

Reg. No.

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BCACAC 108

Credit Based First Semester B.C.A. Degree Examination, Oct./Nov. 2017
(Common to all Batches)
COMPUTER ORGANISATION

Time : 3 Hours

Max. Marks : 80

Note : Answer any ten questions from Part – A and any one full question from each Unit of Part – B.

PART – A

1. a) Write Excess-3 and BCD equivalent of $(125)_{10}$. (10×2=20)
- b) Write 1's and 2's complement.
 - i) $(101101)_2$
 - ii) 1101.11_2
- c) Perform following :
 - i) $(11101.10)_2 + (1011.11)_2$
 - ii) $(111.10)_2 - (100.11)_2$
- d) Define duality of Boolean algebra. Write the dual of the given expression
 $F = (X + Y) (X' + Y) (X + Y' + Z)$
- e) Write the truth table and logic symbol of OR gate and NAND gate.
- f) Draw the logic circuit for $F(X, Y, Z) = X'Y + X'Z$.
- g) What is Half adder ? Write its truth table.
- h) What is Combination Logical Circuit ? Draw the block diagram.
 - i) Write the truth table of 2 to 4 line Decoder.
 - j) Write excitation table for JK and T flip-flops.
 - k) Draw a SR latch using NOR gate.
 - l) Write the characteristics tables of D and T flip flop.

P.T.O.



PART - B

UNIT - I

2. a) Perform following conversion.

i) $(41.56)_8 = ()_2$

ii) $(225.225)_{10} = ()_2$

iii) $(ABCD)_{16} = ()_{10}$

b) Perform the following subtraction using 9's and 10's complement.

i) $(328)_{10} - (85)_{10}$

ii) $(581.35)_{10} - (785.12)_{10}$

c) State and prove any five theorems of Boolean algebra.

(5+5+5)

3. a) Perform the following conversion :

i) $(78.56)_{10} = ()_{16}$

ii) $(452.21)_8 = ()_{10}$

iii) $(1111011011)_2 = ()_{16}$

b) Perform the following subtraction using 1's and 2's complement.

i) $(11011)_2 - (10001)_2$

ii) $(1000)_2 - (1111)_2$

c) State the postulates of Boolean algebra.

(5+5+5)

UNIT - II

4. a) Express the Boolean function $F(A, B, C) = (A' + B)(B' + C)$ as sum of minterm and product of maxterm.

b) Prove that NOR is universal gate.

c) Implement XOR and XNOR using NAND gate.

d) Using K-Map simplify the following expression

$$F(w, x, y, z) = \sum(0, 1, 2, 3, 5, 7, 8, 9, 10, 11, 13, 15)$$

(4+4+4+3)



5. a) Using theorems and Postulates simplify
- i) $F(A, B, C, D) = A'B(D' + C'D) + B(A + A'CD)$
 - ii) $F(A, B, C, D) = (BC' + A'D)(AB' + CD')$
- b) Implement the Boolean function $F(A, B, C) = A'B + CD'$ using only NAND gate.
- c) Using K-Map simplify the following expression $F(a, b, c) = \sum(0, 1, 2, 3, 7)$.
- d) Obtain the simplified expression in product of sums using K-Map.
 $F(w, x, y, z) = \pi(0, 1, 4, 5, 7, 10, 14, 15)$ (4+4+3+4)

UNIT – III

6. a) What is an Adder ? Explain full adder along with its truth table, Boolean expression and logic circuit.
- b) Design 4 to 1 line multiplexer and write necessary table.
- c) Design and explain the working of 2 bit Magnitude Comparator. (5+5+5)
7. a) Design and explain the working of BCD Adder.
- b) Explain the working of 3 to 8 line decoder.
- c) Design BCD to Excess-3 code converter. (5+5+5)

UNIT – IV

8. a) Explain the working of JK flip flop.
- b) Design a MOD 10 synchronous counter using T flip flop.
- c) Explain the working of 4 bit Ripple Counter. (5+5+5)
9. a) Design a MOD-6 synchronous counter using JK flip flop.
- b) Explain state table, state diagram and state equation using example.
- c) Explain the working of Bi-Directional Shift Register. (4+5+6)