Reg. No. | | | | | | | | | |

**BCACAC 108**

## Credit Based First Semester B.C.A. Degree Examination, October/November 2016
## (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 the BCD and Excess-3 code of $(376)_{10}$. **(10×2=20)**

   b) Find the 1's and 2's complement of 10110.

   c) Write the algebraic function and graphic symbol of NOR gate.

   d) Prove that x + xy = x.

   e) Write the Venn diagram for xy + yz.

   f) What is principle of duality ? Write the dual of X'Y + XY' = 1.

   g) Write excitation table of JK flip flop.

   h) What is a half-subtractor ? Write its truth table.

   i) What is a register ? Write the block diagram of 4 bit register.

   j) What is BCD adder ?

   k) What is multiplexer ?

   l) Define :

      i) State table

      ii) State diagram.

P.T.O.

PART – B

**Unit – I**

2. a) Perform the following subtractions using 9's and 10's complement methods :

   i) $(8085 - 3250)_{10}$ ii) $(5310 - 7642)_{10}$.

   b) Perform the following conversion : $(BCA.D)_{16} = (?)_2 = (?)_8 = (?)_{10}$.

   c) State and prove DeMorgan's theorems for two variables. **(6+5+4)**

3. a) Perform the following subtraction using 1's and 2's complement methods :

   i) 10101 – 1011 ii) 10110 – 11010.

   b) Perform the following conversion : $(915.67)_{10} = (?)_2 = (?)_8 = (?)_{16}$.

   c) State any four postulates of Boolean algebra. **(6+5+4)**

**Unit – II**

4. a) Using K-Map simplify the following expression and draw the logic circuit for the simplified expression.

   $F(a, b, c, d) = \Sigma(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$.

   b) Find the complements of :

   i) $F1 = XYZ' + X'Y'Z$ ii) $F2 = (A + B)' (A' + B' + C) (B + C')$.

   c) Prove that NAND is a universal gate. **(6+4+5)**

5. a) Write the truth table and logic circuit for the Boolean function $F = XY + X'Y + Y'Z$.

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

   c) Prove that NOR is a universal gate. **(5+5+5)**

**Unit – III**

6. a) What is a full-adder ? Explain its working.

   b) Design BCD to Excess-3 code converter.

   c) Explain the working of 4*1 multiplexer. **(5+5+5)**

7. a) Explain the working of BCD adder with block diagram.

   b) What is Magnitude Comparator ? Design a 1-bit Magnitude Comparator.

   c) Explain the working of 3×8 Decoder. **(6+4+5)**

## Unit – IV

8. a) Explain the working of basic RS flip-flop using NOR gate.

   b) Design 3 bit binary counter using JK flip flop.

   c) What is a shift register ? Explain with a neat diagram. **(5+5+5)**

9. a) Explain the working of basic JK flip-flop.

   b) Design a mod 6 counter using T flip-flop.

   c) Design a 4-bit binary ripple counter. **(5+5+5)**

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