BCACAC 108

Credit Based First Semester B.C.A. Degree
Examination, Nov./Dec. 2018
COMPUTER ORGANIZATION
(Common to All Batches)

Time : 3 Hours

Max. Marks : 80

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

PART – A

1. a) $(1110001101)_2 = (\quad)_8$.

   (2×10=20)

   b) Write 9's and 10's complement

   i) $(701189)_{10}$

   ii) $(4706.15)_{10}$.

   c) Write the Logic Symbol and truth table of XOR gate.

   d) Write the general structure of 2 and 3 variables K-Map.

   e) Prove that $ABC + A'B + ABC' = B$.

   f) Write the dual of the given expression $F = (X + Y)(X + Y' + Z)$

   g) Write the logical expression for 1 bit comparator.

   h) Write the truth table of Half Subtractor.

   i) Write the truth table of octal to binary encoder.

   j) Write the excitation tables of SR and T flip flop.

   k) Draw a block diagram of 4 bit Right Shift bit register using D flip-flop.

   l) Define counter. How many flip-flops are required to design MOD-18 synchronous counter ?

PART – B

Unit – I

2. a) Perform following Conversion :

    i) $(351)_8 = (\quad)_{10}$

    ii) $(785)_{10} = (\quad)_8$

    iii) $(BCA)_{16} = (\quad)_2$

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

    i) $(216)_{10} - (485)_{10}$

    ii) $(1024)_{10} - (925)_{10}$.

   c) State the postulates of Boolean algebra.   **(5+5+5)**

3. a) Perform following Conversion :

    i) $(ABCD.65)_{16} = (\quad)_2$

    ii) $(785)_{10} = (\quad)_8$

    iii) $(1101)_2 = (\quad)_{10}$

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

    i) $(1101)_2 - (1000)_2$

    ii) $(1011)_2 - (1100)_2$

   c) State and prove any five theorems of Boolean algebra.   **(5+5+5)**

Unit – II

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

   b) Prove that NAND is universal gate.

   c) Using K-Map simplify the following expression :

   $F(w, x, y, z) = \Sigma(1, 3, 4, 5, 6, 7, 9, 11, 12, 13, 14, 15)$.   **(5+5+5)**

5. a) Using K-Map simplify the following expression :

   $F(w, x, y, z) = \Sigma(0, 1, 2, 4, 5, 6, 8, 9, 10, 12, 13, 14)$.

   b) Implement the Boolean function $F(A, B, C, D) = AB + C'D'$ using only NOR gate.

   c) Express the Boolean function $F(A, B, C) = (A' + B')(B + C)$ as sum of minterm and product of maxterm.   **(5+5+5)**

Unit – III

6. a) Explain the working of Full Adder.

   b) Explain the working of 3 to 8 line Decoder.

   c) Design BCD to Excess -3 code converter. (5+5+5)

7. a) Design 2 bit Magnitude Comparator.

   b) Design and explain BCD Adders.

   c) Explain the working of 2×4 De-Multiplexer. (5+5+5)

Unit – IV

8. a) Explain the working of clocked JK flip-flop. Write the characteristics and logical expression.

   b) Design 4 bit Binary ripple counter.

   c) Design BCD synchronous counter using T flip-flop. (5+5+5)

9. a) Explain state table, state diagram and state equation using example.

   b) Explain the working of Bi-directional shift register.

   c) Design a OCTAL Synchronous counter using JK flip-flop. (5+5+5)

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