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Paper Code : BCAC101 Digital Electronics

UMD : 1000079

Time Allotted : 3 Hours | *Full Marks :70*

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(i) A.A' =?

(ii) Full subtractor has ____ number of inputs.

(iii) _____ flip flop is used to store data.

(iv) Mod-10 counter can count upto _____.

(v) Convert the decimal number 739 to its excess-3 form.

(vi) ABC is a _____ (minterm/maxterm)

(vii) If A and B are the inputs to a half subtractor then what is the logic expression for Borrow out?

(viii) In a 8X1 MUX, the number of select lines will be _____.

(ix) In a 4 bit RING counter what is the number of states?

(x) Convert the binary number 1110111 to its equivalent gray code.

(xi) If the number of variables is n then the number of cells in KMap is _____.

(xii) _____ gate is also known as a controlled inverter.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Write a short note on D flip flop. [5]

3. Design a 3 bit Asynchronous Down Counter. [5]

4. Represent -21.75 in IEEE 754 single precision format. [5]

5. State De Morgan's Theorems and proof using truth table. [5]

6. Design a 4 bit SIPO register. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Design a 3 bit Asynchronous Up-Down Counter. [6]

(b) Design a Decade ripple counter. [6]

(c) Explain the method of frequency division in brief. [3]

8. a) Convert the binary number 10110 to its equivalent decimal number. [1+1+1+1+1+5]
b) Convert the binary number 10110 to its equivalent octal number.
c) Convert the binary number 10110 to its equivalent hexadecimal number.
d) Convert the binary number 10110 to its equivalent gray code.
e) Determine 1's complement of the binary number 10110.
f) Write a short note on Parity Generator and Parity Checker.
g) Explain XOR gate and XNOR gate with logic symbol, logic expression, and truth table.

9. a) Find the complement of the Boolean expression: Y=ABC+ABC'+A'B'C+A'BC [3+3+3+6]
b) Prove that (A+C)(A+D)(B+C)(B+D)=AB+CD
c) Simplify the following Boolean expression: A+A'B'+BC'D'+BC
d) Obtain minimal POS for the expression: F(A,B,C,D)= ∑m(3,4,6,7,11,12,13,14,15)

10. (a) Describe full adder with block diagram, truth table, Boolean expression, logic circuit. [5]

(b) Draw a half subtractor circuit and describe its operations. [5]

(c) Draw a full adder using two half adders. [5]

11. (a) Using the K map method simplify the Boolean function to obtain i) minimal SOP ii) minimal POS: [5+5]
Y=∑m(0,2,3,6,7)+ ∑d(8,10,11,15)

(b) Derive the SOP expression from the given truth table where A, B, C are inputs and Y is the output. [5]

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

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