## MODULE-I: Logical Reasoning
(This module has 40 questions, carrying a total of 40 marks. This module has **NEGATIVE MARKING**. *0.25 marks will be deducted for every wrong answer)*

1. Three bells begin tolling at the same time and continue to do so at intervals of 21, 28 and 30 seconds respectively. The bells will toll together after
   (a) 3 sec ☐
   (b) 79 sec ☐
   (c) 420 sec ☐
   (d) 5880 sec ☐

2. If 10th January of a leap year falls on the Saturday then 11th March of the same year falls on
   (a) Monday ☐
   (b) Wednesday ☐
   (c) Thursday ☐
   (d) Saturday ☐

3. By what should 12348 be multiplied or divided in order to make it a perfect square?
   (a) 6 ☐
   (b) 7 ☐
   (c) 16 ☐
   (d) 8 ☐

4. The average weight of students in a class of 35 is 50 kg. If however, the weight of the teacher be included, the average will be increased by 500 gm. Find the weight of the teacher?
   (a) 60 kg ☐
   (b) 68 kg ☐
   (c) 58 kg ☐
   (d) 78 kg. ☐

5. If each alternate letter starting from A in the English alphabet is written in lower case and the remaining in upper case, then, the third month after July will be represented by-
   a. OctObER ☐
   b. ocToBer ☐
   c. SepTemBEr ☐
   d. oCtObEr ☐

6. In a code 'Ni Muk Puk' means 'Serious and worried'; 'In Dik So' means 'Each any other' and 'Tur Muk To' means 'Soul and body' then in that code what are for 'Each Worried'-
   a. In Ni ☐
   b. Pik Ni ☐
   c. Dik Pik ☐
   d. None of these ☐

SPACE FOR ROUGH WORK

7. If love is called sky, sky is called water, water is called tears, tears are called rain, and rain is called man. Hence in absence of her lover, the sweetheart's eyes are filled with?
   a. Water ☐
   b. Sky ☐
   c. Tear ☐
   d. Rain ☐

8. If LOFTY is coded as LPFUY, DWARF will be coded as
   a. DXASF ☐
   b. DXBSG ☐
   c. DXATF ☐
   d. DWBSG ☐

9. If PRICE is coded as SVNIL, COST will be coded as
   a. FSXY ☐
   b. FSWY ☐
   c. FTWZ ☐
   d. FSXZ ☐

10. In code QUEUE is written as Q22 and CHURCH as IURI then BANANA is written as a suitable code from the following-
   a. B5A5 ☐
   b. 5N5A ☐
   c. B55A ☐
   d. BA5A5A ☐

11. Select one figure, which will continue the series.
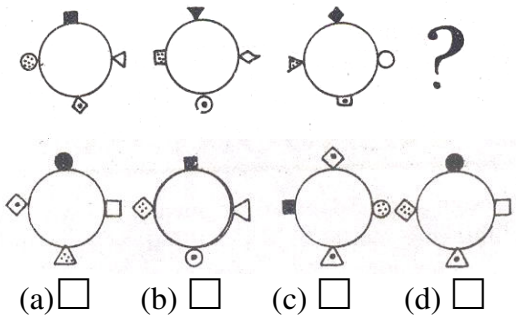
(a) ☐   (b) ☐   (c) ☐   (d) ☐

SPACE FOR ROUGH WORK

12.   How does the figure look like when folded into a cube along the marked lines?
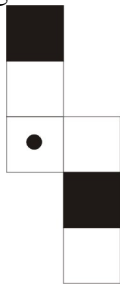
(a) ☐   (b) ☐   (c) ☐   (d) ☐

Directions for Questions 13-15: Select a word/number from the given alternatives so that word-pairs/number- pairs at both sides of :: have the same relationship.

13.   Optimistic: Pessimistic:: Export: ?

    a. Impossible   ☐

    b. Tolerating   ☐

    c. Import   ☐

    d. Deport   ☐

14.   16: 25 :: 36: ?

    a. 30   ☐

    b. 35   ☐

    c. 40   ☐

    d. 49   ☐

15.   9: 125 :: 125:: ?

    a. 344   ☐

    b. 216   ☐

    c. 343   ☐

    d. 344   ☐

Directions for Questions 16-18: In the following questions, one of the numbers/word does not belong to the series of numbers/words given in each question. Find the odd number/word out of four alternatives given in each question.
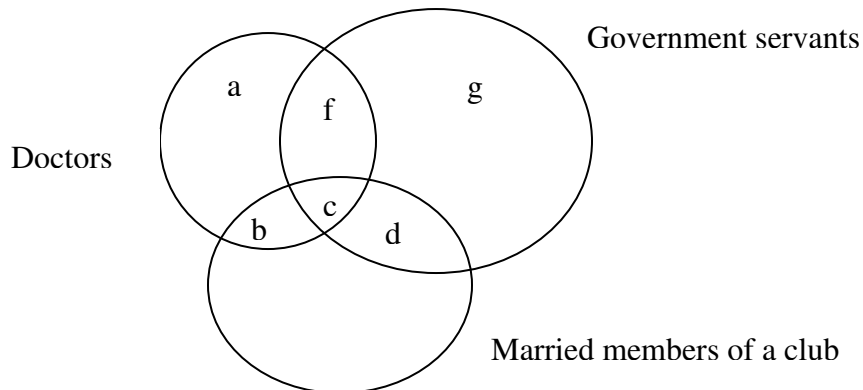
16.   11, 4, 15, 8, 19, 12, 27

    a. 11   ☐

    b. 15   ☐

    c. 19   ☐

    d. 27   ☐

SPACE FOR ROUGH WORK

17.   1, 1, 9, 27, 25, 64, 49, 343
    a. 1 ☐
    b. 343 ☐
    c. 64 ☐
    d. 49 ☐
18.   Line, Circle, Square, Ellipse, Cube
    a. Cube ☐
    b. Circle ☐
    c. Ellipse ☐
    d. Square ☐

Directions for Questions 19-20: Answer the following questions on the basis of the following diagram.

19.   The portion f represents :
    a. Male doctors who are government servants ☐
    b.   Married government servants ☐
    c. Unmarried doctors ☐
    d. Unmarried doctors who are government servants. ☐
20.   Married doctors who are not government servants are represented by
    a. b ☐
    b. c ☐
    c. d ☐
    d. a+b ☐

SPACE FOR ROUGH WORK

Directions for Questions 21-23: In each of the questions below are given two statements followed by two conclusions (i) and (ii). You have to take the given statements to be true and then decide which of the given conclusions logically follows from the two statements, disregarding commonly known facts.
Give answer: *a*(if only (i) is right), *b*(If only (ii) is right), *c*(If either (i) or (ii) is right) or *d*(if neither (i) nor (ii) is right, or both (i) and (ii) are right)

21.   Statements: All pens are birds. All cats are birds
       Conclusions:
    i.   Some cats are pens
    ii.   Some birds are pens

            a.   ☐
            b.   ☐
            c.   ☐
            d.   ☐

22.   Statements: All mangoes are parrots. No parrot is green
       Conclusions:
       i. No mango is green
       ii. Some parrots are mangoes

            a.   ☐
            b.   ☐
            c.   ☐
            d.   ☐

23.   Statements: Some oranges are crows. Some crows are apples.
       Conclusions:
    i.   Some oranges are apple
    ii.   Some apples are crows.

            a.   ☐
            b.   ☐
            c.   ☐
            d.   ☐

24.   How many **'1's** are there in the following sequence of numbers that is followed immediately by **'2'** and **'2'** is not immediately followed by '3'?
            1 2 1 3 4 5 1 2 3 5 2 1 2 6 1 4 5 1 1 2 4 1 2 3 2 1 7 5 2 1 2 5
       a. 3   ☐
   b. 4   ☐
       c. 5   ☐
       d. 6   ☐

25.   Complete the following letter series:
       Z   V   R   N
       a. L   ☐
       b. K   ☐
       c. J   ☐
       d. H   ☐

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SPACE FOR ROUGH WORK

26. What will be the next term in the given number series?
17, 27, 37, 56, …….
a. 49
b. 62
c. 57
d. 78

27. In the given number series, one term is wrong. Find out the wrong term.
3, 10, 19, 31, 43, 58, 75
a. 31
b. 43
c. 10
d. 31

28. Six persons are playing a card game. Bok is facing Kyrmen who is to the left of Alan and to the right of Steve. Alan is to the left of Damanbha. Lambor is to the left of Steve. If Damanbha exchanges his seat with Lambor and Steve with Kyrmen, who will be sitting to the left of Damanbha?
a. Lambor
b. Kyrmen
c. Bok
d. Alan

29. Five girls are standing in a row facing East. Selena is to the left of Grace, Eva and Theresa. Grace, Eva and Theresa are to the left of Kelly. Theresa is between Grace and Eva. If Eva is fourth from the left, how far is Grace from the right?
a. First
b. Second
c. Fifth
d. Fourth

30. Daniel starts walking straight towards East. After walking 75 metres, he turns to the left and walks 25 metres straight. Again he turns to the left and walks a distance of 40 metres straight. Again he turns to the left and walks a distance of 25 metres. How far is he from the starting point?
a. 140
b. 35
c. 50
d. 115

SPACE FOR ROUGH WORK

31. Ribha and Synshar started from a place X. Ribha went West and Synshar went North, both traveling with the same speed. After sometime, both turned their left and walked a few steps. If they again turned to their left, in which directions, the faces of Ribha and Synshar will be with respect to X ?.

a. North and East ☐

b. North and South ☐

c. West and North ☐

d. East and South ☐

32. Two positions of a dice are shown below:
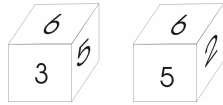
When 3 is at the bottom, what number will be at the top?

a. 5 ☐

b. 4 ☐

c. 1 ☐

d. 2 ☐

33. The needles in these clock problems may follow the usual clock rules. From the given sequence identify the missing one from the options given below
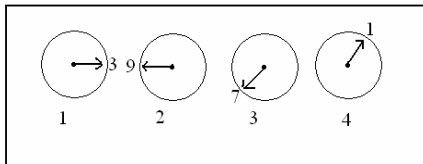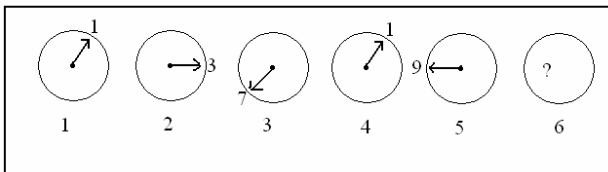
(a) 1 ☐   (b) 2 ☐   (c) 3 ☐   (d) 4 ☐

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SPACE FOR ROUGH WORK

34. A is the father of X, B is the mother of Y. The sister of X and Z is Y. Which of the following is not true?

   a. B is the wife of A   ☐

   b. B has one daughter   ☐

   c. Y is the son of A   ☐

   d. X is the sister of Z   ☐

35. A couple has a son and a daughter. The age of the father is three times that of his daughter and the age of the son is half of his mother. The wife is nine years younger to her husband and the brother is seven years older than his sister. Then what is the age of the mother?

   a. 40   ☐

   b. 45   ☐

   c. 50   ☐

   d. 60   ☐

36. Complete the given series with one of the figures given below .
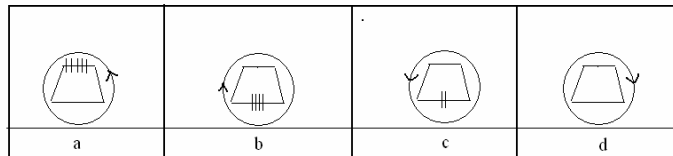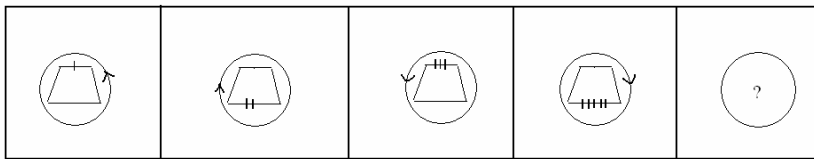
   (a) a ☐   (b) b ☐   (c) c ☐   (d) d ☐

SPACE FOR ROUGH WORK

37.   Complete the given series with one of the figures given below.
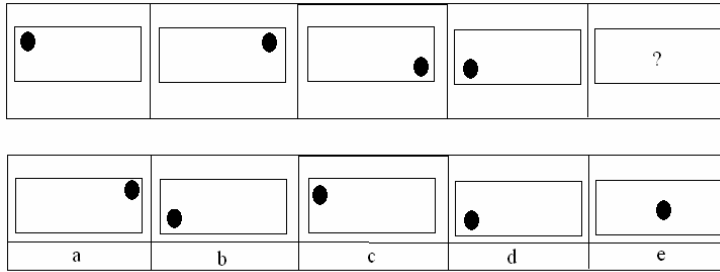
(a) a ☐   (b) b ☐   (c) c ☐   (d) d ☐

38.   If a cube painted green on all sides is cut into 64 cubes of equal size, how many of these smaller cubes are painted only on one side?

a.   4   ☐

b.   8   ☐

c.   16   ☐

d.   24   ☐

39.   What is a Blu-Ray Disc?

40.   Can you name few versions of Linux Operating Systems that are popular in the market?

SPACE FOR ROUGH WORK

(*Each question in this module carries 2 marks. Answer any* **TEN** *questions*)

41.   Show that the point (-1, 1), (2, -2), (8, 4) are the vertices of a right angled triangle.

42.   Find   dy/dx   when y = (x + 1) / (x + 2)

43.   Form the quadratic equation whose roots are 4 and -7.

44.   Apply the binomial theorem to find the value of $(101)^3$

45.   Determine the value of k, so that $k^2 + 2k + 1$, $3k^2 + 6k + 5$, $4k^2 + 5k + 3$ are in A.P.

46.   Prove that the lines $2x + 3y = 2$ and $6x – 4y + 7 = 0$ are at right angles.

47.   Find : $\text{Lim}_{x \to 2} \dfrac{x^2 – 3x + 2}{7x + 6}$

48.   Two independent events A_1 and A_2 are given such that $P(A_1) = 0.2$ and $P(A_2) = 0.7$. Determine $P(A_1 \cup A_2)$.

49.   Find the 10th term of the G.P. 1, 2, 4… … …

50.   In how many ways can six persons be arranged in a row so that two of them, John and Nick should be on either end?

51.   The cost of one chair, 2 tables and 3 desks is Rs. 100. Also 3 chairs, 4 tables and 6 desks cost Rs. 210. Find the cost of a chair.

52.   Let R be the relation in the set {1, 2, 3, 4} given by R = {(1, 2), (2, 2), (1, 1), (4, 4), (1, 3), (3, 3), (3, 2)}. Is R an equivalence relation? Justify.

53.   If $P(A) = 0.5$ and $P(A \cap B) = 0.25$, then find $P(B \mid A)$.

ANSWER MODULE II HERE

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MODULE III: Mathematics

(You can either answer Module III or Module IV. Each question in this module carries 5 marks).
Answer any **EIGHT** *questions.*

54. Evaluate: $\int \dfrac{x\,dx}{x^2 + 3x + 2}$

55. Show that $f\,[\,f\,\{\,f\,(x)\,\}\,] = x$, if $f(x) = \dfrac{1}{(1-x)}$, $x \neq 1$

56. Find $\dfrac{dy}{dx}$, when $x^2 + y^2 = \log(xy)$

57. A class consists of 10 boys and 8 girls. A committee of 3 students is constituted. What is the probability that the committee has 1 boy and 2 girls.

58. Evaluate: $\int e^x \left(\dfrac{1}{x} - \dfrac{1}{x^2} \right) dx$

59. How many odd numbers of five distinct significant digits can be formed with the digits 0, 1, 2, 3, 4?

60. Find the coefficient of x^4 in $\left(1 - \dfrac{1}{x} \right)^{11}$

61. Prove that $\underset{x \to 0}{\text{Lim}} \dfrac{(x+h)^{-1} - x^{-1}}{h} = \dfrac{-1}{x^2}$

62. A pair of dice is thrown. What is the probability of getting neither total of 7 nor 11.

63. Shade the common region bounded by the parabolas $y2 = 4x$ and $x2 = 4y$ and find its value by integration.

64. A toy spherical balloon is being inflated so that its radius increases at the rate of 3.5 cm/sec. Find how fast the surface area is changing when the radius is 6 cm.

65. How many diagonals are there in an octagon?

MODULE IV: Computer Science

(You can either answer Module III or Module IV.
Answer **ANY FIVE** *questions from this module. Each question carries Eight marks.)*

(The functions / programs may be written in Pascal, C, C++ or Java)

66. Write a **program** that accepts an integer "m" and returns the sum of all factors of "m". For example, if "m" is 28 then the output will return 1 + 2 + 4 + 7 + 14 + 28 = 56.

67. Write a **program** that accepts an integer "m" and returns as output an integer value whose digits are one more than the corresponding digit in the input number. For example, if the number is 36951, the output should be 48062.

68. Write a **program** that will accept an array of integers and returns the smallest element in the array with its position after sorting the array.

69. Write a **program** that accepts a matrix of "m" rows and "n" columns. It returns the row number with the largest sum of the row elements. For example, if the matrix is as shown below, then the output should return 3 (i.e., the row having elements 6, 5, 7, 8).

0	2	3	9
1	1	3	5
6	5	7	8
0	2	4	2

70. Write a **program** that will take in a given string (not exceeding 80 characters) and print out all the rotations of the input string. For example, the rotations of the word *best* are

    best   estb   stbe   tbes

71. Write an **algorithm** to split a simple linked list of integers into two lists so that the first list contains all even numbered elements and the second list contains all odd numbered elements. For example, if the original list is {2, 8, 1, 14, 6, 18, 0, 17} then the resultant first list would be {8, 14, 18, 17} and the second list would be {2, 1, 6, 0}.

72. A Pascal's triangle with 5 rows is shown below:

```
1
1                 2   1
1                 2   3   2   1
1                 2   3   4   3   2   1
1                 2   3   4   5   4   3   2   1
```

Write a **function** to display the Pascal's triangle up to 'n' number of rows, the value of 'n' being send as an argument to the function.

73. Write a **program** to store the following information of customers in a bank :

Account Number, Name, Balance in account.

Assume maximum of 200 customers in the bank. Include facilities to display the Account Number and Name of each customer whose balance is below Rs. 500.

ANSWER MODULE III OR MODULE IV HERE

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