the central curve above the line and of the two extreme curves below the line is taken.

Hence, the fourth pair is dissimilar to the other pairs.

Hence, **option 4**.

2. In all the pairs, figure (I) is rotated anticlockwise by 135° .

Also, the orientation of the two lines on the stem is inverted and the petal on the right side of the stem is shaded.

However, in option 5, the petal on the left side of the stem is shaded.

Hence, pair 5 is dissimilar to the other pairs.

Hence, **option 5**.

3. Here, divide each figure into 2 sets of 4 petals each. The first set consists of the horizontal and vertical petals, while the second set consists of the diagonal petals.

For the first set, we observe that apart from figure (2), all the options have at least one pair of consecutive shaded parts. In figure (2), all the horizontal and vertical petals are shaded alternately.

Hence, figure (2) differs from the other figures.

Hence, **option 2**.

4. We observe that except in figure 5, the total number of elements in the central row is equal to the total number of elements in the central column.

For example, in option 1, the number of elements in the central row = $8 + 8 + 12 = 28$

Similarly, the number of elements in the central column = $8 + 8 + 12 = 28$.

This logic applies to figures 2, 3 and 4 as well.

However, in option 5, there are 12 elements in the central column and 13 elements in the central row.

Hence, **option 5**.

5. Among the 5 figures given, only figure 2 is a closed figure.

The other 4 figures are open-ended figures. Hence, mathematically, their area cannot be found.

Hence, **option 2**.

6. We observe that the number of elements in each frame is 5, 6, 4, 6 and 5 respectively.

Hence, there is no particular pattern in terms of number of elements in each frame.

Also, there is no pattern in terms of the position of the various elements.

However, we see that each frame has exactly one polygon and some other symbols.

All the frames, except frame 4, have the number of symbols equal to the number of sides of the polygon present in that frame.

For example, frame 2 has a pentagon (i.e. 5 sides).

Hence, frame 2 has 5 symbols.

However, frame 4 has a hexagon.

Hence, it should have 6 symbols, but has only 5.

Hence, **option 4**.

7. In all the frames, the total number of dots is the same i.e. 10.

Also, the number of black and white dots is also equal i.e. 5 each.

However, in all the frames except frame 1, each row contains a different number of elements.

For example, in frame 2, the consecutive rows have 3, 4, 1 and 2 dots respectively.

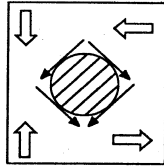
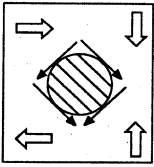
A similar pattern applies in frames 3, 4 and 5 as well.

However, in frame 1, the last 2 rows have 3 dots each.

Hence, **option 1**.

8. If we place a mirror horizontally below the given figure, we get the water image of the original figure. Now, if we keep a mirror on the right hand side of this water image, we get the mirror image of the new figure. This implies that we need to first take the water image of the original figure and then the mirror image of the water image.

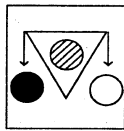
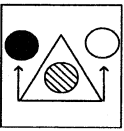
The water image of the original figure and the mirror image of the water image obtained is shown below:



Hence, option 3.

9. Since the mirror is first kept on the right hand side and then below the original figure, we need to first take the mirror image of the original figure and then take the water image of the new figure.

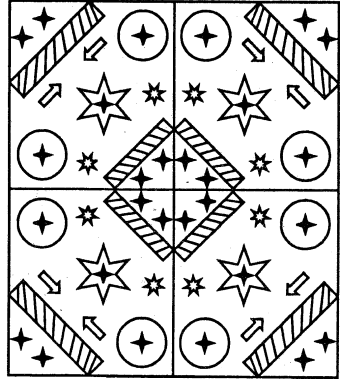
The mirror image of the original figure and the water image of the mirror image obtained is shown below:



Hence, option 1.

10. To solve the problem, we can either take the mirror image of the 3rd quadrant or the water image of the 1st quadrant.

The completed pattern after taking the relevant mirror (or water) image is as shown:



Hence, option 3.

SELECTION CRITERIA

CONCEPT TEST I

1.

Name of student	A	B	C	D	E	F	G	H	I	Comment	Outcome
Navin	x	x	✓	x	x	x	x	✓	✓	C, H and I are satisfied	Promotion with no scholarship

Navin satisfies conditions H and I because he has represented his school in sports which adds 2% and has attendance in the range of 90-94% which adds another 1% to his aggregate score. This takes his overall aggregate score to 50%.

Thus, he satisfies condition C. This makes the individual subject marks redundant. So, he gets a promotion with no scholarship.

Hence, option 2.

2.

Name of student	A	B	C	D	E	F	G	H	I	Comment	Outcome
Mahesh	x	x	✓	x	x	x	x	✓	x	C and H are satisfied	Promotion with no scholarship

Mahesh has obtained an aggregate of 74%.

Hence, he falls in category C where he gets a promotion but no scholarship.

Since he has represented his school in musical competitions, he satisfies condition H which adds 5% to his aggregate score bringing his total aggregate score to 79%.

However, he still falls under category C as his aggregate is between 50% and 80%.

Hence, he gets a promotion without any scholarship.

Hence, option 3.

3.

Name of student	A	B	C	D	E	F	G	H	I	Comment	Outcome
Pravina	x	✓	x	x	x	x	x	✓	✓	B, H and I are satisfied	Promotion with 25% scholarship

The 100% attendance record and the participation in the debate add 4% and 6% to Pravina's aggregate thereby taking it to 97%.

Hence she can be eligible in categories (A), (B), (F) or (G).

Since she has scored 86% in Science, 84% in Maths and 82% in English, she satisfies the conditions in category (B) only.

Hence, she should get a promotion with a 25% sponsorship.

Hence, **option 3**.

4.

Name of student	A	B	C	D	E	F	G	H	I	Comment	Outcome
Neeraj	✓	✓	x	x	x	x	x	x	✓	A, B and I are satisfied	Promotion with 50% scholarship

The 96% attendance record adds 2% to Neeraj's aggregate thereby taking it to 90%.

He now satisfies both the conditions A and B.

Hence, the school will award him the higher of the two scholarships which means condition A will apply to him.

Hence, he gets a promotion and a 50% scholarship.

Hence, **option 2**.

5.

Name of student	A	B	C	D	E	F	G	H	I	Comment	Outcome
Sarvesh	x	x	x	✓	x	x	x	x	✓	D and I are satisfied	No promotion

With the 94% attendance, Sarvesh gets an extra 1%.

However, his modified aggregate is till only 49% i.e. < 50%.

Hence, he is able to satisfy only condition D.

Hence, he does not get either a promotion or a scholarship.

Hence, **option 5**.

6. Let us make a table for all five candidates in order to take a decision:-

Name of student												Comments	Outcome
Nitesh													Selected
Chandan													Technical Expert
Rajesh													Rejected
Padmini													Director
Janaki													Chairman

Nitesh satisfies all the basic conditions and so should be selected.

Hence, **option 1**.

7. Chandan satisfies all the conditions except condition (c). So, his case should be referred to the technical expert.

Hence, **option 2**.

8. Rajesh satisfies all the conditions except conditions (a) and (f). So, he should be rejected.

Hence, **option 5**.

9. Padmini satisfies all the conditions except condition (d). However, she satisfies the alternate condition (h) as she has more than 5 years of work experience. So, her case has to be referred to the Director.

Hence, **option 3**.

10. Janaki satisfies all the conditions except condition (f). However, she satisfies the alternate condition (i) as she has done a certification course on travel booking. So, her case has to be referred to the Chairman.

Hence, **option 4**.