

# **FMS – 2008 (Memory Based)**

## **SECTION – I**

### **Directions for Question Nos. 1 to 4:**

Read the following statements and answer the questions given below:

Radha and Minnilal have two children—Simmi and Divya. Divya is married to Anuj who is the son of Madhu and Jabbar. Resham is the daughter of Anuj. Kiran who is Anju's sister is married to Subodh and has two sons Tarun and Aman. Tarun is grandson of Madhu and Jabbar.

1. What is the relationship between Aman and Resham?  
(1) Cousins                      (2) Father—Daughter      (3) Uncle—Niece              (4) None of these
2. How is Subodh related to Jabbar?  
(1) Father-in-law              (2) Son                              (3) Son-in-law                  (4) None of these
3. How is Kiran related to Divya?  
(1) Sister                          (2) Sister-in-law              (3) Grandmother              (4) None of these
4. Which of the following statements is definitely true?  
(1) Resham is the cousin of Kiran                      (2) Madhu is the mother-in-law of Subodh  
(3) Aman is the son of Simmi                              (4) All the three are true

### **Directions for Question Nos. 5 to 7:**

A dice has six distinct numbers (positive integers) inscribed on its faces, the sum of numbers on opposite faces being 36, 40 and 41. Another identical dice (with identical numbering) is brought and tossed together twice. The sum of numbers thrown up was found to be 33 and 39 while the sums of hidden numbers were 43 and 38 respectively.

5. Let the difference between two numbers on the opposite faces be 5 and another two on the opposite faces be 14. The least number inscribed on the dice will be:  
(1) 15                              (2) 16                              (3) 13                              (4) 14
6. Which of the following will definitely be a difference between two of the inscribed numbers?  
(1) 6                                  (2) 4                                  (3) 2                                  (4) None of these
7. If one of the sum of two inscribed numbers is 37, then which of the following must also be a sum of two numbers?  
(1) 45                              (2) 46                              (3) 42                              (4) 44

8. In the question given below a word is represented by only one set of numbers as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of alphabets as in the 2 matrices given below. The columns and rows of matrix I are numbered from 0 to 4 and that of matrix II from 5 to 9. A letter from these matrices can be represented first by its row and next by column number. Identify the set for the word FARM.

	0	1	2	3	4
0	C	A	F	E	D
1	C	D	A	E	D
2	D	E	C	F	E
3	A	D	D	D	C
4	D	C	A	C	A

	5	6	7	8	9
5	T	R	R	S	M
6	S	T	M	R	S
7	R	S	P	T	P
8	P	S	T	R	T
9	P	M	P	M	S

FARM

- (1) 23, 12, 68, 96      (2) 44, 43, 87, 57      (3) 02, 30, 85, 65      (4) 20, 31, 76, 68

**Directions for Question Nos. 9 and 10:**

A, B, C and D have certain sums of money each. When A divided his money among B, C and D according to the ratio of money they already had, their total amounts are found to be Rs 45, Rs 60 and Rs 75 respectively. If at least one of (B, C, D) can also split his money likewise on the condition that others get only integral number of rupees, then:

9. The money possessed by A initially was:  
 (1) Rs 108      (2) Rs 72  
 (3) Rs 36      (4) Cannot be determined
10. Who will be able to split his money likewise?  
 (1) D      (2) C      (3) B      (4) B or C

**Directions for Question Nos. 11 to 13:**

M1, M2, M3 and M4 bought a computer and decided to share the time of each day according to the money they contributed. The price of the computer in rupees as well as the hours of the day, the computer is used (greater than 10), are integers. If M1 contributed Rs 5,000, M2 contributed 25 per cent of the total money, M3 uses 20 per cent of the time of the computer and M4 uses it for 2 hours, then:

11. M1 uses the computer for:  
 (1) 6 hours 30 minutes    (2) 6 hours 45 minutes    (3) 6 hours      (4) 6 hours 15 minutes
12. M4 contributed:  
 (1) Rs 1,800      (2) Rs 2,000      (3) Rs 1,500      (4) Rs 1,600
13. If another person M5 wanted to use the remaining free hours at the computer each day by paying them a rent of Rs 100 for certain number of days and after which he could have it free because he would have contributed by then the money had he contributed the same money at the purchase of it for his share of time of computer, then he would have paid the rent for:  
 (1) 48 days      (2) 54 days      (3) 42 days      (4) 45 days

**Directions for Question Nos. 14 to 17:**

125 cubes of similar size are arranged in the form of a bigger cube (5 cubes on each side, i.e.,  $5 \times 5 \times 5$ ). From one corner of the top layer of this cube, four smaller cubes ( $2 \times 2 \times 1$ ) are removed. From the column on the opposite side, two cubes ( $1 \times 1 \times 2$ ) are removed, and from the third corner, three cubes ( $1 \times 1 + 3$ ) are removed and from the fourth column four cubes ( $1 \times 1 \times 4$ ) are removed. All exposed faces of the block thus formed are coloured red.

14. How many small cubes are left in the block?  
(1) 109                      (2) 114                      (3) 112                      (4) 110
15. How many cubes do not have any coloured face?  
(1) 38                      (2) 44                      (3) 25                      (4) 35
16. How many cubes have only two coloured faces?  
(1) 32                      (2) 36                      (3) 18                      (4) 29
17. How many cubes in the top layer have three red faces each?  
(1) 6                      (2) 8                      (3) 3                      (4) 4

**Directions for Question Nos. 18 to 21:**

A company wants to select a team of four mechanical engineers from its South Indian Factory for transfer to North India, where they are going to set up a new plant. The company is managed by professional managers and is very particular about human resources and industrial relations. There are seven engineers of equal ability; X, Y and Z (who are in Senior Executive Cadre) and A, B, C and D (who are in Junior Executive Cadre). The company requires that there should be two Senior Executives and two Junior Executives in each team. It is also necessary that all the engineers in a particular team are friendly with each other, in order to have a real team spirit and avoid any industrial relations problem in the new factory being set up in the North. Following is the situation of relations between the seven engineers:

- I. Y and A are not friendly.  
II. Z and C are not friendly.  
III. A and B are not friendly.
18. If B is selected and Y is rejected, the team will consist of:  
(1) X, Z, C and B                      (2) Z, C, D and B                      (3) X, Z, A and B                      (4) X, Z, D and B
19. If A is on the team then which other engineers must be on the team as well?  
(1) X, Z and B                      (2) X, Z and C                      (3) X, Y and D                      (4) X, Z and D
20. If both Y and Z are selected, which of the other engineers must be on the team with them?  
(1) Both B and A                      (2) Both B and D                      (3) Both C and D                      (4) Only D
21. Which statement(s) must be false?  
I. Y and C are never selected together.  
II. Z and B are never selected together.  
III. Z and D are never selected together.  
(1) III only                      (2) II only                      (3) I only                      (4) I, II and III

**Directions for Question Nos. 22 to 25:**

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

Mr Ghosh recently redecorated his house by coordinating orange and three other colours for the walls, carpets and curtains of four different rooms. From the information below, determine the colours of the carpet, walls and curtains for each of the room and answer the following questions:

- (1) Yellow was the only colour used in all the four rooms. It was used at least once for walls, carpets and curtains.
  - (2) Three different colours were used in each room but only the dining room and the bedroom were decorated in the same three colours.
  - (3) The same colour was chosen for the curtains in the bedroom, the carpet in the living room and the walls in the dining room. That colour was not used at all in the study room.
  - (4) The only room with both green and grey in its colour scheme had carpet of the same colour as in the dining room.
  - (5) Grey was the only colour used exactly twice—both times for curtains.
  - (6) The study room walls were painted the same colour as the living room walls.
22. Which of the following rooms had orange curtains and green walls?  
(1) Dining room           (2) Living room           (3) Bedroom           (4) Study
23. Which of the two rooms had green carpets?  
(1) Dining room and bedroom           (2) Study and living room  
(3) Living room and dining room           (4) Study and dining room
24. Which room did not use grey colour at all?  
(1) Dining room           (2) Living room           (3) Study           (4) Cannot say
25. The dining room had \_\_\_ curtains.  
(1) green           (2) yellow           (3) orange           (4) grey

**Directions for Question Nos. 26 and 27:**

Read the following information carefully and answer the questions given below:

A king started construction of a temple on 17th January, 1723. The king was in a hurry, so he stopped the construction only for 10 days in a year except in the last year when it went on without disruption. After 3099 working days, 20 artists and 150 labourers could complete the construction. The total expenditure was 21 lakh rupees. The king was very happy. He announced that the first worship would be on coming Monday, because it was his birthday. The Rajpurohit was against the selection of the date for the first worship. The king did not agree with the Rajpurohit. He started the worship at 7 AM in the morning. The temple collapsed at 7:30 AM and the king died on his 74th birth anniversary.

26. Find the day on which the construction was completed:  
(1) Tuesday           (2) Monday           (3) Sunday           (4) None of these
27. The king was born on:?  
(1) 8th October, 1657           (2) 30th September, 1657  
(3) 1st October, 1657           (4) None of these

**Directions for Question Nos. 28 to 31:**

A goldsmith has give gold rings, each having a different weight:

**Statement 1:** Ring D is weighing twice as much as ring E.

**Statement 2:** Ring E is weighing four and one-half times as much as ring F.

**Statement 3:** Ring F is weighing half as much as ring G.

**Statement 4:** Ring G is weighing half as much as ring H.

**Statement 5:** Ring H is weighing less than ring D but more than ring F.

Based on the above statements, answer the following questions:

28. Which of the following represents the descending order of weights of the rings?  
(1) H, F, G, D and E    (2) D, E, H, G and F    (3) D, E, G, H and F    (4) E, G, H, D and F
29. Which of the numbered statements above is not necessary to determine the correct order of the rings according to their weights?  
(1) Statement 3    (2) Statement 5    (3) Statement 1    (4) Statement 4
30. If these rings are sold according to their weights, which ring will fetch the highest value in rupees?  
(1) F    (2) D    (3) G    (4) H
31. Which of the following fractions expressed in the form  $P/Q$  is most nearly approximated by the decimal  $PQ$ , where  $P$  is the tenths' digit and  $Q$  is the hundredths' digit?  
(1)  $\frac{8}{9}$     (2)  $\frac{4}{5}$     (3)  $\frac{1}{8}$     (4)  $\frac{2}{9}$

**Directions for Question Nos. 32 to 34:**

A, B, C, D and E are five persons holding certain amount of money each (all different). When B, C, D and E exchanged their amounts amongst themselves so that no one had their original amount, it is observed that:

- I. B possesses the highest amount amongst all persons.  
II. D possesses the lowest amount amongst all persons, which is Rs 20 less than what A has.  
III. E and C possess Rs 50 and Rs 70 respectively.

When A, C, D and E exchanged their initial amounts amongst themselves so that no one had their original amount, it is observed that:

- I. A has the highest amount amongst all persons which is Rs 40 more than what B has.  
II. C has Rs 30 less than what A has.  
III. E has Rs 10 less than what D has.

32. The initial amount possessed by A was:  
(1) Rs 80    (2) Rs 60  
(3) Rs 40    (4) cannot be determined
33. The initial amount possessed by B was:  
(1) Rs 60    (2) Rs 50  
(3) Rs 40    (4) cannot be determined
34. The initial amount possessed by C was:  
(1) Rs 80    (2) Rs 70  
(3) Rs 50    (4) cannot be determined

**Directions for Question Nos. 35 and 36:**

In each of the following questions, there is a statement followed by two assumptions I and II. You are to consider each statement and the assumptions that follow and decide which of the assumptions is implicit in the statement. Indicate, your answer as (a) if only I is implicit, (b) if only II is implicit, (c) if neither I nor II is implicit and (d) if both I and II are implicit.

35. Statement:

We should use detergent to clean objects.

Assumptions:

I. Detergents help to dislodge grease and dirt.

II. Detergents form more lather.

(1) c

(2) d

(3) a

(4) b

36. Statement:

Every year doctors, scientists and engineers migrate from India to greener pastures.

Assumptions:

I. Brain drain has affected India adversely.

II. Better scales and better standards of living act as a bait to lure them.

(1) c

(2) d

(3) a

(4) b

**Directions for Question Nos. 37 and 38:**

In each question below are given two statements, followed by four conclusions numbered I, II, III and IV. You have to take everything given in the statements to be true although it may seem at variance with commonly accepted facts. Then decide which of the conclusions follows from the statements. Mark the right answer from (a), (b), (c), and (d).

37. Statements:

1. All children are adults.

2. All adults are fat.

Conclusions:

I. All fat persons are children.

II. All children are fat.

III. Only some children are fat.

IV. Some fat persons are adults.

(a) Only I and II follow

(b) Only III and IV follow

(c) Only II and IV follow

(d) Only I and III follow

(1) c

(2) d

(3) a

(4) b

38. Statements:

1. All stones are marbles.

2. Some marbles are diamonds.

Conclusions:

I. Some diamonds are stones.

II. Some diamonds are not marbles.

III. Every diamond is either a marble or a stone.

IV. No stone is a diamond.

(a) Only I and II follow

(b) Only II and III follow

(c) Either II or III follows

(d) Either I or IV follows

(1) c

(2) d

(3) a

(4) b

**Directions for Question Nos. 39 to 42:**

A scientist is trying to find a cure for the common cold using four ingredients. He can choose from the stable chemicals A, B and C and the unstable chemicals W, X, Y and Z. In order for the formula not to explode, there must be two stable chemicals in it. Also, certain chemicals cannot be mixed because of their reaction together. Chemical B cannot be mixed with chemical W. Chemical C cannot be mixed with Chemical Y. Chemical Y cannot be mixed with Chemical Z.

39. If the scientist calculated that Y is the most important chemical and must be used in the formula, which other ingredients must be a part of the cure?  
(1) A, B and Z                      (2) B, C and X                      (3) A, B and W                      (4) A, B and X
40. The scientist rejected chemical B because of its possible side effects but decided to use chemical Z. Which is a possible combination of the four ingredients in the formula?  
(1) A, W, Y and Z                      (2) A, C, W and Z                      (3) A, W, X and Z                      (4) A, X, Y and Z
41. Which of the following combinations of chemicals is impossible?  
I. Using chemical Y and W together.  
II. Using chemical B and C together.  
III. Using chemical W, X and Z together.  
(1) III only                      (2) I and III only                      (3) I only                      (4) II only
42. Which of the following can never be true?  
I. If chemical C is used, chemical Z is added.  
II. If chemical B is not used, chemical Y is added.  
III. If chemical C is used, chemical W is added.  
(1) III only                      (2) I and II only                      (3) I, II and III                      (4) II only

**Directions for Question Nos. 43 to 46:**

A, B, C, D, E and F are six teachers who teach two of the subjects from Maths, Physics, Chemistry and Biology, no two teachers teaching the same pair of subjects. Now (A, C) do not teach Physics; (B, D) do not teach Chemistry; (E, F) do not teach Maths; only one of (B, E) teaches Biology and only one of (C, D) teaches Biology.

43. If C, D teach exclusive pair of subjects, then which of the following pair will also necessarily teach exclusive pair of subjects?  
(1) Both                      (2) B, E                      (3) A, F                      (4) None of these
44. All the pair of subjects taught by each teacher can be known if it is known that:  
(1) F teaches Physics and Chemistry  
(2) B teaches Maths and Physics  
(3) A teaches Maths and Chemistry  
(4) None of the above
45. If D teaches Biology, then both the subjects taught by how many teachers can be known?  
(1) 3                      (2) 4                      (3) 1                      (4) 2
46. If C teaches Biology, then both the subjects taught by which of the following teachers can be known?  
(1) E                      (2) F                      (3) B                      (4) C

**Directions for Question Nos. (47 to 50):**

47. AZ, GT, MN, ?, YB  
(1) KF (2) RX (3) SH (4) TS
48. J2Z, K4X, I7V, ?, H16R, M22P  
(1) IIIT (2) LIIS (3) LI2T (4) LIIT
49. gfe \_\_\_ ig \_\_\_ eii \_\_\_ fei \_\_\_ gf \_\_\_ ii  
(1) eigfi (2) ifgie (3) figie (4) ifige
50. If 18514 stands for AHEAD, what does 31385 stand for?  
(1) CATCH (2) CASSET (3) CONQUER (4) CACHE



## SECTION – II

### Passage 1 (Question Nos. 51 to 58):

One of the ironies of counterfeiting is that while it reduces demand for authentic products—thus reducing employment that would otherwise be employed in making those products—it also creates jobs in the factories, sweatshops, and back-alley operations where counterfeits are made.

“In advanced Western economies, job creation is regarded as a vital imperative for all governments and politicians. This is because unemployment impacts on society in all sorts of ways, in lost tax revenue, unemployment pay, and attendant social costs. In developing countries where counterfeiting is rife, different considerations apply. Counterfeiters are able to tap a vast pool of low cost labor, which has no access to the sort of welfare benefits available in well developed industrialized countries. In addition, taxes are minimal or nonexistent, and counterfeiters can masquerade as Robin Hood figures providing a valuable service for the community at the expense of ‘wealthy’ rights owners ... the message is that (while counterfeiting does destroy the jobs of victim companies and their suppliers...it does create jobs for those in the counterfeiting industry. This of course may well be one reason why countries that have become well known as havens of counterfeiting have been reluctant to clamp down on this industry too hard.”

—Peter Lowe, Counterfeiting Intelligence Bureau In those economies where counterfeiting is an industry itself, jobs are created when counterfeiters employ people to make fake products. In one startling example described by the Counterfeiting Intelligence Bureau, an investigator in China visiting the city of Wenzhou, about 400 kilometres south of Shanghai, uncovered a vast industrial zone, with perhaps as many as a thousand companies engaged in the business of producing counterfeit low-voltage electrical switchgear. The investigator estimated that somewhere between 2,00,000 to 3,00,000 people were employed in these businesses.

Although this type of employment may appear as a benefit to those being employed, it often has other problems associated with it. The same investigator who described the switchgear counterfeiting industry in Wenzhou also described seeing child labor in the various establishments producing fake products. He described unsafe working conditions, with the assembly of finished goods often taking place on the street. Workers are paid by the piece, and unprotected by any insurance, benefits, union representation, or holidays.

Poor working conditions are endemic throughout much of the developing world—where much counterfeiting takes place. But one key difference between being employed by a counterfeiter and being employed by a legitimate industry is obvious : Counterfeiters have little long-term incentive to improve working conditions, and any legislation or change in government policy would not likely affect counterfeiters. When government interference or regulation becomes too onerous— or makes counterfeiting too risky an occupation in a certain location—the counterfeiters simply move to a more conducive locale.

It may not come as a surprise, though, to realize that support in local communities for counterfeiters can be quite high—these establishments, while illegal, create employment. Often this support can overwhelm government attempts to enforce crack downs :

A violent conflict erupted in Xintang Town, Zengchen City when 5,000 people who were involved in the manufacture of fake jeans and other imitation products confronted a team of government officials who had been sent to crack down on the trade in counterfeits. In what must have been a chilling experience for the enforcers, the local people surrounded the motorcade of more than 60 government officials, reporters and public security officers from Guangzhou who had come to maintain order. The situation turned critical when

some of the local people threatened to disarm the public security officials. A “stand off” of more than three hours ensued after which negotiations were started which finally diffused the situation.

The costs of hosting counterfeiting to a community are not simply those normally associated with low wages and child labor in unsafe conditions. More far-reaching consequences are being uncovered as the scope of counterfeiting throughout the globe has become more apparent. In the McKinsey Quarterly in the spring of 2000, a group of McKinsey consultants looked at the Russian economy’s inability to generate growth throughout the 1990s. Among the factors cited as contributing to the poor labor productivity and the disincentive to invest in research and development was counterfeiting:

The software industry, one of the prime creators of jobs and value in healthy modern economies, employs a mere 8,000 workers in Russia, compared with 6,40,000 in the United States. Why is this important industry so small? For starters, 89% of all packaged software in Russia is produced illegally. Russian packaged-software firms, therefore, can’t produce sufficient returns to justify investing in new products, or in research and development to improve existing ones. In addition, the software-consuming sectors, whose demand drives the emergence and growth of software firms, are both smaller and less interested in productivity-enhancing software tools than are their Western counterparts. In modern economies, for example, supermarkets —with their complex inventory management systems—are big consumers of software, but Russia has few of them. Similarly, modern banks use software to keep costs low and customer service high, but in Russia, where success in banking depends on relationships with the authorities, the demand for banking software is nearly nonexistent relative to demand in the United States.

This conclusion was echoed in the Counterfeiting Intelligence Bureau’s book *Countering Counterfeiting*, which also concluded that “another national consequence resulting from the costs incurred by ‘victim’ companies is a general decline in R&D, since a company cannot expect the full return from its investment.

In addition, the Organization for Economic Cooperation and Development (OECD) has highlighted the loss of direct foreign investment that can arise as a result of a country becoming known as a haven for counterfeiting. In the OECD’s own report on the *Economic Impact of Counterfeiting* (1998), the organization writes that “such countries suffer both tangible and intangible losses... foreign producers of reputable products become reluctant to manufacture their products in countries where counterfeiting is rife as they cannot rely on the enforcement of their intellectual property rights. Hence, such countries not only lose direct foreign investment but also miss out on foreign know-how.”

While counterfeiting can create jobs, it can also create a series of other problems that ultimately could lead to an economy being less competitive, less integrated into the stream of international commerce, and less productive than economies where governments choose to crack down on counterfeiters.

51. Which one of the following would be a suitable title for the passage?
  - (1) Economic and social consequences of counterfeiting
  - (2) The irony of counterfeiting as a creator of employment
  - (3) Social consequences of counterfeiting
  - (4) Advantages and disadvantages of counterfeiting
  
52. Based on the arguments presented in the passage which concrete inference can be made regarding counterfeiting:
  - (1) counterfeiting exists because there is a market for it
  - (2) counterfeiting hurts the economy of developed nations
  - (3) counterfeiting is a necessary evil in developing countries as it generates employment
  - (4) all of the above

53. In Russia the software industry is small because:
- (1) almost 90% packaged software is illegal and therefore its market also is limited
  - (2) Russian banks and supermarkets do not need complex software solutions, and so there is no market for software development in this area
  - (3) very little money is invested in R&D needed for developing new softwares that can help the industry grow
  - (4) all of the above
54. What are some of the consequences of counterfeiting in developing countries?
- (1) It perpetuates poor global work ethics
  - (2) It discourages investments in research and development
  - (3) It encourages exploitation of labour
  - (4) (2) and (3)
55. Which statement is true?
- (1) The confrontation between the crackdown team against counterfeiting and thousands of people involved in manufacture of counterfeit goods turned violent in Xintang Town, Zengchen city
  - (2) People of Zengchen city were exploited by their employers and worked in poor conditions
  - (3) 5,000 people from Wenzhou confronted 60 government officials from Guangzhao
  - (4) All the statements are true
56. In the final analysis who benefits from counterfeiting?
- (1) Counterfeiting organization and its employees
  - (2) The counterfeiting organization
  - (3) Developing countries and its people
  - (4) No one
57. What recommendations would you like to make to developing countries which engage in producing counterfeit goods?
- (1) The passage does not provide information for making recommendations
  - (2) Allow global regulatory agencies to independently handle the counterfeit economy
  - (3) Clamp down on organizations which produce counterfeit goods
  - (4) Allow employment through counterfeit but force, such organizations, to provide better work conditions to the employees
58. Which cluster according to you is the best solution for handling the problem of counterfeiting?
- (1) Play of market forces; sanctions; allow counterfeiting
  - (2) MOU between original and counterfeiting organization; government regulation; activism
  - (3) Allow counterfeiting; regulate work conditions; invest in R&D
  - (4) None of the above

**Passage 2 (Question Nos. 59 to 66):**

How can technology be defined? Technology often is considered a means to a particular end, the means being artificially created, not natural, and something that is not directly necessary for the individual or the end user; it serves, rather, to fulfil the need to produce something that is later to be consumed. However, we use the term in a broader sense. We regard technology as being more than just sum of such artefacts, which are merely the crystallized, concrete manifestations of human behavioural patterns. A method is the how, the way in which a goal is reached and which involves the use of means. A means is a medium in that

it mediates between the starting point and the desired result, regardless of what sort of action is involved. Thus one could speak of social technology (e.g., psychotherapy) as a technology and not merely of technology as something used for material production in a society. So technology also includes the know-how involved in the use of the application of the artefacts. In short, technology embraces the ways and means of acting in pursuit of a goal.

How can culture be defined? Using the same analogy of technology, it could be understood to be an equally artefact-based concept, which is not a means to an end, but rather an end in itself. That is to say, it is not in itself an essential of life, but rather something that represents a human desire (i.e., what makes humans distinct from other living beings). Here, too, there is a notion that culture is not only the result of a process but also this very process itself as it moves towards a goal; that is to say, culture is a characteristic of goal-oriented actions (i.e., striving towards goals as well as the goals themselves).

Are there imaginable connections between culture and technology? The two ideal typical extreme positions are well known, each making a single direction of determination.

The first position can be referred to as technological determinism, which postulates the total, or at least dominating, influence of technology on culture. Technology is supposed to develop more or less on its own, pushing social development along as it goes. This may be interpreted positively or negatively. An uncritical opinion of Marxist origin saw social advancement as an inevitable result of technical achievements, just as the ideology of the bourgeoisie justified the progress of technically possible as socially desirable. This view is opposed entirely by fundamentalists who hold technological development responsible for the loss of human values in a society. Neither philosophy accepts the possibility of technological development being influenced in any way. Both ignore the fact that there would be no such development if multinational corporations and national governments were to stop investing in research and development; if there was no political, economic and military interests. The fact that on a micro-level there are countless thousands of engineers constantly involved in technology design, and that on a macro-level managers and politicians decide which technological options are realised, supports the second theory—social constructivism—that technology is constructed deliberately to be a part of a society. According to this view, the interests of those groups that dominate the genesis of technology finally are embodied in the technology, which in itself cannot be neutral. Here again both a critical and an approving variant may be distinguished. While one bemoans the inability of existing technology to pursue ethically justifiable, socially acceptable, and peaceful and environmentally sound objectives, the other sees the existing economic, democratic and human rights structures as the best guarantee of developing optimal technological options. Both approaches neglect the inherent dynamism within technological development.

Do the two theories—technological determinism and social constructivism—together give a realistic view of the relationship between culture and technology? This would mean that two equally matched factors—technical and cultural would not be complete without other. Though as a corollary you may like to add that they are a little independent also of each other. This is a superficial answer. A better explanation can be put forward. Technology is based on cooperation, be it in the application of special methods, the implementation of these in specific social areas, their invention and development or any situation in which skills and knowledge of members of society are required. The same holds true for convictions, value judgements, instructions, standards, behavioural pattern and the like. These are just as much part of content that promote or discourage technological methods. Technology makes every technologically mediated action into a socially determined one, and its use is a human characteristic. Technological development is part of cultural development; this means that technology is part of culture, and their relationship to each other is one of part and whole. Culture is the all embracing factor in this context.

In each part whole relationship, the parts are the necessary precondition for the emergence of the whole but are not the sufficient condition for the complete determination of the result. The whole arises from parts but exerts control over them in the form of downward causation. This means technology has the purpose of solving social problems. Social interests and culture are therefore in the origin of invention of technology—and culture becomes the reason for the existence of technology. But technology is ambivalent, sometimes it fails to do what is wanted, and other times not only fulfils expectations but goes on to do other useful tasks not anticipated. Realizable goals therefore, do not exist at the start of the process, but may be discovered as option made available by technology. However, whether society decides to pursue these goals on grounds they are possible is no longer a question of technology but rather social decision making. To conclude, the relationship of technology and culture is dialectic. A relationship is usually dialectic if, first, the sides of the relation are opposed to each other; second, both sides depend on each other; and third, they form a relationship that is asymmetrical. A part-whole relationship is dialectic since part and whole represent opposites, the whole depends on parts as well as parts on the whole, and parts and whole build up a hierarchy in which the different levels cannot be replaced by each other. Such is the relationship between technology and culture.

59. With respect to “defining technology” which statement is true?
- (1) Technology is the sum of the artefacts which are crystallized and concrete manifestations of human behavioural patterns.
  - (2) Technology is more than the sum of parts that mediates goals and the realization of goals.
  - (3) Technology is a complex phenomenon and is about the “know how” and “means” to achieve goals that are not natural to human beings.
  - (4) None of the above.
60. Which statement best represents the ‘meaning of culture’?
- (1) Culture is the set of goal oriented activities and their solutions, that are shared by a particular group.
  - (2) The trajectory of fulfilling human desires, through chosen ways and the resultant outcomes is culture.
  - (3) Culture is the summation of goals that people strive for and the means to achieve them.
  - (4) All of the above.
61. Which statement is true?
- (1) Technology and culture shape each other equally.
  - (2) Culture shapes technology.
  - (3) Technology shapes culture.
  - (4) All are wrong.
62. What is common between technology and culture?
- (1) Both lead to new needs and desired goals
  - (2) Both are shaped by each other
  - (3) Both are shared phenomenon
  - (4) Statement (2) and (3)
63. Which of the following statements is true?
- (1) The Fundamentalists are against technological development.
  - (2) The Marxists believe that technology propel social advancement.
  - (3) The bourgeoisie equate technological growth with socially desirable.
  - (4) All the statements are correct.

64. The passage refers to part-whole relationship. Which of the following statements is correct in this regard?
- (1) The relationship between part-whole is bidirectional, dynamic and hierarchical.
  - (2) The whole exerts influence on parts, and not the other way round.
  - (3) In part-whole relationships, the whole is sum of parts.
  - (4) (2) and (3) are correct.
65. Which of the following statements is false?
- (1) Realizable goals do not exist, unless technology finds ways to realize them.
  - (2) All goals that are realizable are based on societal decisions.
  - (3) Technology is ambivalent; it both realizes social goals and changes pre-existing goals.
  - (4) Culture defines goals that technology strives to realize.
66. The passage talks of three viewpoints regarding the relationship between technology and culture. Which of the following does not represent a viewpoint?
- (1) Technological determinism and social constructivism together give a realistic view of the relationship between technology and culture.
  - (2) Technology has the task of functioning as a means for solving social problems, and culture influences the invention, diffusion and application of technology; but sometimes technology also creates new goals.
  - (3) Technology develops more or less on its own, pushing social development.
  - (4) Interests of those groups that dominate the genesis of technology finally are embodied in the technology.

### Passage 3 (Question Nos. 67 to 74):

A creamy blur of succulent blue sound smells like week- old strawberries dropped onto a tin sieve as mother approaches in a halo of color, chatter, and a perfume like thick golden butterscotch. Newborns ride on intermingling waves of sight, sound, touch, taste, and, especially, smell. As Daphne and Charles Maurer remind us in *The World of the Newborn*:

His world smells to him much as our world smells to us, but he does not perceive odors as coming through his nose alone. He hears odors, and sees odors, and feels them too. His world is a *mêlée* of pungent aromas—and pungent sounds, and bitter-smelling sounds, and sweet-smelling sights, and sour- smelling pressures against the skin. If we could visit the newborn's world, we would think ourselves inside a hallucinogenic perfumery.

In time, the newborn learns to sort and tame all its sensory impressions, some of which have names, many of which will remain nameless to the end of its days. Things that elude our verbal grasp are hard to pin down and almost impossible to remember. A cozy blur in the nursery vanishes into the rigorous categories of common sense. But for some people, that sensory blending never quits, and they taste baked beans whenever they hear the word "Francis", as one woman reported, or see yellow on touching a matte surface, or smell the passage of time. The stimulation of one sense stimulates another : synesthesia is the technical name, from the Greek *syn* (together) + *aisthanesthai* (to perceive). A thick garment of perception is woven thread by overlapping thread. A similar word is synthesis, in which the garment of thought is woven together idea by idea, and which originally referred to the light muslin clothing worn by the ancient Romans.

Daily life is a constant onslaught on one's perceptions, and every-one experiences some intermingling of the senses. According to Gestalt psychologists, when people are asked to relate a list of non-sense words

to shapes and colors they identify certain sounds with certain shapes in ways that fall into clear patterns. What's more surprising is that this is true whether they are from the United States, England, the Mahali peninsula, or Lake Tanganyika. People with intense synesthesia tend to respond in predictable ways, too. A survey of two thousand synesthetes from various cultures revealed many similarities in the colors they assigned to sounds. People often associate low sounds with dark colors and high sounds with bright colors, for instance. A certain amount of synesthesia is built into our senses. If one wished to create instant synesthesia, a dose of mescaline or hashish would do nicely by exaggerating the neural connections between the senses. Those who experience intense synesthesia naturally on a regular basis are rare—only about one in every five hundred thousand people—and neurologist Richard Cytowic traces the phenomenon to the limbic system, the most primitive part of the brain, calling synesthetes “living cognitive fossils”, because they may be people whose limbic system is not entirely governed by the much more sophisticated (and more recently evolved) cortex. As he says, “synesthesia .... may be a memory of how early mammals saw, heard, smelled, tasted and touched.”

While synesthesia drives some people to distraction, it drives distractions away from others. While it is a small plague to the person who doesn't want all that sensory overload, it invigorates those who are indelibly creative. Some of the most famous synesthetes have been artists. Composers Aleksandr Scriabin and Nikolai Rimski-Korsakov both freely associated colors with music when they wrote. To Rimski-Korsakov, C major was white; to Scriabin it was red. To Rimski-Korsakov, A major was rosy, to Scriabin it was green. More surprising is how closely their music-color synesthesias matched. Both associated E major with blue (for Rimski-Korsakov, it was sapphire blue, for Scriabin blue-white), A-flat major with purple (for Rimski-Korsakov it was grayish-violet, for Scriabin purple-violet), D major with yellow, etc.

Either writers have been especially graced with synesthesia, or they've been keener to describe it. Dr Johnson once said that scarlet “represented nothing so much as the clangour of a trumpet.” Baudelaire took pride in his sensory Esperanto, and his sonnet on the correspondences between perfumes, colors, and sounds greatly influenced the synesthesia-loving Symbolist movement. Symbol comes from the Greek word *symballein*, “to throw together”, and, as *The Columbia Dictionary of Modern European Literature* explains, the Symbolists believed that “all arts are parallel translations of one fundamental mystery. Senses correspond to each other; a sound can be translated through a perfume and a perfume through a vision. .... Haunted by these horizontal correspondences” and using suggestion rather than straightforward communication, they sought “the One hidden in Nature behind the Many.” Rimbaud, who assigned colors to each of the vowel sounds and once described A as a “black hairy corset of loud flies”, claimed that the only way an artist can arrive at life's truths is by experiencing “every form of love, of suffering, of madness”, to be prepared for by “a long immense planned disordering of all the senses.” The Symbolists, who were avid drug takers, delighted in the way hallucinogens intensified all their senses simultaneously. They would have loved (for a short time) taking LSD while watching Walt Disney's *Fantasia*, in which pure color dramatizes, melts into, and spurts from classical music. Few artists have written about synesthesia with the all-out precision and charm of Vladimiar Nabokov, who, in *Speak, Memory*, analyses what he calls his “colored hearing”:

Perhaps “hearing” is not quite accurate, since the color sensation seems to be produced by the very act of my orally forming a given letter while I imagine its outline. The long a of the English alphabet ... has for me the tint of weathered wood, but a French a evokes polished ebony. This black group also includes hard g (vulcanized rubber) and r (a sooty rag being ripped). Oatmeal n, noodle-limp l, and the ivory-backed hand mirror of o take care of .....

Synesthesia can be hereditary, so it's not surprising that Nabokov's mother experienced it, nor that it expressed itself slightly differently in her son. However, it's odd to think of Nabokov, Faulkner, Virginia

Woolf, Huysmans, Baudelaire, Joyce, Dylan Thomas and other notorious synesthetes as being more primitive than most people, but that may indeed be true. Great artists feel at home in the luminous spill of sensation, to which they add their own complex sensory Niagara. It would certainly have amused Nabokov to imagine himself closer than others to his mammalian ancestors, which he would no doubt have depicted in a fictional hall of mirrors with suave, prankish, Nabokovian finesse.

67. Those who experience intense synesthesia are rare. Which cluster are synesthetes?  
(1) Some artists, mystics and drug takers  
(2) Infants and Symbolists and Musicians  
(3) Some artists, babies and avid drug takers  
(4) Artists and babies
68. According to Richard Cytowic the most primitive part of the brain is:  
(1) Medulla                      (2) Cerebrum                      (3) Cortex                      (4) Limbic system
69. Which statement best describes the experience of synesthesia?  
(1) It is a long immense disordering of all the senses  
(2) A garment of thought is woven idea by idea, like the light muslin cloth  
(3) A thick garment of perception is woven thread by overlapping thread  
(4) All the sentences are correct
70. Which composer(s) associated E major with blue, while writing?  
(1) Aleksandr Scriabin and Rimski-Korsakov  
(2) Aleksandr Scriabin and Bob Dylan  
(3) Alek Sandr Scriabin  
(4) Bob Dylan and Rimski-Korsakov
71. According to synesthesia:  
(1) "the stimulation of one sense stimulates another"  
(2) "all arts are parallel translations of one fundamental mystery"  
(3) the brain tries to see "the one hidden in nature behind the many"  
(4) all of the above
72. Non-synesthetes (complete the sentence):  
(1) can never become artists and reach extraordinary heights  
(2) would love to take LSD (for a short time) while watching Walt Disney's Fantasia  
(3) tame all the sensory impressions into rigorous categories of common sense  
(4) are living cognitive fossils who use their limbic system more
73. From the passage, which other category of people (not mentioned in the passage) could be experiencing synesthesia  
(1) Mystics                      (2) Actors                      (3) Scientists                      (4) Chefs
74. People with intense synesthesia respond in predictable ways. Which of the following experience is not shared by co-synesthetes?  
(1) Musical note A Major is green  
(2) High sounds are associated with bright colours  
(3) Low sounds are associated with dark colours  
(4) All are not shared by synesthetes



#### Passage 4 (Question Nos. 75 to 82):

Behaviour therapy has a long and productive history of empirically researched treatments for a wide range of adult and child disorders, but what is dialectical behaviour therapy? It is an integration of behaviour therapy with other perspectives and practices that includes, most notably, principles and practice of Zen and an overarching dialectical philosophy that guides the treatment. The treatment, developed by Marsha Linehan (1987) evolved over almost 20 years of work with chronically suicidal women. It is rooted firmly in the principles and practices of behaviour therapy and cognitive therapy, including a strong emphasis on systematic ongoing assessment and data collection during treatment; operational definitions of clearly defined target behaviours; a therapist-patient relationship that emphasizes collaboration, orienting the patient to the treatment, and education of the patient; and the use of any standard cognitive and behavioural treatment strategies. But it also has a number of distinctive characteristics that have emerged partly in response to characteristics of this patient population. One of these is an emphasis on dialectics. The fundamental dialectic with this population is the need for both acceptance and change. The therapist needs to fully accept the patient as he or she is and at the same time to persistently and insistently push for and help the patient to change. The therapist also tries to develop and strengthen an attitude of acceptance towards reality on the part of the patient as well as the motivation and ability to change what can be changed. This dialectic both flows from and is addressed by the integration of behaviour therapy with Zen practice, Rogerian practice, and others. The therapist also needs to think in a dialectical fashion, not becoming polarized but seeing the value of opposing points of view and finding appropriate synthesis.

The treatment rests on the dialectic of two core sets of strategies : validation strategies and problem-solving strategies. Behaviour therapy has emphasized problem solving but has had little to say about validation or acceptance. DBT also involves a dialectic of communication style between a reciprocal, warm, genuine interpersonal style and a more irreverent style and a dialectic in case management between consultation to the patient regarding how to manage his or her environment on the one hand and direct environmental intervention by the therapist on the other. DBT was developed to address the issues that lead therapists of not only behavioural but also other theoretical orientations to frequently get stuck, go down blind alleys, and in some cases even contribute to serious, even fatal, deterioration in the patient's well-being. DBT does not particularly emphasize the role of the patient's motivational factors (e.g., resistance) in understanding the difficulty these patients have in changing. Rather, it recognizes that they almost always are seriously deficient in a wide spectrum of interpersonal, emotion regulation, distress tolerance, and other skills. However, the behaviour therapist who attempts to treat the borderline patient by a relatively structured sequence of skills acquisition and practice, as one might do with some patients who have depressive or anxiety disorders, quickly discovers that the patient's emotional sensitivity necessitates presenting skills, and problem-solving in general, within a context in which the patient feels understood and validated, particularly with regard to his or her emotions and motives.

Conducting skills training in individual therapy with borderline patients is frequently almost impossible because of the recurrent chaos and crises of their lives, so that at every session some new behaviour or situation may need to be dealt with. Linehan therefore decided to separate skills training into a separate component of the treatment, typically in a group format, to free up the individual psychotherapist for helping patients manage crises, reinforce the use of skills, and deal with motivational issues that interfere with their using the skills they have. Thus, it is assumed that patients not only have skills deficits but typically also do not use the skills they have. In DBT, the term "motivational" refers to emotions, cognitions, or reinforcement contingencies that interfere with skilled behaviour. The therapist's job therefore becomes one of helping the patient overcome inhibitions, change beliefs and thinking styles, and rearrange reinforcement

contingencies for adaptive and maladaptive behaviour. The treatment therefore targets both improvement in skills and adequate attention to these several motivational factors that can interfere with them.

75. What is the corner-stone of the philosophy that underlies Dialectical Behaviour Therapy (DBT)?
- (1) Developing a collaborative relationship between patient-therapist, and standard cognitive and behavioural treatment strategies
  - (2) On-going and systematic assessment and data collection during treatment, with an emphasis on clearly defined target behaviours of the patient which need to be changed
  - (3) Accepting the patient for what he or she is; while striving to change the patient so that problems are solved
  - (4) Integration of behaviour therapy with other perspectives notably Zen and dialectics
76. DBT has developed because:
- (1) Traditional models of therapy is didactic and pedagogical rather than being human and realistic
  - (2) Lead therapists, both behavioural and theoretical, frequently get stuck, and use trial and error while treating patients
  - (3) Lead therapists found that often patient's health deteriorated totally by the use of traditional methods of therapy
  - (4) (2) and (3) both
77. The notion of (1) accepting reality as it is and (2) striving to change what can be changed derives from \_\_\_\_ and \_\_\_\_ respectively.
- |                                          |                                          |
|------------------------------------------|------------------------------------------|
| (1) Behaviour therapy; Cognitive therapy | (2) Cognitive therapy; Behaviour therapy |
| (3) Rogerian practice; Zen philosophy    | (4) Zen philosophy; Rogerian practice    |
78. An innovation that Linehan introduced in DBT; and which has led to better results with respect to improvements in the patient is:
- (1) Conducting skills training of patients in a separate component as a group format; allowing the individual psychotherapist help patient with motivational issues
  - (2) The therapist focuses on helping patient overcome inhibitions, change beliefs and thinking styles, and rearrange reinforcement contingencies for adaptive and maladaptive behaviours
  - (3) The individual psychotherapist uses both skills training and reduction of motivational deficits to help patients
  - (4) Borderline patients benefit when they are made to go through relatively structured sequence of skills acquisition and practice
79. One of the main problems with a DBT therapist could be:
- (1) Lack of understanding of Zen philosophy
  - (2) To be reverent and irreverent at the same time while treating a patient
  - (3) Inability to synthesize opposing perspectives and tending to become polarized while treating a patient
  - (4) All of the above

80. In the final analysis the advantages of DBT are numerous. Which statement can be inferred as not to be one of the advantages of DBT?
- (1) Cultural differences between the patient and the therapist can create complications in the practice of DBT
  - (2) DBT can be very taxing for the therapist to practice
  - (3) DBT is an open ended form of treatment, and therapists can choose from a wide repertoire of available techniques
  - (4) The DBT therapist needs to be a highly skilled and evolved person, which is not possible for many individuals
81. Marsha Linehan evolved DBT over almost 20 years of work with:
- (1) women who were deficient in a wide spectrum of interpersonal, emotion regulation, distress tolerance and other skills
  - (2) all of the above
  - (3) depressive women
  - (4) chronically suicidal women
82. Which social institution practices DBT in its essence, without being conscious of it?
- (1) Hospitals                      (2) All of these                      (3) Schools                      (4) Families

**Passage 5 (Question Nos. 83 to 90):**

How do we go about investigating personologic phenomena? Should we adhere to the time-tested rules of common sense, continuously and painstakingly refining our measures and methods until we are virtually infallible? Or should we explore innovative new concepts that will partition the personological realm in ways that are more theoretically and clinically fruitful? One option would be to anchor personological phenomena directly in the empirical world of observables in a one-to-one fashion, tying each attribute to only one indicator. Each attribute would then be its mode of measurement, possessing no information beyond that contained in the procedure itself, akin to *operational definitions*.

Operational definitions are quite pleasingly precise but considerably limited in scope. Ultimate empirical precision can only be achieved if every defining feature that distinguishes a taxon is anchored to a single observable in the real world; that is, a different datum for every difference observed between personality syndromes. This goal is simply not feasible or desirable: The subject domain of personology is inherently more weakly organized than that of the so-called hard sciences. As one moves from physics and chemistry into biological and psychological arenas, unidirectional causal path-ways give way to feedback and feedforward processes, which in turn give rise to emergent levels of description that are more inferential than the physical substrates that underlie them. Intrapsychic formulations, for example, require that the clinician transcend the level of the merely observable. Owing to their abstract and hypothetical character, these indeterminate and intervening concepts are known as *open concepts*.

The polar distinction between operational definitions (the paradigm of those who prefer to employ data derived from empirical-practical contexts) and open concepts (those whose ideas are derived from a more causal-theoretical stance) represents in part an epistemological continuum of conceptual specificity to conceptual openness. Each end of this polarity embraces a compromise between scope and precision. The virtue of each hides its vices. The advantage of operationism is obvious: Personality syndromes and the attributes of which they are composed are rendered unambiguous. Diagnostic identifications are directly translatable into measurement procedures, maximizing precision. However, the direct mapping of attributes

to measurement procedures required ignores the biases incumbent to any one procedure, so that operationism is fatally deficient in scope.

The “open concept” model, likewise, has its own advantage : Open concepts acknowledge the desirability of multiple measurement procedures and encourage their user to move freely in more abstract and inferential realms. Each open concept can be embedded in a theoretical matrix or network from which its meaning is derived through its relations with other open concepts, with only indirect reference to explicit observables. The disadvantage is that open concepts may become so circuitous in their references that they become tautological and completely decoupled from observables. No doubt clarity gets muddled and deductions become tautological in statements such as “in the borderline the mechanisms of the ego disintegrate when libidinous energies overwhelm superego introjections.” In such formulations, the scope of a theory overwhelms the testability of its empirical linkages, rendering precision zero.

Due to simple pragmatism, all scientific models, being simplifications of nature, must reach a compromise between scope and precision. We are not yet mystics at the beginning of a science : Unlike the individually borne thinking in a taxonomy which carves nature at its joints, we are acutely conscious that the relations among our naive representations are not those intrinsic to the subject domain itself. No one today would seriously put Hippocrates’s humoral theory forward as a model of personality syndromes. Instead, such formulations resemble the more or less unrefined and often self-contradictory knowledge of commonsense than the well- criticized and well-corroborated knowledge of science. As disputable as common sense is, it is nevertheless the point of departure for scientific knowledge and a source of common sense taxonomies.

On an individual level, what distinguishes these two broad approaches? What does each individual scientist do to carry out his or her approach? Evidently, the theoretical approach is driven primarily by taking perspective on sense-near representations in order to discover underlying theoretic- causal relations from which a more coherent, internally corroborating system of constructs might be established. New constructs are generated, “more or less removed from the level of directly observable things and events.” Some old ones are discarded, while others have their meaning sharpened or transformed as the system of relations is made more explicit. A process of reflection seems essential. Such representations are referred to as theoretical constructs, to reinforce their abstract origins in the mind of a reflective scientists.

Empiricism, however, tends to keep close to sense-near representations and holds theory as a dubious entity. The empiricist’s vocabulary, then, remains “largely observational”. As an ideal type, empirical preoccupations tend toward the progressive refinement of methods of observing of preexisting constructs, rather than the generation of new ones, toward ever greater agreement of man-with-man (interrater reliability), man-with-himself (reliability over occasions), and greater purity of observation (internal consistency).

Few members of the modern scientific community are native empiricists, yet “no science embraced empiricism more wholeheartedly than psychology”. Moreover, some of the assumptions underlying empiricism are insidious and difficult to escape from, even when one ostensibly believes in the utility of theory. Foremost among criticisms is that the empiricism of common sense, naive realism, believes that the world it takes in is the world as it is. Commonsensical empiricism literally believes its constructs are the world. There is no reason to leave the security of immediate perception. Ultimately, this agenda rests on the assumption that theory-neutral data exist; that is, that one can know the world without transforming it. In the world view of radical empiricism, there are no mediating mental constructs to foul things up. If only it were so, then every act of observation would be an act of knowledge. Each small fact would present us with an objectivity, to be plucked from the world like fruit, collected as a hobby, or catalogued like microscope slides. Because naive empiricism remains unconscious of the potentially deceiving role of mental constructs, it believes

itself to be carving nature at its joints just as it is. Naive empiricism, then, is really a false mysticism which breaches the gulf between subject and object by denying that any such gulf exists; it is a naive realism which believes that what you see is what you get.

83. The passage discusses two approaches which are used to investigate personologic phenomenon. These are:
- (1) "Operational definitions" and "Open concepts"
  - (2) "Facts" and "Theory"
  - (3) "Commonsensical empiricism" and "naive mysticism"
  - (4) "Personology" and "Hard sciences"
84. Which statement is not an advantage of "operationism"?
- (1) Data is derived from empirical-practical content
  - (2) Direct mapping of personologic attributes to measurement mode, frees them from making inferences
  - (3) Personality syndromes and attributes become clear and unambiguous
  - (4) Measurement procedures are maximized and this increases precision
85. Which statement does not describe a characteristic of "open concepts"?
- (1) "Open concepts" derive their meaning from theoretical frameworks and models
  - (2) "Open concepts" allows the researcher to move freely in more abstract and inferential realms
  - (3) "Open concepts" model allows the researcher to use multiple measurement procedures
  - (4) "Open concepts" free research from becoming tautological and decoupled from observables
86. Science moves away from commonsense in some essential ways. Which statement reflects one such way?
- (1) A scientist introduces new "theoretical terms" which are embedded in theory, and more or less removed from the level of directly observable things and events, while researching
  - (2) A scientist ignores biases incumbent in multiple measurement procedures and moves freely in abstractions
  - (3) A scientist progresses from a "theoretical stage" to the "natural history" stage while researching
  - (4) A scientist is acutely conscious of identifying representations that are intrinsic to the subject of inquiry
87. From the passage what are the characteristics of a researcher who wants to examine personologic phenomenon?
- (1) The researcher is adept in clinically and painstakingly refining measures to the point that no information beyond that contained in the procedure is valid
  - (2) The researcher should be a good reflective scientist, who is able to carve nature at its joints
  - (3) The researcher should be able to move from empirical to theoretical by discovering underlying theoretic causal relationship existing in the phenomenon that is examined
  - (4) All the above characteristics
88. The corner stone of the philosophy of "Empiricism" is:
- (1) Empiricism in its pure form is mysticism
  - (2) To strive and refine methods of pre-existing constructs, rather than generating new constructs to explain what exists
  - (3) There is no gulf between "subject" and "object" and all data is theory free
  - (4) Mediating mental constructs do not affect reality as it exists

89. Which science has adopted "Empiricism" whole-heartedly according to the passage?  
(1) Biology                      (2) Psychology                      (3) Hard sciences                      (4) All of these
90. "Interrater reliability", "Test-retest reliability" and "internal consistency", are terms that will preoccupy a/an:  
(1) mystic                                              (2) pure empiricist  
(3) common sense empiricist                      (4) personologic scientist

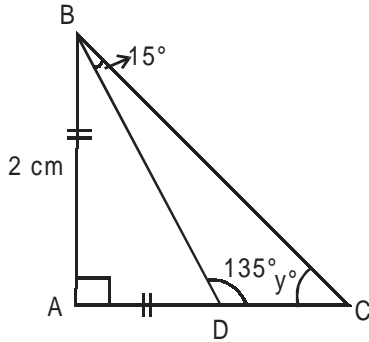
### SECTION – III

91. In an academic programme at FMS, there are 6 foreign students of whom 2 are Chinese, 2 Americans and the remaining two from SAARC countries. They have to stand in a row for a photograph so that the two Chinese are together, the two Americans are together and so also the two SAARC citizens. The number of ways in which the students could do so is:  
(1) 24 ways                      (2) 48 ways                      (3) 6 ways                      (4) 12 ways
92. There are 10 trains plying between Delhi and Jammu Tawi. The number of ways in which a person could go from Delhi to Jammu Tawi and return by a different train is:  
(1) 80                      (2) 90  
(3) 99                      (4) Cannot be determined on the basis of the data given
93. The 'm'th term of an arithmetic progression series is 'n' and the 'n'th term is 'm'. The 'r'th term of the series would be:  
(1)  $\frac{m+n+r}{2}$                       (2)  $\frac{m+n-r}{2}$                       (3)  $m+n-r$                       (4)  $n+m-2r$
94. The number of the term of the series—  
 $10 + 9\frac{2}{3} + 9\frac{1}{3} + 9 \dots$  that would amount to 155 is :  
(1) 32nd term                      (2) 33rd term                      (3) 30th term                      (4) 31st term
95. If  $y = x(x-1)(x-2)$  then  $\frac{dy}{dx}$  is:  
(1)  $3x^2 + 2$                       (2)  $3x^2$                       (3)  $3x^2 - 6x + 2$                       (4)  $-6x + 2$
96. The value of  $\int x\sqrt{x} dx$  would be  
(1)  $\frac{2}{5}x^{\frac{5}{2}} + c$                       (2)  $\frac{3}{2}x^{\frac{2}{5}}$                       (3)  $\frac{2}{5}x^{\frac{3}{2}}$                       (4)  $\frac{2}{5}x^{\frac{3}{2}} + c$
97. If  $A = \{1, 2, 3, 4\}$ ,  $B = \{3, 5, 7\}$ , then the set  $(A - B) \cup (B - A)$  would be :  
(1)  $\{1, 2, 3, 4, 5, 7\}$                       (2)  $\{5, 7\}$                       (3)  $\{1, 2, 4, 5, 7\}$                       (4)  $\{3\}$
98. In a class of 60 at a business school, 40 students like marketing management, 36 like production management and 24 like both. The number of students who like only production management are:  
(1) 16                      (2) 52                      (3) 8                      (4) 12
99. A salesman's commission is 5% on all sales upto Rs 10,000 and 4% on all sales exceeding this amount. He remits Rs 31,100 to the parent company after deducting his commission. His sales were worth:  
(1) Rs 35,100                      (2) Rs 32,500                      (3) Rs 35,000                      (4) Rs 36,100

100. The wheel of a loco-engine, 7.5 metres in circumference, makes 7 revolutions in 9 seconds. The speed of the train in km per hour would be:  
 (1) 130 (2) 135 (3) 150 (4) 132
101. A managing committee of 7 members is to be constituted from a group comprising 8 gentlemen and 5 ladies. What is the probability that the committee would comprise 2 ladies?  
 (1)  $\frac{10}{249}$  (2)  $\frac{56}{429}$  (3)  $\frac{392}{429}$  (4)  $\frac{140}{429}$
102. One junior student is asked to divide half a number by 6 and the other half by 4 and then add the quantities. Instead of doing so, the student divides the given number by 5. If the answer is 4 short of the correct answer, then the actual number is:  
 (1) 320 (2) 360 (3) 480 (4) 400
103. If 'p' and 'q' are the roots of  $x^2 + x + 1 = 0$ , then the value of  $p^3 + q^3$  becomes:  
 (1) 4 (2) -4 (3) 2 (4) -2
104. The value of 'x' for the equation  $x^2 + 9x + 18 = 6 - 4x$  are:  
 (1) (-1, -12) (2) (1, 12) (3) (-1, 12) (4) (1, -12)
105. The market value of a 10.5% stock, in which an income of Rs 756 is realised by investing Rs 9,000, the brokerage being 0.25%, is:  
 (1) Rs 124.75 (2) Rs 112.20 (3) Rs 125.25 (4) Rs 108.25
106. Distributor of a canned apple juice has 5,000 cans in the store that it intends to distribute in a given quarter. Experience shows that the demand, D in number of cans can be expressed as follows:  
 $D = -2000 p^2 + 2000 p + 17,000$   
 The price per can that would result in zero inventory (stock) would be:  
 (1) Rs 2 (2) Rs 5  
 (3) Rs 3 (4) Cannot be determined on the basis of the data given
107. A manufacturer produces 80 television (TV) sets at a cost of Rs 2,20,000 and 125 TV sets at a cost of Rs 2,87,500. Assuming cost curve to be linear (straight line), the cost of 95 sets would be:  
 (1) Rs 2,42,500 (2) Rs 2,18,500  
 (3) Rs 26,12,500 (4) Cannot be determined on the basis of the data given
108. The equation of the straight line passing through the points (-5, 2) and (6, -4) is:  
 (1)  $6x + 11y + 8 = 0$  (2)  $x + y - 4 = 0$  (3)  $11x + 6y + 8 = 0$  (4)  $x + y + 4 = 0$
109. The point of intersection between the straight lines  $3x + 2y = 6$  and  $3x - y = 12$  should lie in:  
 (1) 3rd quadrant (2) 4th quadrant (3) 1st quadrant (4) 2nd quadrant
110. A right angled triangle is formed by the straight line  $4x + 3y = 12$  with the axes. The length of the perpendicular from the origin to the hypotenuse would be:  
 (1) 3.5 units (2) 4 units (3) 4.2 units (4) 2.4 units



111.



In the figure above, the value of  $y^\circ$  would be:

- (1)  $30^\circ$                       (2)  $15^\circ$                       (3)  $60^\circ$                       (4)  $40^\circ$

112. If  $\frac{a}{4} = \frac{b}{5}$  then:

- (1)  $\frac{a-4}{a+4} = \frac{b+5}{b-5}$               (2)  $\frac{a-4}{a+4} = \frac{b-5}{b+5}$               (3)  $\frac{a+4}{a-4} = \frac{b-5}{b+5}$               (4)  $\frac{a+4}{a-4} = \frac{b+5}{b-5}$

113. If  $\frac{1}{x^p} - \frac{1}{y^q} - \frac{1}{z^r}$  and  $xyz = 1$ , then the value of  $p + q + r$  would be:

- (1) 2                              (2) 0                              (3) 1                              (4) A rational number

114. The independent probabilities that the three sections of an accounts department will encounter a computer error are 0.2, 0.3 and 0.1 per week respectively. What is the probability that there would be at least one computer error per week?

- (1) .504                      (2) .006                      (3) .60                      (4) .496

115. If  $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}}$ , then the value of  $3x^3 - 9x$  would be :

- (1) 12                              (2) 9                              (3) 15                              (4) 10

116. If  $\alpha = \log_{24} 12$ ,  $b = \log_{36} 24$  and  $c = \log_{48} 36$ , then the value of  $1 + abc$  would be :

- (1)  $2ac$                       (2)  $2bc$                       (3)  $bc$                       (4)  $2ab$

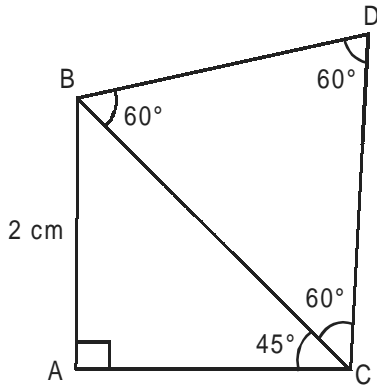
117. The value of  $\log \left[ 1 - \left\{ - \left( 1 - x^2 \right)^{-1} \right\}^{-1} \right]^{\frac{-1}{2}}$  can be expressed as:

- (1)  $\log \frac{1}{x}$                       (2)  $\log \sqrt{x}$                       (3)  $\log x^2$                       (4)  $\log x$

118. If  $a = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$ ,  $b = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ , then the value of  $a^2 + b^2$  would be:  
 (1) 98 (2) 99 (3) 10 (4) 100
119. If  $a - b^2 - c^3 - d^4$ , then the value of  $\log_a(abcd)$  would be:  
 (1)  $\log_a 1 + \log_a 2 + \log_a 3 + \log_a 4$  (2)  $\log_a 24$   
 (3)  $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}$  (4)  $1 + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!}$
120. The root of the equation  $\frac{x+4}{4} = \frac{x-5}{3} = 11$  is:  
 (1) 12 (2) 20 (3) 2 (4) 10
121. The points  $(1, -1)$ ,  $(-\sqrt{3}, -\sqrt{3})$ , and  $(-1, 1)$  are the vertices of a triangle which is:  
 (1) Equilateral (2) Isosceles  
 (3) Right angled (4) Cannot be determined on the basis of the data given
122. The centroid of a triangle with vertices  $(1, -2)$ ,  $(-5, 3)$  and  $(7, 2)$  is given by:  
 (1)  $(-1, 1)$  (2)  $(1, 1)$  (3)  $(0, 0)$  (4)  $(1, -1)$
123. The value of  $\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x}$  would be:  
 (1) 2 (2) 1 (3) 0 (4) Non-existent
124. The derivative of  $y = \sqrt{x+1}$  would be :  
 (1)  $\frac{1}{2\sqrt{x+1}}$  (2)  $-\frac{1}{2\sqrt{x+1}}$  (3)  $\frac{1}{\sqrt{x+1}}$  (4)  $-\frac{1}{\sqrt{x+1}}$
125. The points  $(2, -1)$ ,  $(-2, 3)$ ,  $(3, 4)$  and  $(-3, -2)$  are the vertices of a:  
 (1) Parallelogram (2) Rectangle (3) Square (4) Rhombus
126. Which of the following sums would produce Rs 28,600 as interest in 3 years and 3 months at 2.5% annual simple interest?  
 (1) Rs 2,50,000 (2) Rs 2,00,000 (3) Rs 3,52,000 (4) Rs 3,00,000
127. A sum of money doubles itself in 10 years. The number of years it will take to triple itself would be:  
 (1) 25 years (2) 17.5 years (3) 15 years (4) 20 years
128. The annual birth and death rates in a country per 1000 are 39.4 and 19.4 respectively. The number of years in which the population would be doubled assuming there is no immigration or emigration is:  
 (1) 25 years (2) 20 years (3) 35 years (4) 30 years

129. A machine is depreciated at the rate of 20% on reducing balance. The original cost of the machine was Rs 1,00,000 and its ultimate scrap value was Rs 30,000. The effective life of the machine is approximately:  
 (1) 5 years                      (2) 4 years                      (3) 4.5 years                      (4) 5.4 years
130. When Dr Deng arrives at his clinic, he finds 12 patients waiting to see him. If he can see only one patient at a time, the number of ways, he can schedule his patients after 3 patients have already left in disgust before Dr Deng gets to see them, would be:  
 (1)  $^{12}P_3$  ways                      (2) 362880 ways                      (3) 12! ways                      (4) 3! ways
131. During a landscaping operation, the length of a rectangular garden is decreased by 10% and its breadth is increased by 10%. The area of the new rectangular garden is:  
 (1) Decreased by 1%  
 (2) Decreased by 10%  
 (3) Increased by 1%  
 (4) Neither increased nor decreased
132. Two cylindrical blocks have their diameters in the ratio 3 : 1 and their heights in the ratio 1 : 3. Their volumes would, thus, be in the ratio of:  
 (1) 3 : 1                      (2) 3 : 4                      (3) 1 : 2                      (4) 2 : 3
133. The number of small cubes with edge 10 cm that can be accommodated in a cubical box of 1 metre edge would be:  
 (1) 100                      (2) 10                      (3) 10,000                      (4) 1,000
134. An aluminium metal sheet 27 cm long, 8 cm broad and 1 cm thick is melted into a cube. The difference in the surface areas of the two solids would be:  
 (1) 284 cm<sup>2</sup>                      (2) 286 cm<sup>2</sup>                      (3) 296 cm<sup>2</sup>                      (4) Nil
135. A sphere of copper with radius 3 cm is beaten and drawn into a wire of diameter 0.2 cm. The length of the wire would be:  
 (1) 9 m                      (2) 12 m                      (3) 36 m                      (4) 24 m
136. Which is a better investment: 12% stock at par with an income tax at the rate of Re 0.05 per rupee or  $14\frac{2}{7}\%$  stock at 120 free from income tax?  
 (1)  $14\frac{2}{7}\%$  stock  
 (2) 12% stock  
 (3) Both are equally good  
 (4) Cannot be determined on the basis of data given

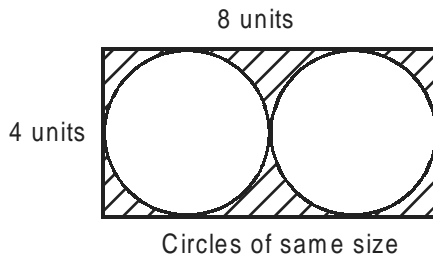
137.



In the figure above, the perimeter of  $\triangle BCD$  would be:

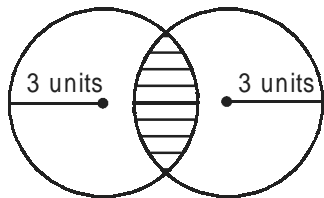
- (1)  $3\sqrt{2}$                       (2)  $6\sqrt{2}$                       (3) 12                      (4)  $2\sqrt{2}$

138. What is the area of the shaded portion of the figure drawn below:



- (1)  $32 - 8\pi$                       (2)  $32 + 8\pi$                       (3)  $32 - 4\pi$                       (4)  $32 + 4\pi$

139. In the figure shown below, if the radius of the circles is 3, what is the perimeter of the shaded part of the figure?



- (1)  $6\pi$                       (2)  $8\pi$                       (3)  $3\pi$                       (4)  $4\pi$

140. The equation of the curve whose slope at  $(x, y)$  is  $9x$  and which passes through the origin, is:

- (1)  $y = \frac{9x^2}{2}$                       (2)  $y = \frac{9x^2}{2} + c$                       (3)  $y = 9x^2$                       (4)  $y = 9x$

## SECTION – IV

### Directions for Question Nos. 141 to 150:

Read the following ten statements and answer Question Nos. 141 to 150:

- (i) During the interview Rakesh answered all the questions in mono syllables like : “yes”, “no”, and “perhaps”.
- (ii) Mona advised Sujata, not to end all her business calls with a “feel free to call me” statement, as it was an over used expression. Sujata however disregarded the advice and continued to do so.
- (iii) When Shyam was recovering from a severe bout of jaundice, his mother Ramola had no option but to be very strict with Shyam’s diet. She called herself a “mean mother” at that time.
- (iv) In 1942, Abel Tasman, a Dutch navigator discovered the island of Tasmania off the South-eastern coast of Australia.
- (v) When the class, yet again failed to submit the assignment in time, Reena, the class teacher, angrily denounced the class for full fifteen minutes.
- (vi) Seema could have very well written WHO, and saved time. By writing the full form World Health Organization, she missed winning the last round of quiz by two seconds.
- (vii) “O’ Henry”, the short story writer was actually William Sydney Porter in real life.
- (viii) When Krishna gave the sales figures of the last five years, the client was convinced that the product was “successful” and this was not an exaggeration.
- (ix) All the team members were so excited that they rushed to answer first and thus gave many wrong answers in the quiz. Jai, the leader scolded them and said, “Look before you leap”.
- (x) Sunita was planning a surprise party for her husband. She felt hurt when Bimal, her husband asked, “What are you scheming behind my back.”

141. Who used an oxymoron?

- (1) Sujata                      (2) Reena                      (3) Jai                      (4) Ramola

142. Who had used a Pseudonym?

- (1) Vivek                      (2) Ramola  
(3) William Sydney Porter                      (4) Abel Tasman

143. Who used a maxim?

- (1) Jai                      (2) O’ Henry                      (3) Reena                      (4) Mona

144. Who spurned an acronym?

- (1) Ramola                      (2) Picasso                      (3) Seema                      (4) O’ Henry

145. Who was inarticulate?

- (1) Reena                      (2) Sujata                      (3) Seema                      (4) Rakesh

146. Who clung to a cliché?

- (1) Fred                      (2) Mona                      (3) Sujata                      (4) Jai

147. Who became an eponym?

- (1) Abel Tasman                      (2) William Sydney Porter  
(3) O’Henry                      (4) None of these

148. Who used a pejorative expression?  
 (1) Ramola (2) Mona (3) Bimal (4) Jai
149. Who made an abstract term concrete?  
 (1) Ramola (2) Krishna (3) Shyam (4) Bimal
150. Who unleashed a diatribe?  
 (1) Anita (2) Fred (3) Mona (4) Reena

**Fill in the blanks with the appropriate allusion from the options given:**

151. Her uncle and cousins are reporters, and she, too, hopes to join the....  
 (1) juggernaut (2) Armageddon (3) fourth estate (4) fifth column
152. The freedom fighters knew they would be hanged if caught, but they nevertheless decided to.  
 (1) carry coal to Newcastle (2) juggernaut  
 (3) hoist with one's own petard (4) cross the Rubicon

**Which pair of words in the options are related to each other in the same way as the capitalized pair?**

153. CICCERONE : SIGHTSEER  
 (1) Understudy : actor (2) Audio : video  
 (3) Baedeker : tourist (4) Mentor : guidance
154. QUISLING : TREASON  
 (1) Accomplice : guilt (2) Murderer : homicide  
 (3) Renegade : loyalty (4) Perjurer : arson
155. POLLYANNA : OPTIMISM  
 (1) Diehard : resistance (2) Environmentalist : pollution  
 (3) Malingerer : illness (4) Reactionary : change
156. LARGE : GARGANTUAN  
 (1) Emaciated : thin (2) Wise : Machiavellian  
 (3) Obese : stout (4) Small : tiny

**Read each statement, and from the options select the best idiom that describes what is being said in the statement.**

157. Reena felt queasy and slightly unwell in office because of the late night party she had attended the night before:  
 (1) to be off colour (2) to be coloured (3) to be colourless (4) to be under colour
158. Ronald continued to report for work during the strike in defiance of trade union instructions. Ronald is.  
 (1) a black spot (2) in the black (3) a black leg (4) the black sheep

159. A period of great happiness came into Rita, a widow, and Ranjan, a widower's life when they married late in life, after fulfilling the responsibilities towards their respective children. This phase is for them:  
 (1) the autumn of life (2) unexpected rain  
 (3) an Indian summer (4) the spring of their life
160. Which idiom correctly expresses the following : to regret bitterly, either one's own mistakes or success of somebody of whom one is jealous?  
 (1) To grit one's teeth (2) To show one's teeth  
 (3) To grind one's teeth (4) To gnash one's teeth
161. The idiom.....refers to a male adult who mentally remains fixated on his childhood.  
 (1) Tommy Atkins (2) Simple Simon (3) Peter Pan (4) Paul Pry
162. A dwelling is a place of residence. Pairs of different types of dwellings are given below. Identify the pair; which is not a dwelling:  
 (1) bungalow—barrack (2) diazo—sappanwood (3) hermitage—hogan  
 (4) prefab—priory
163. Which one is not a synonym of 'devil'?  
 (1) Mephisto (2) Velavu (3) Lucifer (4) Beelzebub
164. Calligraphy is to cartooning as gouache is to...  
 (1) baguette (2) chevron (3) scumbling (4) beading
165. Shrewdness of apes is similar to tidings of...  
 (1) larks (2) nightingales (3) swallows (4) magpies
166. Autocracy is by an absolute ruler as timocracy is by....  
 (1) property owners (2) rich  
 (3) elected representatives (4) priests
167. One of the options does not contain different types of units of measurement, all others are:  
 (1) radian, lambert, coulomb, kelvin (2) spartan, klang, caslon, sabon  
 (3) acre, month, quintal, pound (4) byte, cubit, furlong, gallon
168. The words given below are all applied to things that are unusual or unfamiliar; they generally also suggest that something is in some way surprising. Which word is the most "neutral" term, and expresses the least of above qualities?  
 (1) Strange (2) Odd (3) Peculiar (4) Curious
169. When a person shakes while experiencing "extreme fear", which of the following words would be the most appropriate?  
 (1) Shiver (2) Quiver (3) Quake (4) Tremble
170. The following words imply a "mocking attitude". Which one of the following conveys the greatest degree of criticism or rejection?  
 (1) Sardonic (2) Sarcastic (3) Caustic (4) Ironic

171. All the four verbs given below can just mean 'puzzle'; but they also hint at different stages along the road to bewilderment. Select the option in which the verbs are listed from low to the highest level of bewilderment in ascending order.
- (1) Perplex, mystify, puzzle, baffle                      (2) Baffle, puzzle, mystify, perplex  
(3) Mystify, perplex, baffle, puzzle                      (4) Puzzle, perplex, mystify, baffle
172. These words are all applied to qualities or features that are a central element in something's nature. "....." refers to a feature of someone or something that is so important to their nature that without it they would not be the same person or thing.
- (1) innate                      (2) inherent                      (3) essential                      (4) intrinsic
173. "Consistency is contrary to nature, contrary to life. The only completely consistent people are the dead."  

—Aldous Huxley (1894-1963)

In this quotation the author is talking about:
- (1) change is natural                      (2) change is contrary to life  
(3) consistency is natural                      (4) life is consistent
174. "Take care to get what you like or you will be forced to like what you get."  

—George Bernard Shaw (1856-1950)

In this quotation the author is referring to:
- (1) choosing what we want                      (2) all of the above  
(3) choices we make in life                      (4) importance of making choices
175. "I must have a prodigious quantity of mind; it takes me as much as a week, sometimes, to make it up."  

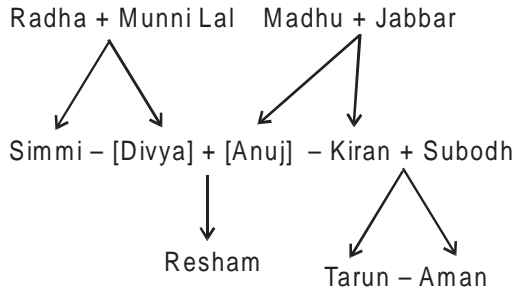
—Mark Twain (1835-1910)

In this quotation the author is referring to:
- (1) carefully weigh pros and cons                      (2) how people decide  
(3) powerful memory                      (4) inability to decide quickly



## Answers and Explanations

1. 1 \* For Qs. 43-46, we have



(+  $\Rightarrow$  husband & wife,  $\downarrow \Rightarrow$  children, -  $\Rightarrow$  brother or sister)

Thus, (1) follows

2. 3

3. 2

4. 2

5. 3

Let the opposite faces be: a and c, b and d, e and f

From the given data,  $a + c = 36$ ,  $b + d = 40$ ,  $e + f = 41$

Adding these equations,  $a + b + c + d + e + f = 117$

Also given,  $a + b = 33$ ,  $c + d = 43$ ,  $e + b = 39$ ,  $f + d = 38$

Now, sum of opposites can be: 36, 40 or 41 and difference of opposites is: 14

Let,  $\rightarrow x + y = 40$ ,  $x - y = 14$

$\rightarrow x = 13$  is possible

(from sums = 41, or 36,  $x = 23$ , or 11, not given in options).

6. 2

Let  $b + d = 40 \rightarrow 13 + 27 = 40$

From  $a + b + c + d + e + f = 117$ ,

$\rightarrow a + c + e + f = 117 - 40 = 77$

Also,  $e + f = 41$ ,  $e - f = 5$  ?  $2e = 46$  ?  $e = 23$ ,  $f = 18$

Now,  $a + c = 36$ ,  $a + b = 33 \rightarrow a = 33 - b$

$$- 33 - 13 = 20$$

$\therefore a = 20$ ,  $c = 16$

$\rightarrow a, b, c, d, e, f = 20, 13, 16, 27, 23, 18$

$\rightarrow$  difference can be  $18 - 16 = 2$

and also  $20 - 16 = 4$

7. 4

Let, sum of 40 become  $40 - 3 = 37$

$\therefore$  Total becomes  $117 - 3 = 114$

Thus, other 2 totals can be

$36 + 3 = 39$ , or  $41 + 3 = 44$

8. 1 F = 23, 02  
 A = 12, 30  
 R = 68  
 M = 96

9. 2

10. 4

11. 4 For Qs. 48 -50 : 25% + 20% = 45%  
 Remainder = 55% =  $M_1 + M_4$   
 55% of total (x) = 5000 +  $M_4 (=2)$ , and  $x > 10$

$$\rightarrow \frac{55x}{100} = 5000 + ? \rightarrow x = \frac{? \times 20}{11} = \text{multiple of 11}$$

Put  $n = 1$  (for minimum value)  $\rightarrow M_1 + M_4 = 6600 \rightarrow M_4 = 1600$   
 Now, 2 hrs = 1600  $\rightarrow ? = 5000 \rightarrow ?$

$$= \frac{5 \times 2}{16} = 6.25 \text{ hrs.} = 6 \frac{1}{4} \text{ hrs.}$$

$\rightarrow ? = 6 \text{ hrs, } 15 \text{ minutes} = \mathbf{6: 15 \text{ hrs}}$

12. 4

13. 4 Now, 8 : 15 hrs = 55% time }  $? = 6 : 45 \text{ hrs}$   
 $\rightarrow ? = 45\% \text{ time}$

$\rightarrow$  Total time = 15 hrs, remaining = 9 hrs

$$\therefore \text{Rent for } \frac{9}{24} \text{ hrs} = ? \quad (24 - 15)$$

$$\text{For } \frac{6 \frac{1}{4} \text{ hrs}}{15 \text{ hrs}}, \text{ rent} = 5000 \therefore \text{for } \frac{9 \text{ hrs}}{24 \text{ hrs}}, \text{ rent} = ?$$

$$\text{On cross multiplication, } ? = 5000 \times \frac{9}{24} \times \frac{15 \times 4}{25} = 4500 = 100 \times 45$$

$\therefore$  No. of days = 45.

14. 3 Number of small cubes left

$$= 5 \times 5 \times 5 - 1 \times 1 \times 2 - 1 \times 1 \times 3 - 1 \times 1 \times 4 - 2 \times 2 \times 1 = 125 - 2 - 3 - 4 - 4$$

$$= 125 - 13 = 112$$

15. 3 Leave / scrape off the topmost layers (coloured),  $\rightarrow 3 \times 3 \times 3 - 2$  (The cubes  $2 \times 2 \times 1$  give 2 less)

$\rightarrow 27 - 2 = 25 \text{ cubes}$

16. 4 All the cubes beneath / touching the removed ones. Thus, beneath  $2 \times 2 \times 1$  we have 8,  
 $1 \times 1 \times 4 \rightarrow 9, 1 \times 1 \times 2 \rightarrow 5, 1 \times 1 \times 3 \rightarrow 7$   
 Total =  $8 + 9 + 5 + 7 = 29$
17. 2 The remaining cubes on top layer, i.e.  $2 + 1 + 3 + 2 = 8$  (at the edges).
18. 4 B selected  $\rightarrow$  A not selected  $\rightarrow$  option (3) is wrong and Y rejected  $\rightarrow$  X and Z are selected  
 $\rightarrow$  (1) or (4).  
 Since Z is in  $\rightarrow$  C is out  
 Thus, X and Z from group 1 and B, D from 2nd group  $\rightarrow$  XZBD
19. 4 A in  $\rightarrow$  Y and B out  $\rightarrow$  XZ from seniors.  
 Since Z in  $\rightarrow$  C out  $\rightarrow$  A and D from juniors.
20. 2 Y in  $\rightarrow$  A out and Z in  $\rightarrow$  C out  
 Thus B in and D in
21. 4
22. 3 The four colours = Orange, Green, Grey and Yellow  
 Since  $x \neq$  grey  $\rightarrow$   $x =$  orange / green / yellow  
 Also, from (1)  $\rightarrow$  yellow is used in all 4 rooms  
 $\rightarrow$   $x \neq$  yellow and  $\rightarrow$   $y =$  yellow  
 i.e.  $x =$  orange / green  
 Now, since grey is used only twice,  
 $\rightarrow$  Room 1 and 2 have orange / green / yellow  
 Also, from (4),  $x =$  orange (as it is used with grey)  
 Tabulating the given data, we have

	Walls	Carpet	Curtain
Dining Room	( $x =$ orange)	green	yellow
Bedroom	green	yellow	orange
Living Room	( $y =$ yellow)	orange	grey
Study Room	yellow	green	grey

23. 4

24. 1

25. 2

26. 4 Friday

27. 1

28. 2 Let  $H = x$  (st. 4)  $\rightarrow G = x / 2$   
 (St. 3)  $\rightarrow F = G / 2 = x / 4$
- (St. 2)  $\rightarrow E = 4 \frac{1}{2} \times F = \frac{9}{2} \times \frac{x}{4} = \frac{9}{8}x$  i.e.  $\frac{1}{8}x$  (i.e.  $> x$ , H).
- (St. 1)  $\rightarrow D = 2E$ , i.e.  $D > E$   
 Thus, in the descending order, we have : D, E, H, G, F
29. 2 Statement 5 is not needed above
30. 2 Since weight of D is the highest
31. 1  $8 / 9 = 0.88\dots \cong 0.89$ , whereas,  $\frac{4}{5} = 0.8$ , etc.
32. 3 From the given information , for Qs. 17 -19, we have :  
 A / B / C / D / E have Rs 50 / Rs 70  
 highest – C / D / E, lowest – B / C / E  
 and differences = 10, 20, 30, 40, A – intermediate  
 Thus, we can have :  
 A / B / C / D / E = 40 / 70 / 50 / 30 / 20  
 But  $B \neq 70 \rightarrow B = ?$   
 $\rightarrow A = 40, B = ?, C = 50$ , etc
33. 4
34. 3 Rs 50
35. 3 It is invalid as role of lather is not defined.
36. 4 I is a conclusion (not an assumption)

37. 4 \* For Qs. 9 and 10 based on syl log isms, the following inf ormation will be very useful for direct results :

All + All	All / Some		Some + Some = No
Some + All	Some		Combined Conclusion
Some + No	No.		No + Some, All + Some
No + No	No		= No Combined conclusion
No + All	? No / Not		

(b ) Single statements (reversal) :

All → Some		Some not
Some → Some		→ no definite conclusion
No → No.		

I is wrong, as All + All (reversed) ≠ All

II is correct, as, All +All I = All children are fat.

III is wrong, as, only is uncertain.

It can be some / all

IV is correct (reversal of St. 2, → Some fats are adults)

→ II and IV → ( b ) → (4)

38. 2 Statement 1 + 2 = No conclusion (All + Some)

I → uncertain

II → invalid (negation does not follow from affirmative or positive sentences).

III → uncertain (2 + 1 reversed → some + some)

IV → invalid (negation)

{ But, I → Some diamonds are stones  
 → Some stones are diamonds  
 and IV → No stones are diamonds.

∴ Either I or IV has to be true.

39. 4 If Y is included → exclude Z and C.

Now, B is present → exclude W. We have : Y + (X, A, B)

40. 2 Since B is rejected → AC included

Since C is used → Y excluded

Thus, we can have : AC + WXZ (any 2)

41. 2 I → If Y and W used → B and C not used → only A from 1st group

III → only 2 should be used.

42. 4 II → A, C are used and C rejects Y.

43. 2

	Phy.	Chem.	Maths	Bio.
A	X	—	—	—
B		X	✓	✓
C		✓	X	✓
D	✓		✓	✓
E			X	✓
F			X	

For C and D, supposing

C takes Bio  $\rightarrow$  D  $\times$  (does not)

Now, C can take chemistry or Maths  $\rightarrow$  C = Bio and chemistry and D = not Bio, not Chemistry  $\rightarrow$  Physics and Maths

For B and E, B = P / M & Bio  $\rightarrow$  Physics, Bio or Maths, Bio.

and  $E \neq B \rightarrow E = P / C \rightarrow$  Phy., Chem.

44. 4 From given information, we have

	Phy.	Chem.	Maths	Bio
A	$\times$	✓	—	✓
B	✓	$\times$	✓	$\times$
C	$\times$	✓	✓	$\times$
D	—	$\times$	✓	✓
E	✓	—	$\times$	✓
F	✓	✓	$\times$	—

None follows, as C and D are ambiguous.

45. 3 Similarly, A cannot take up Chem. and Maths

$\rightarrow$  A = Chem. Bio or Maths Bio.

$\rightarrow$  D  $\neq$  MB, i.e. D = PB

Thus, A, C, D, F can be found out.

However, only C is certain

(as B and E are doubtful)

46. 4 From table for Q. 5, C = Bio + Chem / Maths

But C  $\neq$  Physics, and D  $\neq$  Chem.

Putting these values, C = Bio + Chem

47. 3 We have:

$$\left. \begin{array}{l} A + 6 = G, G + 6 = M \rightarrow M + 6 = S \\ \& Z - 6 = T, T - 6 = N \rightarrow N - 6 = H \end{array} \right\} \rightarrow SH$$

48. 4 1st term of series follows the rule:

$J + 1 = K, - 2 = I, + 3 = L, - 4 = H, +5 = M,$   
for Mid - term :  $2 + 2 = 4, + 3 = 7, + 4 = 11, + 5 = 16, + 6 = 22$   
for Last term :  $Z - 2 = X, - 2 = V, - 2 = T,$  etc.  
Thus, we have L, 11, T

49. 2 On inserting just first 3 terms from each answer choice, we observe from (2) that: series = gfeii, which repeats itself. i.e. gfeii/gfeii/etc.

50. 4 Each number is denoted by the corresponding alphabet.  $\rightarrow 31385 = CACHE$

51. 1 Last para....Economic impact and other paras...Social.

52. 4 various paras (2, 3, 4...) ? General view of passage.

53. 4 para on Russia ....(4th last para).

54. 4 paras 4, 5 and 3rd last para (last line).

55. 1 para 6, ....(on Xintang Town, China).

56. 2 para 5.

57. 3 (4) is counteracted by the Eg. on Russia (para 7 end, para 8), .... para 3 (last line), last para ((2) is also suitable).

58. 4 last para.

59. 3 Para 1-see the beginning and the end.

60. 4 Para 2

61. 4 3rd last para (1st line) and last para....both shape each other but culture is "all embracing". Also, Para 4 ....(starting)....dominating influence of technology.

62. 4 2nd last para-technology is ambivalent? (1) not true. (2) follows from the various contents in the passage.

63. 4 (1) follows-para 3...(after marxist view) ..."This view is opposed entirely". (4) follows....para 3...beginning. (3) follows .... 2nd last and 3rd last paras.
64. 4 2nd last para.... "The whole arises...downward direction."
65. 3 2nd last para.... "fails to do".
66. 4 Para 3, near the end... "According to this view, ...which in itself cannot be neutral."
67. 3 Para 4....some of the most famous synesthetes (here, 'artists' includes 'musicians'). Para 3...a dose of mascaline or hashish. and Paras 1 and 2....conclusion ? babies/infants. \* (for 'natural' synesthesia, answer would be (4).)
68. 4 --traces the phenomenon to the limbic... (Para 3, 2nd last sentence).
69. 4 3 is correct (Para 2, near the end). 4 is correct (Para 2, end).
70. 1 ....Para 4, near the end.
71. 4 (1) ....para 2 (mid.), (3) ...para 3rd from last, (4).... (3rd last para)... symbolists believed that....
72. 3 para 2, starting line.
73. 3 para 4, 1st few lines...while synesthesia denies.... "creative".
74. 1  $\left\{ \begin{array}{l} (1)\text{-not shared ....para 4 (mid.).} \\ (3) \text{ and } (4)\text{-true-para 3 (mid.).} \end{array} \right.$
75. 3 Para 1, middle, ...The fundamental....to change.
76. 4 Para 2, ....DBT was developed.
77. 2 Para 1, ending lines..... "This dialectic both...." and Para 1, starting and also Para 3, 2nd sentence \*(1) and (2) are close answer choices, be cautious!
78. 3 Last para, last sentence.
79. 3 zen → para 1, starting (could be ?) and becoming polarised → para 1, end, (main problem).
80. 4 Last para, starting....Lineman therefore decided to separate skills training.



81. 2 Para 1, .....beginning lines.
82. 2 not directly mentioned but 'features' of DBT are practised to a more or less extent.
83. 1 Para 2 and 1st sentence of para 3
84. 4 1 is a feature as well as an advantage 2 and 3 are true (para 3, middle → end) 4 is certainly wrong (procedures are 'maximised') Actually, due to direct translation, procedures are a few and precision is maximised.
85. 4 Para 4 (middle)....The disadvantage is that....become tautological and....
86. 1 Para 6 (mid.)...New constraints are generated.....things and events.
87. 4 ....characteristics of various researchers.
88. 2 ...2nd last para (on Empiricism)...
89. 2 ....Last para, 1st sentence (last word).
90. 2 ....2nd last para... "as an 'ideal' type ( → pure).
91. 2 CC/AA/SS →  $\angle 3 \times (\angle 2)^3$  ways
92. 2  $10 \times 9 = 90$
93. 3  $T_m = n = a + (m - 1)d$   
 and  $T_n = m = a + (m - 1)d$   
Subtracting,  $n - m = d(m - 1)$   

$$\rightarrow d = \frac{n - m}{-(m - 1)} = -1$$
 Thus,  $n = a + (m - 1)(-1) = a + 1 - m$   
 $\rightarrow a = n + m - 1$   
 Thus,  $T_r a + (r - 1)d$   
 $= n + m - 1 + (r - 1)(-1)$   
 $= n + m + r$

94. 4  $S_n = 155, a = 10, d = -\frac{1}{3}$

Using,  $S_n = 155, a = 10, d = -\frac{1}{3}$

$\rightarrow n = 31$

95. 3  $y = x(x-1)(x-2) = x^3 - 2x^2 - x^2 + 2x$   
 $= x^3 - 3x^2 + 2x$

$\frac{dy}{dx} = 3x^2 - 6x + 2$

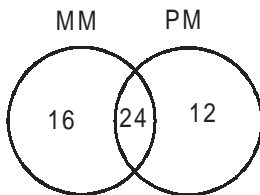
96. 1  $\int x\sqrt{x} dx = \int x^{3/2} dx = \frac{x^{5/2}}{5/2} + C$

$= \frac{2}{5}x^{5/2} = C$

97. 3  $A - B = \{1, 2, 4\}$  and  $B - A = \{5, 7\}$

$\rightarrow (A - B) \cup (B - A) = \{1, 2, 4, 5, 7\}$

98. 4



99. 2 Since he remitted Rs 31,000  $\rightarrow$  sales  $>$  10,000

Let the sale be Rs  $x$

$\rightarrow x - \left\{ \frac{5}{100} \times 10,000 + \frac{4}{100} (x - 10,000) \right\} = 31,000 \rightarrow \frac{96}{100} x = 31,200$

$\rightarrow x = \frac{31200 \times 100}{96} = 32500$

100.4 No. of revolutions in 1 sec =  $\frac{7}{9}$

and distance in 1 revolution

$$= 2\pi r = 2 \times \frac{22}{7} \times 7.5$$

$$\therefore \text{Distance in 1 sec} = \frac{7}{9} \times 2\pi r$$

$$\rightarrow \text{Total } d = \frac{7}{9} \times 2 \times \frac{22}{7} \times 7.5 \times 3600$$

$$= 1,32,000 \text{ m, or } 132 \text{ km}$$

101.4 We have to choose 2 ladies (out of 5) and hence 5 men (out of 8).

This can be done in:  ${}^5C_2 \times {}^8C_5$  ways.

Also, in total, we have to choose 7 (out of 13).

This can be done in:  ${}^{13}C_7$  ways.

$$\therefore \text{Required probability} = \frac{{}^5C_2 \times {}^8C_5}{{}^{13}C_7}$$

$$\text{Using } {}^nC_r = \frac{n!}{(n-r)!} \text{ we get, } p = \frac{140}{429}$$

102.3 From given information,  $\left(\frac{x/2}{6} + \frac{x/2}{4}\right) - \frac{x}{5} = 4$

$$\rightarrow \frac{x}{12} + \frac{x}{8} - \frac{x}{5} = 4$$

$$\rightarrow x = 4 \times 120 = 480$$

103.3  $1x^2 + 1x + 1 = 0$  (of the form,  $ax^2 + bx + c = 0$ )

Use,  $p^3 + q^3 = (p + q)(p^2 - pq + q^2)$

$$= (p + q)[(p + q)^2 - 3pq]$$

$$\text{Here, } \left[ \begin{array}{l} \text{Sum of roots} = p + q = -\frac{b}{a} = -1, \\ \text{Product of roots} = pq = c/a = 1 \end{array} \right]$$

$$\therefore p^3 + q^3 = (-1)[(-1)^2 - 2 \times 1] = -1 \times [1 - 3] = 2$$

104.1  $x^2 + 9x + 18 + 6 - 4x$

$$\rightarrow x^2 + 13x + 12 = 0$$

$$\rightarrow x^2 + 12x + 1x + 12 = 0$$

$$\rightarrow x(x + 12) + 1(x + 12) = 0$$

$$\rightarrow (x + 1)(x + 12) = 0$$

$$\rightarrow x = -1, x = -12$$

105. 1 For an income of Rs 756, investment = Rs 9000

∴ For income =  $\frac{21}{2}$ , investment = ?

$$? = \frac{9000}{756} \times \frac{21}{2} = \text{Rs}125$$

$$\text{Now, MV} = 125 - \frac{1}{4} = \text{Rs}124.75$$

106. 3 For zero stock → demand = supply

i.e. Maximum D = 5000

$$\rightarrow 5000 = -2000p^2 + 2000p + 17000$$

$$\rightarrow 2000p^2 - 2000p - 12000 = 0$$

$$\rightarrow p^2 - p - 6 = 0$$

$$\rightarrow p^2 - 3p + 2p - 6 = 0$$

$$\rightarrow p(p - 3) + 2(p - 3) = 0$$

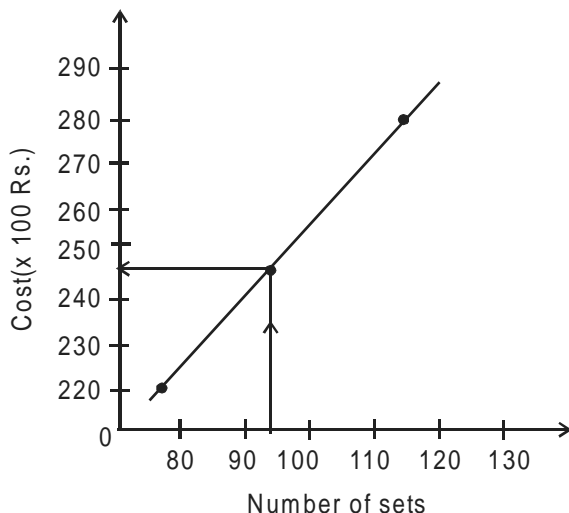
$$\rightarrow (p + 2)(p - 3) = 0$$

$$\rightarrow p = -2, p = 3$$

107. 1 Plot a graph of the cost Vs no. of sets.

Join the 2 given points.

Search for 95. It gives 2,42,500 (approx. 243)



$$108. 1 \quad y - y_1 = m(x - x_1), m = \frac{y_2 - y_1}{x_2 - x_1} = -\frac{6}{11}$$

$$\rightarrow y - 2 = -\frac{6}{11}(x + 5)$$

$$\rightarrow 11y - 22 = -6x - 30$$

$$\rightarrow 6x + 11y + 8 = 0$$

109.2 Put  $y = 3x - 12$  in equation (1)

$$\rightarrow 3x + 2(3x - 12) = 6$$

$$\rightarrow 3x + 6x - 24 = 6$$

$$\rightarrow 9x = 30, x = \frac{30}{9} = \frac{10}{3}$$

$$\text{and } y = 3x - 12 = 10 - 12 = -2$$

$$\rightarrow \text{Point is } \left( \frac{30}{9}, -2 \right)$$

It lies in the 4th quadrant

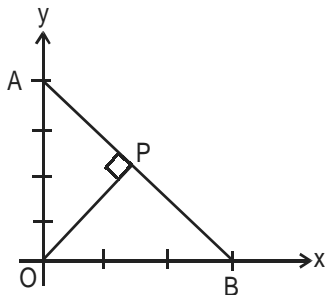
110.4 Put  $x = 0$  and  $y = 0$  to find the intercepts on the 2 axes  $\rightarrow$  At  $x = 0, y = 4$  and at  $y = 0, x = 3$

$\rightarrow A(0, 4)$  and  $B(3, 0)$  and  $O(0, 0)$  form a right angled triangle

Now, using similar  $\Delta$ s AOP and BOP,  $\frac{OP}{PB} = \frac{4}{3} \rightarrow P$  divides AB as 4 : 3

$$\text{Using section formular } P_x = \frac{4 \times 3 + 3 \times 0}{7} = \frac{15}{7}$$

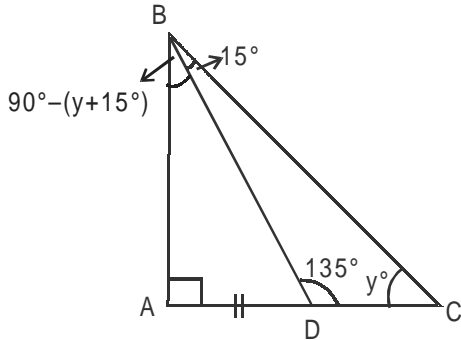
$$\text{and } P_y = \frac{4 \times 0 + 3 \times 4}{7} = \frac{12}{7}$$



$$\text{Length of perpendicular } OP = \sqrt{\left(\frac{15}{7}\right)^2 + \left(\frac{12}{7}\right)^2}$$

$$= \sqrt{\frac{269}{49}} = \frac{17}{7} \approx 2.43$$

- 111.1  $90^\circ - (15 + y) + 15^\circ + y^\circ + 90^\circ = 180^\circ$   
 Since  $AB = AD \rightarrow \angle ADB = \angle ABD = 45^\circ$   
 and  $\angle BDC = 135^\circ$   
 Now  $\rightarrow 15^\circ + y^\circ + 135 = 180^\circ$   
 $\rightarrow y = 180^\circ - 150^\circ = 30^\circ$



- 112.4 By C and D (Componendo and Dividendo) Rule

- 113.2 Let  $x^p = y^q = z^r = k$   
 $\rightarrow x = k^{\frac{1}{p}}, y = k^{\frac{1}{q}}, z = k^{\frac{1}{r}}$   
 Since  $xyz = 1 \rightarrow k^{\left(\frac{1}{p} + \frac{1}{q} + \frac{1}{r}\right)} = 1$   
 $\rightarrow k^0 = 1$   
 $\rightarrow p + q + r = 0$

- 114.4  $p(\text{at least one}) = 1 - p(\text{none})$   
 $= 1 - (0.8 \times 0.7 \times 0.9)$   
 $= 1 - \frac{504}{1000} = \frac{496}{1000} = 0.496$   
 $*0.8 = 1 - 0.2, \text{ etc.}$

115. (\*)  $x = 3^{\frac{1}{3}} + 3^{\frac{1}{3}} = 2 \cdot 3^{\frac{1}{3}}$   
 $\rightarrow 3x^3 - 9x = 3(2^3 \cdot 3) - 2 \cdot 3^{\frac{7}{3}}$   
 $\rightarrow (\text{No. of the given choices})$

116.2 Use  $\log_a b = \frac{\log b}{\log a}$ .

$$\begin{aligned} \rightarrow 1 = abc &= 1 + \frac{\log 12}{\log 24} \times \frac{\log 24}{\log 36} \times \frac{\log 36}{\log 48} \\ &= 1 + \frac{\log 12}{\log 48} = \frac{\log 48 + \log 12}{\log 48} = \frac{\log(48 \times 12)}{\log 48} \\ &= \frac{\log 576}{\log 48} = \frac{\log 24^2}{\log 48} = 2\log_{48} = 24 = 2(bc) \end{aligned}$$

117.4 Here  $(1 - x^2)^{-1}$

$$= \frac{1}{1-x^2} \text{ (start with the smallest bracket)}$$

$$\rightarrow 1 - \frac{1}{1-x^2} = \frac{1-x^2-1}{1-x^2} = \frac{-x^2}{1-x^2}$$

$$\text{and } \left[ \frac{-x^2}{1-x^2} \right]^{-1} = \frac{1-x^2}{-x^2} = \frac{1}{-x^2} - 1$$

$$\text{and } 1 - \left[ \frac{1}{-x^2} - 1 \right] = \frac{1}{x^2} \rightarrow \left[ \frac{1}{x^2} \right]^{\frac{1}{2}} = \frac{1}{x^{2 \times \frac{1}{2}}} = \frac{1}{x^1} = x^{-1} = x$$

118.1 Use,  $a^2 + b^2 = (a + b)^2 - 2ab$ .

$$\begin{aligned} \rightarrow \left[ \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} + \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} \right]^2 &\rightarrow \left[ \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} + \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} \right]^2 - 2 \left( \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} \times \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}} \right) \\ &= \left( \frac{3+2+2\sqrt{6}+3+2-2\sqrt{6}}{3-2} \right)^2 - 20 \\ &= 10^2 - 2 = 98 \end{aligned}$$

$$119.3 \quad a = b^2 = c^3 = d^4 \rightarrow b = \sqrt{a} = a^{\frac{1}{2}},$$

$$c = a^{\frac{1}{3}}, d = a^{\frac{1}{4}}$$

$$\rightarrow \log_a(abcd) = \frac{\log abcd}{\log a} = \frac{\log(a^1 \cdot a^{\frac{1}{2}} \cdot a^{\frac{1}{3}} \cdot a^{\frac{1}{4}})}{\log a}$$

$$= \frac{\log a^{1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}}}{\log a} = \left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right) \frac{\log a}{\log a}$$

$$= \left(1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right)$$

$$120.2 \quad \rightarrow \frac{(3x + 12 + 4x - 20)}{12} = 11 \rightarrow 7x - 8$$

$$= 132 \rightarrow 7x = 140, \rightarrow x = 20$$

$$121.1 \quad \text{By distance formula, } d = \rightarrow \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

$$\sqrt{8} = d_1 = d_2 = d_3$$

(between points, say, A, B and C)

Thus, equilateral  $\Delta$

$$122.2 \quad \text{Centroid, } C = \left( \frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

$$= \left( \frac{1 - 5 + 7}{3}, \frac{-2 + 3 + 2}{3} \right)$$

$$= \left( \frac{3}{3}, \frac{3}{3} \right) = (1, 1)$$

$$123.1 \quad \text{Let } x = 2, \text{ then, as } x \rightarrow 2, t \rightarrow 0 \text{ and } x = t + 2$$

$$\text{Out question becomes: } \lim_{t \rightarrow 0} \frac{e^{t+2} - e^{-t+2}}{t+2}$$

$$\text{Using } \lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1 \text{ and } \lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x} = 2,$$

We get, Ans = 2



$$124.1 \quad y = \sqrt{x+1} = (x+1)^{\frac{1}{2}}$$

$$\rightarrow \frac{dy}{dx} = \frac{1}{2}(x+1)^{-\frac{1}{2}} \times \frac{d}{dx}(x+1) = \frac{1}{2}(x+1)^{-\frac{1}{2}} \times 1$$

$$= \frac{1}{2\sqrt{x+1}}$$

$$125.4 \quad AB = BC = CD = DA \text{ and also, } M_1(AB) = \frac{4}{-4} = -1$$

$$\text{and } M_2(CD) = \frac{-6}{-6} = 1$$

Since  $M_1 M_2 = -1$ ,  $\rightarrow$  they are perpendicular  
 $\rightarrow$  Rhombus.

$$126.3 \quad 28600 = P \times 3 \frac{1}{4} \times \frac{2.5}{100} \rightarrow P = \frac{28600 \times 100 \times 4}{13 \times 2.5} = 3,52,000$$

$$127.4 \quad SI = 2P - P = P = \frac{PTR}{100}$$

$$\rightarrow TR = 100, \text{ Put } T = 10 \rightarrow R = 10\%$$

$$\text{Now, } SI = 3P - P = 2P = \frac{P \times T \times 10}{100}$$

$$128. (*) \rightarrow T = 20$$

OR, (in every 10 years, SI = same.)

$$\rightarrow T = 20 \text{ directly}$$

(Q. incomplete),

$$\text{Net \% increase} = 3.94 - 1.94 = 2\%$$

$$A = 2P \rightarrow 2P = P \left(1 + \frac{2}{100}\right)^n$$

$$\rightarrow \left(\frac{102}{100}\right)^n = 2, n = ?$$

(Using SI formula,  $n = 50$ ?)

$$129.4 \quad 30,000 = 1,00,000 \left(1 - \frac{20}{100}\right)^n$$

$$\rightarrow \frac{3}{10} = \left(\frac{4}{5}\right)^n$$

$$\text{At } n = 5, \left(\frac{4}{5}\right)^5 < 0.3$$

$$\rightarrow n = 5.4 \text{ (As } n > 5)$$

$$130.2 \quad \text{After 3 leave, remainder} = 12 - 3 = 9$$

$$\begin{aligned} \text{No. of ways} &= {}^9P_1 = 9! \\ &= 9 \times 8 \times 7 \times 6! \\ &= 504 \times 720 \\ &= 362880 \end{aligned}$$

$$131.1 \quad \% \text{ change} = x + y + \frac{xy}{100}$$

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

$$132.1 \quad \frac{V_1}{V_2} = \frac{\pi R_1^2 h_1}{\pi R_2^2 h_2} = \frac{\pi (3r)^2 (h)}{\pi (r)^2 (3h)} = \frac{9}{3} = 3:1$$

$$133.4 \quad 1m^3 = n(0.1)^3, \text{ as } V_1 = V_2$$

$$\rightarrow n = \left(\frac{1}{0.1}\right)^3 = 1000$$

$$134.2 \quad V_1 = V_2 \rightarrow 27 \times 8 \times 1 = a^3 \rightarrow a = \sqrt[3]{3^3 \times 2^3} = 6$$

$$\text{Now, surface area I} = 2(lb + bh + lh)$$

$$= 2(27 \times 8 + 8 \times 1 + 1 \times 27)$$

$$= 2 \times 251 = 502$$

$$\text{and surface area II} = 6a^2 = 6(6)^2 = 216$$

$$\text{Difference} = 502 - 216 = 286 \text{ cm}^2$$

$$135.1 \quad V_1 = V_2, V_1 = \frac{4}{3}\pi r^3, V_2 = \pi r^2 h$$

$$\rightarrow \frac{4}{3} \times \frac{22}{7} \times 3^3 = \frac{22}{7} \times (0.2)^2 \times h$$

$$\rightarrow 4 \times 9 = 0.04 \times h$$

$$\rightarrow h = 900 \text{ cm} = 9 \text{ m}$$

136. 1 Let investment be Rs  $100 \times 120$   
 (stock at par  $\rightarrow$  Rs 100)

Income in 1st case

$$\left. \begin{aligned} &\text{Income in 1st case} \\ &= \frac{12}{100} \times (100 \times 120) = \text{Rs}1440 \\ &\text{and Income in 2nd case} \\ &= \frac{100}{120} \times (100 \times 120) = \text{Rs}1428 \end{aligned} \right\}$$

1st > 2nd

137. 2  $\triangle ABC = \text{Isosceles}$  (as  $\angle ABC = \angle ACB = 45^\circ$ )

$$\rightarrow AB = AC = 2 \text{ and } BC^2 = 2^2 + 2^2 = 8 \rightarrow BC = \sqrt{8}$$

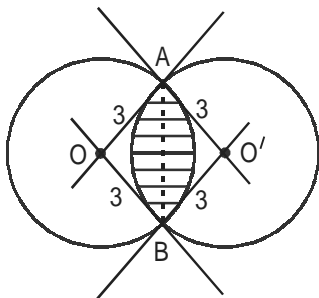
$$\therefore \text{Perimeter of } \triangle BCA = 3 \times \sqrt{8} = 3 \times 2\sqrt{2}$$

$$= 6\sqrt{2} \text{ units}$$

138. 1 Here, r of circles =  $\frac{4}{2} = 2$  units each

$$\begin{aligned} \therefore \text{Required area} &= \text{area of (rectangle - 2 circles)} \\ &= 8 \times 4 - 2 \times \pi \times 2^2 \\ &= 32 - 8\pi \end{aligned}$$

139. 3  $OA = OB \rightarrow \angle OAB = 45^\circ, \angle O = 90^\circ$



$$\rightarrow \text{Length of arc} = \frac{90^\circ}{360^\circ} \times 2\pi r = \frac{6\pi}{4}$$

$$\rightarrow \text{Total circumference of shaded area} = \frac{6\pi}{4} \times 2 = 3\pi$$

140.1 Slope =  $\frac{dy}{dx} \rightarrow 9 \text{ x dx} = dy$

$\rightarrow \int 9x \text{ dx} = \int dy$

$\rightarrow \frac{9x^2}{2} + c = y$

But,  $c = 0$  (passes origin)

$\rightarrow \frac{9x^2}{2}$

141.4 oxymoron  $\rightarrow$  contrary epithet  $\rightarrow$  Ramola

142.3 pseudonym  $\rightarrow$  pen name  $\rightarrow$  porter.

143.1 maxim  $\rightarrow$  saying / proverb  $\rightarrow$  Jai

144.3 Acronym = abbreviated form (short form)  
e.g. WHO  $\rightarrow$  Seema

145.4 inarticulate = lacking expression  $\rightarrow$  Rakesh

146.3 cliché = stereotype / similar  $\rightarrow$  Sujata

147.1 eponym = base word  
Thus, Tasman  $\rightarrow$  Tasmania

148.3 pejorative = depreciatory / unfavourable  $\Rightarrow$  Bimal

149.2 Krishna, by providing vital statistics

150.4 diatribe = abuse / exhaustive discussion.

151.3 4th estate  $\rightarrow$  journalism.

152.4 to be harmed by one's own plan to harm others.

153.3 \* (spelling mistake) : cicerone helps sightseers and baedeker is a guide book for tourists.

154.2 quisling = traitor (commits treason) and murderer (commits homicide i.e. murder)

155.1 pollyanna = blindly optimistic, diehard = opposer

156. 4 according to increase in 'deg ree'.
157. 4
158. 4
159. 1
160. 3
161. 2
162. 2 diazo (related to chemistry)
163. 2 velavu → surrounding, circle.
164. 3 gouache → opaque (coloured) painting, scumbling → using this technique.
165. 4 tidings = inf ormation, magpie ≈ 'chatter box' bird
166. 1
167. 2 others are units in physics.
168. 4
169. 4
170. 2 Sarcastic (that wounds).  
Caustic = corrosive, painful.
171. 4
172. 1 part of inner nature, inborn and essential characteristic
173. 1
174. 2
175. 4