SECTION – I

VERBAL COMMUNICATION

Directions (Qs. 1 to 6): Each sentence below has one or two blanks. Fill in these blanks with the, most appropriate word/ phrase from the four options that are given following each sentence.

1. _____, their small size and the thin soil make them easy prey to a hiker's heel.
   [1] Alpine flowers which can resist wind, cold, and snow
   [2] While alpine flowers can resist wind, cold, and snow
   [3] Alpine flowers resisting wind, cold, and snow
   [4] When alpine flowers which can resist wind, cold, and snow

2. _____sighting an approaching car, some drivers tend to speed up.
   [1] When instead of slowing down
   [2] Instead when slowing down at
   [3] When instead of slowing down at
   [4] Instead of slowing down when

3. _____, the passengers found that their flight had been cancelled because of the severe snowstorm.
   [1] That they arrived at the airport
   [2] They arrived at airport
   [3] As soon as arriving at airport
   [4] At the airport.

4. With_____ grin, Ramesh quickly _____ his way through the crowd towards us.
   [1] infectious, demolished
   [2] a soppy, devoured
   [3] an irrepressible, manoeuvred
   [4] a surely, crawled

5. He is very _____about everything. Ensure that you do not use any indecent language in his presence.
   [1] prim and proper **[2]** safe and sound **[3]** odds and ends **[4]** length and breadth

6. The government's _____ clinical study requirements for approval of new drugs do not _____ pharmaceutical firms when it comes to research and development, chiefly because of their profit potential.
   [1] official, permit **[2]** onerous, dissuade **[3]** excess, motivate **[4]** unforceable, favour

Directions (Qs. 7 to 12): Replace the italicised portion by choosing the phrase from the given alternatives that best keeps the meaning of the original sentence.

7. The researcher had to mull over his idea for several days.
   [1] to organize his idea for a number of days
   [2] to remember his ideas for several days
   [3] to scrutinize his ideas for many days
   [4] to ponder over his idea for several days

8. The function would have been more enjoyable, if all the extraneous activities had been dropped from the programme.
[1] if all the irrelevant activities had been dropped from the programme
[2] if all the excessive activity had been dropped from the programme
[3] if all overextended activities had been dropped from the programme
[4] if the exceptional activities had been dropped from the programme

9. The professor wants him to improve the coherence of his term paper,
[1] to increase the distinctiveness of his term paper
[2] to improve the consistency of his term paper
[3] to improve the rationality of his term paper
[4] to enhance the quality of his term paper

10. Researchers warn of the impending extinction of many species of plants and animals.
[1] imminent extinction of many species of plants and animals
[2] irrefutable extinction of several species of plants and animals
[3] absolute extinction of species of plants and animals
[4] formidable extinctions of many species of plants and animals.

11. In addition to those specified for various professions, the corporations maintained endowments for supporting purely academic fields, especially in the .physical sciences
[1] the corporations had maintained purely academic endowments like those of the physical sciences
[2] in purely academic fields, endowments especially in the physical sciences were maintained by the corporations
[3] endowments were maintained in purely academic fields, especially in the physical sciences by the corporations
[4] purely academic endowments, especially for those fields like the physical sciences were maintained by the corporations

12. A career in business management, which requires an excessive investment of time and money, does not guarantee success, as there is so much competition.
[1] which requires an enormous investment of time and money, does not guarantee success since there is so much competition.
[2] requiring an enormous investment of time and money without guarantee because there is so - much competition.
[3] requires an enormous investment of time and money and it cannot guarantee success because there is so much competition.
[4] requires that an enormous investment of time and money be made and success cannot be guaranteed.

Directions (Qs. 13 to 18): Each of the following questions consists of capitalized pair of words followed by four pairs of words. The capitalized words have some meaningful relationship with each other. Choose from the given alternatives the pair, of words whose relationship is more similar to that expressed by the capitalized pair.

13. MISDEMEANOR: FELONY::?
[1] police : prison **[2]** thief : burglar **[3]** crime : degree **[4]** mishap : catastrophe

14. YEAST: LEAVEN:?
[1] iodine : antiseptic **[2]** aspirin: medicine **[3]** flour: dough **[4]** penicillin: plant

15. PUSILLANIMOUS: DASTARD::?
[1] impecunious: mendicant **[2]** plebeian: entrepreneur
[3] magnanimous : misanthrope **[4]** optimistic: pessimist

16. SHOAL: FISH::?
[1] drake : ducks **[2]** gaggle : geese **[3]** apiary : bees **[4]** aerie: eagles

17. LAMENTATION: KILLJOY::?
[1] accusation : scapegoat **[2]** disloyalty : turncoat
[3] sophistication : scarecrow **[4]** caution: daredevil

18. STEER:AUTOMOBILE::?
[1] cultivate: garden **[2]** play: game **[3]** explore: cave **[4]** relax: vacation

Directions (Qs. 19 to 21): Each question below consists of one word printed in capital letters followed by four options. Choose the option that is nearly opposite in meaning to the word in capital letters.

19. VACILLATION
[1] steeliness **[2]** intransigence **[3]** steadfastness **[4]** occupation

20. DERELICTION
[1] assiduousness **[2]** propriety **[3]** uncanniness **[4]** verbosity

21. SANCTIMONIOUS
[1] devout **[2]** maudlin **[3]** empirical **[4]** impious

Directions (Qs. 22 to 24): Each question below consists of one word printed in capital letters followed by four options. Choose the option that is nearly similar in meaning to the word in capital letters.

22. SALUBRIOUS
[1] miasmic **[2]** unhealthy **[3]** wholesome **[4]** delightful

23. PUTATIVE
[1] undisputed **[2]** reputed **[3]** rewarding **[4]** powerful

24. STARE
[1] glance **[2]** blink **[3]** glimpse **[4]** gape

Directions (Qs. 25 to 32): Answer based on following passage. Choose the most appropriate option from the alternatives given each question.

Since times immemorial people have been communicating with each other verbally or nonverbally. No one can live in society without communicating. It may be in the form of silence. There are some expressions of emotions, like happiness, sadness, fear, and anger which are considered to be universal.

In today's competitive world, it has become essential that one must have skills in more than one area. A person might possess a number of good qualities necessary for dealing with various problems of daily lives, but lack of effective communication might make the task difficult. Whether it is a corporate world, academic world or social world, the ability to communicate effectively has become a need today. Communication can make or break a relationship, begin or end a war. Perhaps, this is the most important thing, we do in our lives. It is said that motivation is very important, if a person wants to achieve something in life. How can people be motivated? It's again through communication only. A person might achieve in life many things, if he/she knows the art and science of communication.

In this context, it is said that culture-has a great impact on communication. In fact, culture is communication and communication is culture. When we talk about Indian culture, it is observed that people are very context sensitive. One has to be very cautious about the time and the context of communication, in order to make communication more effective.

Gender and communication is another important area, which has drawn the attention of scholars. Whereas many scholars are of the opinion that men and women differ in their communication styles, some scholars have found no significant difference. Are women better communicators than men? It is a question of debate. Perhaps, it may be due to the biology or socialization process or both. The researchers will strive to find out a suitable answer to this.

Who does not like a smiling face and friendly and warm communication? Whether it is boss or subordinate, teacher or student, husband or wife, father or son, everyone needs to develop skills in communication. This will not only help in getting accomplishment of difficult tasks one, but also will give a peace of mind which ultimately may lead to a successful and meaningful life.

25. The author focuses primarily on
    [1] gender and communication
    [2] culture and communication
    [3] communication skills
    [4] All the above

26. It can be inferred from the passage that
    [1] women are better communicators
    [2] men are better communicators
    [3] both are equally good communicators
    [4] communication skills need to be developed

27. According to the passage
    [1] In Indian culture people are not context sensitive.
    [2] Indian people are very context sensitive.
    [3] Women are very context sensitive.
    [4] None of the above.

28. According to the passage which of the following is **NOT** true
    [1] There are some expressions of emotions, which are universal.
    [2] No one can live in society without communicating.
    [3] Silence is not a form of communication
    [4] Body language is an important part of communication.

29. Which of the following alternatives is closest in meaning to “communication style”?
    [1] communication type
    [2] interaction type
    [3] way of communicating
    [4] None of the above

30. Which of the following statements is correct?
    [1] Silence is not communication.
    [2] Silence is a type of verbal communication.
    [3] Silence is a powerful tool of communication.
    [4] Silence is a written form of communication.

31. According to the passage, it is required
    [1] to develop skills in verbal communication
    [2] to have knowledge of communication
    [3] to know the art of communication
    [4] to interact effectively

32. According to the passage, it can be inferred that
[1] motivation is necessary
[2] one gets motivated through communication
[3] motivation is necessary for good communication
[4] all of the above

SECTION – II

LOGICAL REASONIG

Directions (Qs. 33 to 39): The sentences given in questions, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Select the most logical order of the sentences in each case.

33. (i) Introducing mass transit systems may decrease the number of vehicles on the road and mitigate the problems of pollution.
(ii) The development of urban transport infrastructure, e.g. roads, has not kept pace with the growth in the number of vehicles.
(iii) Gridlock and pollution result when transportation infrastructure is unable to cope with the growth in number of vehicles.
(iv) The number of cars operating in urban areas has increased tremendously.
[1] (iv)–(ii)–(iii)–(i) **[2]** (iv)–(iii)–(i)–(ii) **[3]** (i)–(iv)–(iii)–(ii) **[4]** (ii)–(iv)–(iii)–(i)

34. (i) If profit margins are eroded, an Internet store may go out of business.
(ii) Internet stores must deliver their products to their customers' homes.
(iii) Home delivery implies that logistics costs erode the available profit margins for an Internet store.
(iv) High logistical costs could account for the failure of many online grocers.
[1] (iv)–(ii)–(iii)–(i) **[2]** (i)–(ii)–(iii)–(iv) **[3]** (ii)–(iii)–(i)–(iv) **[4]** (ii)–(iv)–(ii)–(i)

35. (i) US companies can outsource non-core functions to cut costs.
(ii) The call center BPO industry in India might therefore experience a boom during a US recession
(iii) Customer service call centers represent a non- core function for many US companies.
(iv) During a recession, US companies must cut costs to increase profitability.
[1] (iv)–(ii)–(iii)–(i) **[2]** (iv)–(i)–(iii)–(ii) **[3]** (ii)–(i)–(iv)–(iii) **[4]** (ii)–(iv)–(iii)–(i)

36. (i) Airline passengers might ultimately experience a price increase during a war in the Middle East.
(ii) A war in the Middle East may endanger oil supplies.
(iii) When oil supplies diminish, oil prices go up.
(iv) Industries that rely heavily on fuel, e.g. aviation, may see associated cost increases.
[1] (ii)–(iii)–(iv)–(i) **[2]** (iii)–(i)–(iv)–(ii) **[3]** (i)–(iv)–(iii)–(ii) **[4]** (ii)–(iv)–(ii)–(i)

37. (i) In many countries that they colonized, the British left behind the legacy of the English language.
(ii) Even after the end of colonization and British rule, English remained as the language of commerce and international trade.
(iii) Business people the world over must be comfortable communicating in English.
(iv) During its heyday, colonization had spread so far and wide that the sun never set on the British Empire.
[1] (iv)–(ii)–(iii)–(i) **[2]** (iv)–(i)–(ii)–(iii) **[3]** (ii)–(iii)–(i)–(iv) **[4]** (ii)–(iv)–(i)–(iii)

38. (i) Admen also recruit charismatic cricketers like Sachin Tendulkar to gain wider acceptance for their products.
(ii) India's national pastime is cricket.
(iii) Millions of viewers watch a major cricketing event like the World Cup.
(iv) Advertisers promote their products during cricket matches to take advantage of the number of viewers.
[1] (ii)–(iii)–(iv)–(i) **[2]** (i)–(ii)–(iii)–(iv) **[3]** (ii)–(iii)–(i)–(iv) **[4]** (ii)–(iv)–(iii)–(i)

39. (i) When required monthly payments are lower, more individuals purchase houses.
(ii) During a recession, the government lowers the interest rate to lower the cost of capital and stimulate borrowing.
(iii) When interest rates fall, monthly payments on debt, e.g. mortgages, also fall.
(iv) The real estate market may experience a boom during a recession if interest rates are reduced.
[1] (iv)–(ii)–(iii)–(i) **[2]** (i)–(ii)–(iii)–(iv) **[3]** (iv)–(iii)–(ii)–(i) **[4]** (ii)–(iii)–(i)–(iv)

Directions (Qs. 40 to 42): Each of the problems in this section contains a question and two statements which are labeled as (1) and (2) and the corresponding question to decide whether the statements are sufficient to answer the question. For each problem, determine which of the following is the correct alternative:

[1] (I) alone is sufficient, but (II) alone is not sufficient.
[2] (II) alone is sufficient, but (I) alone is not sufficient.
[3] (I) and (II) together are sufficient but neither (I) alone, nor (II) alone is sufficient.
[4] (I) and (II) together are not sufficient.

40. Did the Hill Corporation have higher sales in the year 2000 or year 2001?
I. In year 2002, the sales were thrice the sales in year 2001
II. In year 2000, the sales were twice the average (arithmetic mean) of the sales in years 2000, 2001 and 2002.

41. A red pipe and a blue pipe are connected to a reservoir and if they both are used, the reservoir can be filled with oil in one hour. How long will it take for the red pipe to fill the reservoir without the use of the blue pipe?
I. The red pipe can flow twice as much oil as the blue pipe.
II. The blue pipe would take double the time to fill the reservoir when the red pipe is partially blocked.

42. Sumant bought 20 pens of two different types for Rs.500 in total. He sold the costlier pens at no profit or loss, but made a profit with the less expensive pens. What is the total percentage profit made by him?
I. Half the pens cost Rs.20 each and half the pens cost Rs.30 each.
II. The profit on the cheaper pens is 10 per cent.

Directions (Qs. 43 to 46): Each of the problems in this section contains a question and two statements which are labeled as (I) and (II). Use the information provided in statements (I) and (II) and the corresponding question to decide whether the statements are sufficient to answer the question. For each problem, select one of the options **[1]**, **[2]**, **[3]** or **[4]** based upon the following criteria:

[1] Choose option 1 if one of the following conditions is met:
- statement (I) is sufficient to answer the question and statement (II) alone is not sufficient to answer the question OR
- statement (II) is sufficient to answer the question and statement (I) alone is not sufficient to answer the question

[2] Choose option 2 if the following condition is met:
- statement (I) alone Is sufficient to answer the question AND statement (II) alone is also sufficient to answer the question

[3] Choose option 3 if the question can be answered by using both statements (I) and (II) together, but cannot be answered by using either statement alone

[4] Choose option 4 if the question cannot be answered even using both statements (I) and (II) together

43. Mr. Rao deposited Rs. 50,000 on 3rd January 2000 at a large bank, in a multi-option deposit scheme. He withdrew Rs. 5,000 on 15th February 2000, another Rs.10,000 on 20th September 2000 and Rs. 10,000 on 10th August 2001. How much will be the interest earned by him until 31st December 2003?
    I. The interest rate in his savings account is 3.5 per cent and the interest rate on term deposits of more than three months duration is 4.5 per cent.
    II. The interest rate is compounded quarterly.

44. The age of a father is three times the age of his son five years back. What is the age of the father?
    I. Eight years ago, the son was 12 years old,
    II. Eight years ago, the father was more than 40 years old.

45. Arun is at least 12 inches taller than Ram. Ram is at least six inches shorter than Jyoti. What is the exact difference in height between Arun and Ram?
    I. Arun is taller than Jyoti by 7 inches.
    II. Jyoti and Ram are siblings, born two years apart.

46. In year 2001, Jennifer worked very hard at her job, but could not produce positive results. Will Jennifer get promoted before the year 2003?
    I. Jennifer received her last promotion in the year 2000.
    II. Her company policy mandates at least a five year gap between promotions.

Directions (Qs. 47 to 51): Answer of questions based upon following passage. Information is provided in this passage is common. Any additional information provided with a question, pertains to that individual question only.

A company plans to sell a new product through five distinct marketing channels: Retail Stores (RS), the Internet (I), Mail Catalogs (C), a Sales Force (SF) and Resellers (RES). The company plans to use all the five channels, but makes them available sequentially. The exact sequence in which all the channels will be made available needs to be decided, subject to the following constraints:
- The product must be made available in Retail Stores (RS) before being sold through Catalogs (C).
- The Internet (I) cannot be the first marketing channel used by the company.
- Selling through a Sales Force (SF) must immediately follow the roll-out of Catalogs (C).
- Resellers (RES) cannot be the last channel option used.

47. Which of the following channel sequences represents an acceptable ordering for the roll-out of the new product?
    [1] (C),(SF),(RES),(RS),(I) **[2]** (I),(C),(SF),(RS),(RES)
    [3] (RS),(RES),(C),(SF),(I) **[4]** (RES),(RS),(SF),(I),(C)

48. If the Internet (I) is the second channel to be opened up, which of the following statements must be true?
    [1] Catalogs must be the third channel. **[2]** Retail Stores (RS) must be the third channel.
    [3] Sales Force (SF) must be the fifth channel. **[4]** Retail Stores (RS) must be the first channel.

49. If the company exercises the Resellers (RES) channel second, then Retail Stores (RS) must be
    [1] First or third **[2]** First only **[3]** Fourth or Fifth **[4]** Second or Fourth

50. If the Internet (I) is the third channel used and the Sales Force (SF) is the fifth channel used, then Resellers (RES) can be
[1] First of Second **[2]** Second only **[3]** Fourth only **[4]** First only

51. If the Resellers (RES) channel is the third to be opened and the Internet (I) channel is exercised last, then
[1] Retail Stores (RS) must be used first.
[2] Catalogs (C) and the Sales Force (SF) must be first and second,
[3] Retail Stores (RS) must be fourth.
[4] There is no feasible ordering of the channels that satisfies the required constraints.

Directions (Qs. 52 to 56): Answer of questions based upon following passage. Information is provided in this passage is common. Any additional information provided with a question pertains to that individual question only.

A manager has seven employees A, B, C, D, E, F and G reporting to him in his group. A and B have strong quantitative skills, but poor communication skills. E and F excel in both quantitative ability and communication. C, D and G have strong communication skills, but poor quantitative skills. The Manager must assign his seven employees to three projects in the following manner:

- Project 1 must be staffed with at least two people. At least one team member must possess quantitative skills. At least one team member must possess communication skills.
- No more than two people must be assigned to Project 2. This project requires at least one person with quantitative ability.
- Project 3 must be staffed with exactly three people. At least one of them must possess good communication skills.

52. Which of the following combinations is a feasible assignment of team members to projects?
[1] A & B on Project l, F & G on Project 2
[2] A & C on Project 2, E & F on Project 3
[3] A & G on Project 1, C & E on Project2
[4] A & B on Project 1, e, F & C on Project 3

53. In addition, if C, D and G are women and if each project team cannot contain more than 2 men, which of the following are feasible assignments?
[1] A & E on Project I, D, F and G on Project 3
[2] D & G on Project 1, A, B and C on Project 2
[3] A & G on Project 1, C, D and E on Project 2
[4] A, E & F on Project 3

54. In addition, assume that A and B do not get long and cannot be part of the same project team. D and B are married and do not want to be part of the same project team. Which of the following assignments are feasible?
[1] A & D on Project l, C & E on Project 2
[2] A, B & G on Project 3
[3] A & G on Project l, B & D on Project 3
[4] D, E & F on Project 3, A & B on Project 1

55. Employee D crosses a road rashly and is unfortunately run over by a bus. The Manager scrambles to reassign his employee to project teams in a manner that satisfies the skill set requirements. A feasible assignment is provided by
[1] C, F & G on Project 3, A on Project2
[2] A & B on Project 1, C, E & G on Project3
[3] A & B on Project 1, C, F & G on Project 3
[4] All of the above

56. Assume that A and E–have been assigned to Project 1, and D, F and G have been assigned to Project 3. A sudden change in the business, climate requires that Project 2 be staffed with three people and Project 3 be staffed with only two people. Further, at least two members of the Project 2 team must have both quantitative and communication skills. In the new business climate, Project 1 requires only quantitative skills and Project 3 requires only communication ability. A feasible assignment is
[1] Move F to Project 1, and A to Project 2.
[2] Move A to Project 3.
[3] Move B to Project 1, D to Project 2.
[4] Move E & F to Project 2, and B to Project 1.

57. Arun is taller than Vivek. Harish is taller than Vivek, but shorter than Arun. Divya is taller than Harish, while Ramya is shorter than Arun. Which of the following statements is necessarily true?
[1] Ramya is shorter than Harish.
[2] Divya is taller than Vivek.
[3] Divya is taller than Arun.
[4] Ramya is shorter than Harish, but taller than Vivek.

58. On the basis of the following two statements, determine which of the stated conclusions can be logically inferred:
I. All artists are eccentric
II. Most skaters are artists.
Conclusion:
[1] Some skaters are not eccentric
[2] Most skaters are eccentric,
[3] All skaters are eccentric.
[4] Most artists are skaters.

59. On the basis of the following three statements, determine which of the ensuing conclusions can be logically inferred:
I. People with high cholesterol levels always get heart attacks.
II. Some people who eat fatty food have high cholesterol levels.
III. All people who eat fatty food and exercise regularly do not have high cholesterol levels.
Conclusion:
[1] Some people with high cholesterol levels exercise regularly.
[2] All people who eat fatty food exercise regularly.
[3] All people who get heart attacks have high cholesterol levels.
[4] Some people who eat fatty food get heart attacks.

60. Mr. Ogre gets up every morning and immediately gets into a good mood or a bad mood for the entire day. Careful historical analysis shows that Mr. Ogre gets into a good mood for about 30 out of 100 days. He gives his dog an affectionate pat during, one out of every two days that he is in a good mood. If he is in a bad mood, he pats his dog affectionately for only one out of every ten days. On a certain morning, we are told that he patted his dog affectionately. What is now the probability that he woke up in a good mood?
[1] 15/37 **[2]** 15/30 **[3]** 63/100 **[4]** 15/22

61. A box contains 13 red balls (numbered 1 through 13) and 7 green balls (numbered 1 through 7). A little Elf selects a ball at random from the box, writes down the number and throws the ball away (i.e., does not put it back in the box). Then he selects another ball from the same box, and writes down the number again before throwing it out of the box. The probability that both balls selected by the Elf are numbered 7 would be
[1] 2/20 **[2]** 1/91 **[3]** 1/200 **[4]** 1/190

62. In a coding language, if CAB is coded as 3-1-8, then ACE should be coded as
[1] 24–0 **[2]** 4–6–8 **[3]** 2–4–6 **[4]** 1–9–125

63. On the basis of the following three statements, determine which of the ensuing conclusions can be logically inferred:
I. Some CEOs of companies are also athletes.
II. All Marathon runners are athletes.
III. Some marathon runners are CEOs.
Conclusion:
[1] Most CEOs are marathon runners.
[2] Not all marathon runners are CEOs.
[3] All athletes are CEOs.
[4] You cannot become a CEO if you are not athletic.

64. Jeanne loves to work with either Raymond or Debra. Debra gets along with Elaine and Jeanne. Raymond loves to work with either Jeanne or Richard, but doesn't particularly like Debra. Debra and Richard cannot stand each other and cannot work together at all. Elaine adores Debra, but cannot stand Raymond. However, Elaine likes Richard. Jeanne like Richard as well. We are required to form two harmonious teams, in a manner such that each team member likes any other member of the same team. One possible solution is
[1] Jeanne, Raymond & Debra in team 1, Elaine & Richard in team 2
[2] Jeanne, Raymond & Richard in team 1, Debra & Elaine in team 2
[3] Elaine, Raymond & Jeanne in team 1, Debra & Richard in team 2
[4] Elaine & Jeanne in team 1, Richard, Debra & Raymond in team 2

65. Several years ago, the Coca-Cola Corporation introduced a new Coke formula called "New Coke", after extensive market research. Within a few months however customers clamoured for the older "Classic Coke" formula and the company was forced to bring it back to the market place. This incident shows that companies must
[1] rarely conduct market research.
[2] carefully evaluate brand loyalty before phasing out an older product.
[3] never introduce new products.
[4] use market research only for products that are not beverages

66. The most widely argued reasons for globalization are saturation of domestic markets, economies of scale and competitive factors. The process of globalization tends to cover a wide range of industries and is not selective by the country of ownership. The above statement assumes that
[1] globalization will not occur in countries where markets are emerging and not saturated.
[2] globalization of business is so widespread as to cause concern.
[3] globalization is endemic to business due to pressing factors, but is not limited to any particular country.
[4] globalization is the major approach to cost reduction.

67. Set A contains (2n + 1) elements. The number of subsets of A that contain at most n elements is 256, then the number of elements in A is
[1] 4 **[2]** 9 **[3]** 11 **[4]** 7

68. Suppose A_1, A_2, $A_3 ... A_{30}$ are thirty sets, each with 5 elements and B_1, B_2, ... B_n are n sets each with three elements. Let $\bigcup_{i=1}^{30} A_i = \bigcup_{j=1}^{n} B_j$. Assume that each element of S belongs to exactly 10 of A_is and exactly 9 of B_js, then n is equal to element of A Î X, is
[1] 15 **[2]** 45 **[3]** 125 **[4]** None of these

69. The number of ways in which 6 gentlemen and 4 ladies can sit for dinner at a round table so that no two ladies sit together is

[1] 50400 **[2]** 42600 **[3]** 43200 **[4]** 41800

70. If a, b & c are complex numbers, then

$$z = \begin{vmatrix} 0 & -b & -c \\ \bar{b} & 0 & -a \\ \bar{c} & \bar{a} & 0 \end{vmatrix} \text{ is}$$

[1] purely real and nonzero **[2]** purely imaginary

[3] 0 **[4]** none of the above

71. If $\Delta_r = \begin{vmatrix} 1 & r & 2^r \\ 2 & n & n^2 \\ n & \frac{1}{2}n(n+1) & 2^{n+1} \end{vmatrix}$, then the value of $\sum_{r=1}^{n} \Delta_r$ is

[1] $-2n$ **[2]** $2n$ **[3]** $-2n^2$ **[4]** $-2n^3$

72. The area of the triangle formed by the tangents from the points (4, 3) to the circle $x^2 + y^2 = 9$ and the line joining their point of contact is

[1] $\frac{25}{192}$ sq units **[2]** $\frac{192}{25}$ sq. units **[3]** $\frac{384}{25}$ sq. units **[4]** None of these

73. In an examination, the question paper consisted of three parts, A, B and C, which contained 4, 3 & 2 questions respectively. A student had the freedom to attempt any number of questions taking at least one question from each part. The probability that an answer sheet selected at random shall have exactly one question from each part is

[1] $\frac{25}{350}$ **[2]** $\frac{24}{512}$ **[3]** $\frac{24}{315}$ **[4]** None of these

74. Romesh and Ravi make an appointment to meet on 20th Nov. 2005 at the CAT examination centre, but without fixing than that it is between 10 a.m. to 11 a.m. They decide to wait not longer than 10 minutes for each other. Assuming that each is independently likely to arrive at any time during the hour, the probability that they will meet

[1] $\frac{5}{6}$ **[2]** $\frac{25}{36}$ **[3]** $\frac{11}{36}$ **[4]** None of these

75. If α, β and γ are real numbers that

$$\Delta = \begin{vmatrix} 1 & \cos(\beta-\alpha) & \cos(\gamma-\alpha) \\ \cos(\alpha-\beta) & 1 & \cos(\gamma-\beta) \\ \cos(\alpha-\gamma) & \cos(\beta-\gamma) & 1 \end{vmatrix} \text{ is equal to}$$

[1] -1 **[2]** 1 **[3]** $\cos\alpha \cos\beta \cos\gamma$ **[4]** None of these

76. If the lines of regression of y on x and x on y are respectively $y = kx + 4$ and $x = 4y + 5$ then

[1] $0 \le k \le 4$ **[2]** $0 \le k \le \frac{1}{4}$ **[3]** $k > \frac{1}{4}$ **[4]** None of these

77. The angle of elevation of the top of an incomplete vertical pillar at a horizontal distance of 100 mt from its base is 45°. If the angle of elevation of the top of the complete pillar at the same point is to be 60°, then the height of the incomplete pillar is to be increased by

[1] $50\sqrt{2}$ **[2]** 100mt **[3]** $100\left(\sqrt{3}-1\right)$ **[4]** $100(\sqrt{3}+1)$ mt

78. The $\hat{i}$ + x5 + $3\hat{k}$ is rotated through an angle q and doubled in magnitude, then it becomes $4\hat{i} + (4x - 2)\,5 + 2\hat{k}$. The value of x is

[1] $-\frac{2}{3}, 2$ **[2]** $\frac{2}{3}, -2$ **[3]** $\frac{2}{3}, \frac{1}{3}$ **[4]** $-\frac{2}{3}, -\frac{1}{3}$

79. The value of x that satisfies $\sin^{-1}\frac{4}{5} + \sin^{-1}\frac{12}{13} = \tan^{-1} x$ is

[1] $\frac{56}{43}$ **[2]** $-\frac{56}{33}$ **[3]** $-\frac{56}{43}$ **[4]** $\frac{56}{33}$

80. Each side of a square subtends an angle of 60° at the top of a tower 'h' meters standing in the centre of the square. If 'a' is the length of the each side of square then,

[1] $2a^2 = h^2p$ **[2]** $2h^2 = a^2$ **[3]** $3a^2 = 2h^2$ **[4]** $2h^2 = 3a^2$

81. An equivalent triangle is inscribed in the circle $x^2 + y^2 = a^2$ with the vertex located at (a, 0). The equation of the side opposite to this vertex is

[1] 2x – a = 0 **[2]** x + a = 0 **[3]** 2x + a = 0 **[4]** None of the above

82. The remainder when 2^{2003} is divided by 17 is

[1] 1 **[2]** 2 **[3]** 8 **[4]** None of these

83. If q_1, q_2 are the angles that the lines $x^2(\tan^2 q + \cos^2 q) - 2xy \tan q + y^2 \sin^2 q = 0$ make with the axis of x, then ½ tan q_1 – tan q_2 ½ is equal to

[1] 0 **[2]** ∞ **[3]** 1 **[4]** 2

84. A regular hexagon is circumscribed around a circle of radius 10 cms. The length of each side of the hexagon (in cms.) is

[1] $\sqrt{3}$ **[2]** $\frac{1}{\sqrt{3}}$ **[3]** $\frac{2}{\sqrt{3}}$ **[4]** None of the above

85. Three normals to the parabola $y^2 = x$ are drawn through a point (c, 0) then

[1] $C = \frac{1}{4}$ **[2]** $C = \frac{1}{2}$ **[3]** $C > \frac{1}{2}$ **[4]** None

86. The slope of the tangent at the point (h, h) of the circle $x^2 + y^2 = a^2$ is

[1] 0 **[2]** 1 **[3]** –1 **[4]** Depends of h

87. From a square of side 10 units another square is extracted by joining the midpoints of adjacent sides. Then a third square is extracted from the second in the same way. This process is continued infinitely. The sum of areas of all the residual figures (in sq. units) is

[1] 50 **[2]** 150 **[3]** 100 **[4]** 200

88. A tin funnel consists of two parts; one part is conical, the slant side is 12 cm, the circumference of the one end is 40 cm and of the other end is 2.5 cm; the other part is cylindrical, the circumference being 2.5 cm and length 16 cm. The area of tin used in making 20 such funnels (in sq. cms.) is

[1] 6,000 **[2]** 10,200 **[3]** 5,100 **[4]** 5,900

89. Water flows at the rate of 20 meters/minute from a cylindrical pipe of 50 mm. Diameter. How long (in minutes) would it take to fill a conical vessel whose diameter at the surface is 60 cm. And depth is 100 cm.

[1] 2.5 **[2]** 2.4 **[3]** 2.3 **[4]** 2.0

90. A triangular carpet is proposed to be spread in a circular room of radius 3m. The cost of carpeting is Rs.100 per sq.m. The total cost of carpeting (in Rs.), such that the carpeted area is maximum, is

[1] $675\sqrt{3}$ **[2]** $675\sqrt{2}$ **[3]** $675\sqrt{5}$ **[4]** $675\sqrt{7}$

91. $\lim\limits_{n\to\infty}\sum\limits_{r=1}^{n}\frac{\pi}{n}\sin\left(\frac{\pi r}{n}\right)$ is equal to

[1] -1 **[2]** 1 **[3]** -2 **[4]** 2

92. If g(x) is a polynomial satisfying $g(x)g(y) = g(x) + g(y) + g(xy) - 2 \ \forall\ x, y \in R$ and $g(2) = 5$ then $\lim\limits_{x\to 3} g(x)$ is

[1] 4 **[2]** 10 **[3]** 3 **[4]** 7

93. Let f(x) be a polynomial in x. The second derivative of $f(e^x)$ at x = 1 is

[1] $ef'(e) + f'(e)$ **[2]** $[ef^2(e) + f'(e)]\, e^2$

[3] $[ef^2(e) + f'(e)]e$ **[4]** $e^2f^2(e)$

94. The mean deviation from the mean of the AP a, a + d, a + 2d, ... A + 2nd is

[1] n(n + 1)d **[2]** $\frac{n(n+1)d}{2n+1}$ **[3]** $\frac{n(n+1)d}{2n}$ **[4]** $\frac{n(n-1)d}{2n+1}$

95. Two finite sets have 'm' and 'n' elements. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The value of 'm' and 'n' are

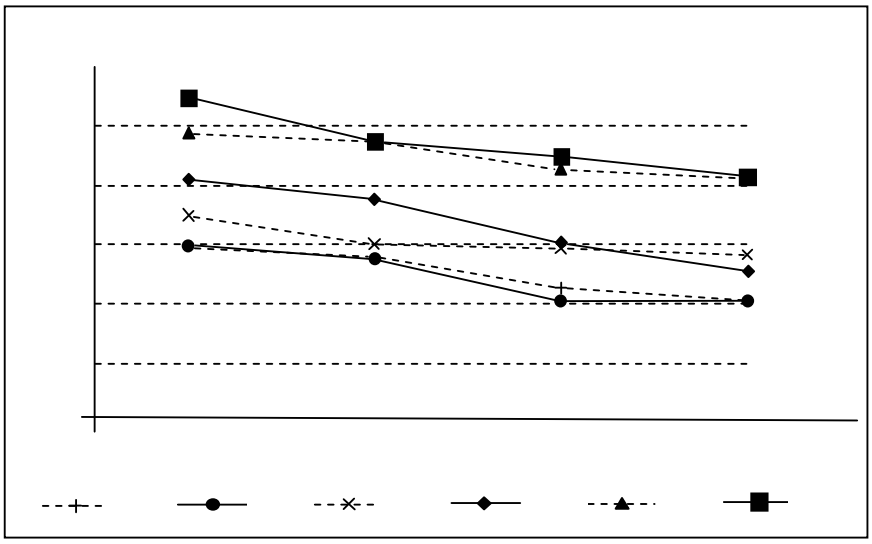
[1] m = 7, n = 6 **[2]** m = 6, n = 3 **[3]** m = 5, n = 1 **[4]** m = 8, n = 7

SECTION – IV

DATA INTERPRETATION

Directions (Qs. 96 to 99): Questions based on the information and the graph provided below:

The graph denotes the selling price (CP) per unit (in Rs.) for three different products, X, Y and Z against the number of units produced/sold by a certain company named ABC Corporation. Assume that all the units produced for any product are sold such that there is not inventory left.



96. If the company can produce and sell any quantity (in the range of 1750–2625 units) for all the three products individually, then what is the range of profit /loss for the company in Rs.?
[1] + 1750 to + 2625 **[2]** + 2625 to + 3905
[3] –1750 to + 2625 **[4]** None of the above

97. The company produces and then sells 1500 units of X, 2500 units of Y and 3500 units of Z. The ratio of their cost prices is
[1] 16 : 8 : 4 **[2]** 12 : 8 : 4
[3] 8 : 5 : 4 **[4]** None of the above

98. If the company produces and sells 3905 units of each product, then the profit per unit for the three products, if arranged in the descending order, is
[1] X, Y, Z **[2]** Z, X, Y
[3] Y, X, Z **[4]** None of the above

99. The company is planning to produce and sell 4000 units of all the three products taken together. Due to warehouse capacity limitations, it is decided that products Y and Z taken together should be 3500 units in number. What is the profit/loss (in Rs.) due to the production and then selling of product X?
[1] Profit of Rs.300 **[2]** Loss of Rs.300
[3] No profit no loss **[4]** None of the above

Directions (Qs. 100 to 102): Questions based on the information, tables and graph provided below:

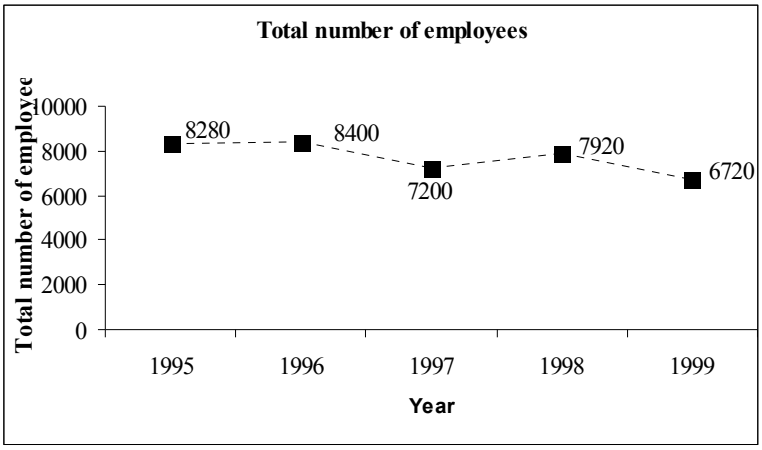
The following two tables along with the graph show the function–wise percentage breakup of the number of employees, function–wise average salary per year (in Rs.) and the total number of employees for the organization XYZ, for the years 1995 to 1999, respectively.

Function–wise percentage breakup of employees for the years 1995 to 1999

FUNCTIONS YEAR	OPR	FIN	MKT	HR	OTH
1995	15%	5%	45%	5%	30%
1996	20%	6%	50%	14%	10%
1997	24%	8%	40%	18%	10%
1998	30%	10%	35%	10%	15%
1999	25%	15%	30%	15%	15%

Function–wise average salary (in Rs.) per year for the years 1995 to 1999

FUNCTIONS YEAR	OPR	FIN	MKT	HR	OTH
1995	250000	320000	270000	280000	220000
1996	270000	390000	280000	290000	250000
1997	280000	420000	290000	300000	260000
1998	290000	450000	300000	310000	280000
1999	280000	470000	310000	320000	270000



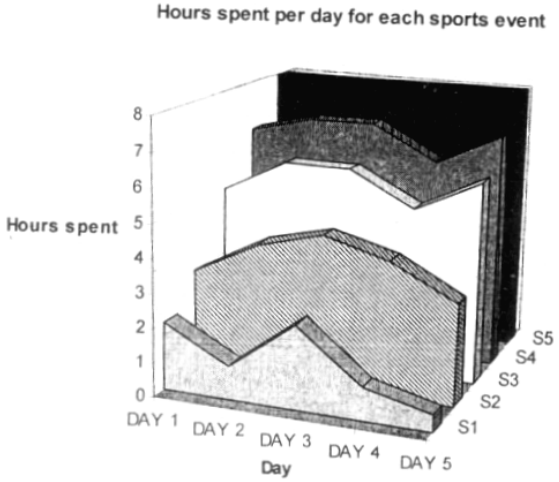
100. the highest percentage increase in the number of employees for any particular functional area, between any two consecutive years is approximately.
[1] 180% **[2]** 150% **[3]** 120% **[4]** 90%

101. Consider that in the year 2000, the total number of employees decreases by 25% over that of the value of 1999, but the percentage of employees in OPR function remains the same as it was in 1999. Then the change in the number of employees for OPR between 1999 and 2000 is
[1] 420 **[2]** 400 **[3]** 450 **[4]** 480

102. The number of employees under the different functional areas has changed from 1995 to 1997. For these change in the number of employees, the functional areas can be arranged from the maximum change to the minimum change as follows:
[1] FIN, OPR, HR, MKT and OTH **[2]** OPR, MKT, HR, FIN and OTH
[3] OTH, HR, MKT, OPR and FIN **[4]** None of the above

Directions (Qs. 103 to 106): Questions based on the information and the graph provided below:

The following graph shows the practice schedule for an athlete for five consecutive days as he/she practices for five different sports events (S). The athlete's daily schedule is for eight hours and he/she prepares for all the five sports events each day.



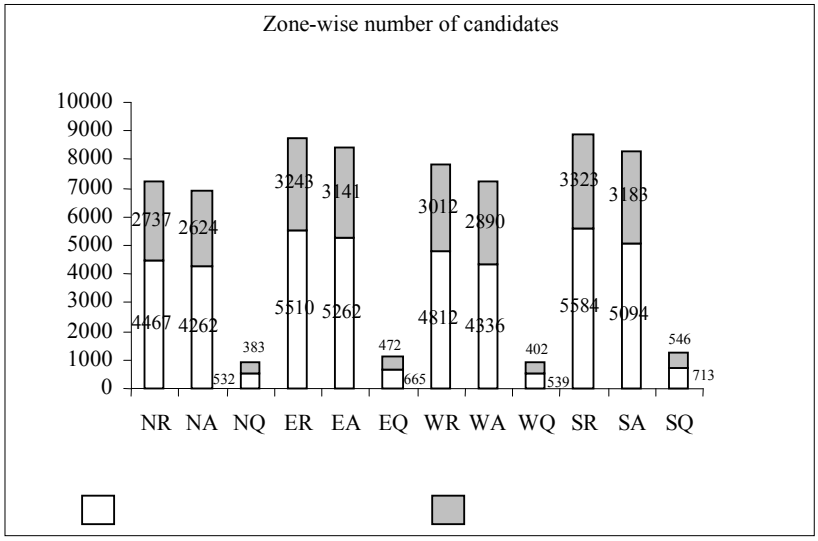
103. The ratios of the number of hours during the first three days, which the athlete has spent in each sports event SPT3 with respect to sports event S4 are
[1] 2 : 6 : 5 :: 4 : 4 : 2 **[2]** 4 : 4 : 2 :: 2 : 3 : 5
[3] 2 : 5 : 6:: 2 : 4 : 3 **[4]** 4 : 4 : 2:: 2 : 6 : 5

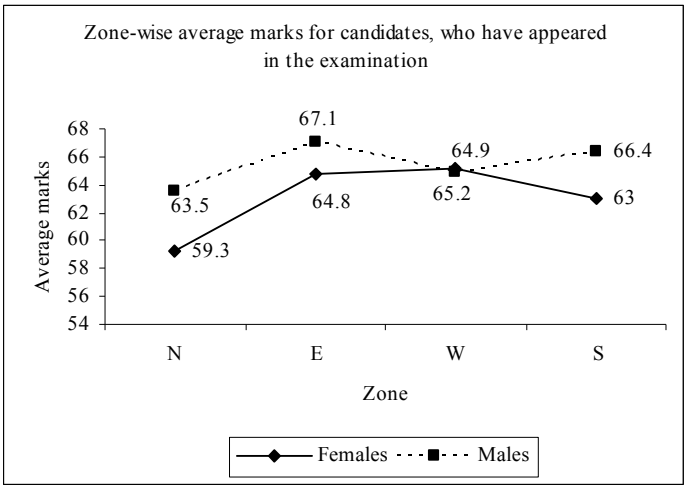
104. The cumulative hours during the first five days, which the athlete has spent in each sports event has been calculated and then ranked in the descending order. Then the highest ranked sport event is
[1] S5 **[2]** S4
[3] S3 **[4]** S1

105. The steepest increase in the number of hours spent for any sports event between any two consecutive days is
[1] 1.0 **[2]** 1.5
[3] 2.0 **[4]** 2.5

106. The average number of hours per day the athlete spends for S3 is
[1] 1.3 **[2]** 1.5
[3] 1.7 **[4]** 1.9

Directions (Qs. 107 to 110): Questions based on the information, histogram and graph provided below:
The following histogram gives us a zone–wise pattern for the number of male and female candidates, who have registered in four zones (NR, ER, WR, SR); appeared in these four zones (NA, EA, WA, SA); and qualified from these zones (NQ, EQ, WQ, SQ) for an all India competitive examination. The graph (following this histogram) denotes the zone–wise average marks obtained by both male and female candidates, who have appeared for this competitive examination.





107. The ratio of the total marks obtained by all the male candidates who have appeared for the examination from the North zone to that of all the female candidates who had qualified from the North zone is
[1] 1.7 **[2]** 2.7 **[3]** 3.7 **[4]** Data is insufficient

108. The average marks of all the students, who have appeared in the examination in the country, do not lie in the following ranges:
(1) 63 to 64 (2) 64 to 65 (3) 65 to 66
[1] (1) and (2) **[2]** (1) and (3) **[3]** (2) and (3) **[4]** (1), (2) and (3)

109. The ratio of the number of qualified candidates to the number of candidates who appeared in the examination is nearest to:
[1] 0.10 **[2]** 0.12 **[3]** 0.14 **[4]** 0.16