Subject:	**Computer Science (Theory)**	**Full Marks: 70**
Grade:	XII	**Writing Time: 1 Hour 45 Minutes**

Reading Time: 15 Minutes (Excluding Writing Time)
Uploading Time: 15 Minutes (in PDF format only)

General instructions:

1. *ALL QUESTIONS ARE **COMPULSORY***
2. *The intended marks for questions or parts of questions are given in brackets [].*

(Select the CORRECT option for each of the following questions)

1. The law which represents the Boolean equation A + A'.B = A + B is: [1]

   (a) Commutative Law

   (b) Associative Law

   (c) Distributive Law

   (d) Idemoptence Law

2. The dual of Boolean equation X.Y + X.Y' = X + 0 [1]

   (a) (X' +Y') . (X'+Y) = X'.1

   (b) (X +Y) . (X+Y') = X.1

   (c) (X' +Y) . (X+Y') = X.0

   (d) (X +Y') . (X'+Y) = X.1

3. If W=0,X=1,Y=1,Z=1, then the minterm will be: [1]

   (a) W'+X+Y+Z

   (b) W+X'+Y'+Z'

   (c) W'.X.Y.Z

   (d) W.X'.Y'Z

4. Find the complement of F(A,B,C) = (A'.B.C')   [1]

    (a) A' + B + C'

    (b) A' + B' + C'

    (c) A + B' + C'

    (d) A + B' + C

5. The proposition operator V represents: [1]

    (a) Conjunction

    (b) Disjunction

    (c) Implication

    (d) Biconditional

6. Multiplexer :   [1]

    (a) Converts from number system to any number system.

    (b) Selects decimal information from one or many input lines and directs it to a one output line.

    (c) Selects binary information from one input line and directs it to a one or many output lines.

    (d) Selects binary information from one or many input lines and directs it to a single output line.

7. XNOR gate gives high output: [1]

    (a) when the input combination has odd number of 1's.

    (b) when the input combination has even number of 1's.

    (c) when any input line is high.

    (d) when all the input lines are high.

8. The combinational circuit which converts binary to equivalent decimal form: [1]

    (a) Encoder

    (b) Multiplexer

    (c) Decoder

    (d) Full Adder

9. A paired group in a Karnaugh Map eliminates: [1]

    (a) 4 variables

    (b) 3 variables

    (c) 2 variables

    (d) 1 variable

10. A two input (A,B) XOR gate is represented by: [1]

    (a) $(A' + B).(A + B')$

    (b) $(A' + B'). (A + B)$

    (c) $A.B' + A'.B$

    (d) $A'.B' + A.B$

11. In a decimal to binary encoder, when 7th input switch button is pressed then [2]

    (a) F_0 and F_1 OR gates produce the high output.

    (b) F_0, F_1 and F_3 produce the high output

    (c) F_1, F_2 and F_3 produce the high output

    (d) F_0, F_1 and F_2 produce the high output

12. A matrix A[m][m] is stored in the memory with each element requiring 4 bytes of storage. If the base address at A[1][1] is 1500 and address of A[4][5] is 1608, determine the order of the matrix when it is stored in **Column Major Wise**. [2]

    (a) The order of the matrix A is 4 rows and 4 columns

    (b) The order of the matrix A is 6 rows and 4 columns

    (c) The order of the matrix A is 6 rows and 6 columns

    (d) The order of the matrix A 4 rows and 6 columns

13. If P = "You won't go to bed now" and Q = "You will be tired tomorrow" then,

    (a) write its proposition for inverse: [1]

        (i) If you won't go to bed now then you will be tired tomorrow.

        (ii) If you go to bed now then you won't be tired tomorrow.

        (iii) You won't go to be now and you will be tired tomorrow.

        (iv) If you go to bed now then you would be tired tomorrow.

(b) write its proposition for converse:					[1]

    (i)   If you won't go to bed now then you will be tired tomorrow.

    (ii) If you go to bed now then you won't be tired tomorrow.

    (iii) If you won't be tired tomorrow then you will go to bed now.

    (iv) If you go to bed now then you would be tired tomorrow.

14. The reduce expression of the Boolean expression $F(A,B,C) = \pi (0,2,4,6)$			[2]

    (a) 0

    (b) $(A + B).(A' + B)$

    (c) $(A + C). (A' + C)$

    (d) $(B + C). (B' + C)$

15. What is the output of the code given below:					[2]

```
int i,j;
for(i=10;i>=1;i-=3)
{
  for(j=i;j>1;j-=2)
  {
    System.out.print(j + "\t");
  }
  System.out.println();
  if(i%4==0)
    break;
}
```

    (a) 10 8   6   4   2

       7 5   3

       4 2

    (b) 10 7   4 3   1

       7   4 3 1

       4   3 1

(c) 10   8 6   4

     8   6 4

     6   4

     4

(d) 10 7 4   3

    8 6 4 2

    7 4 3

    5 4

16. What is the output of the code given below: [2]

```
char[ ] alpha={'A', 'B', 'C', 'D'};
int sum=0;
for(int i=0;i<alpha.length;i++)
        sum+=alpha[i] + Integer.parseInt("10");
System.out.print(sum);
```

(a) A10B10C10D10

(b) 300

(c) 306

(d) 310

17. What is the output of the code given below: [2]

```
System.out.print('a' + Integer.parseInt("a") +100 )
```

(a) 230

(b) 294

(c) Runtime Exception: NumberFormatException

(d) 97 a 100

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