Credit Based First Semester B.C.A. Degree Examination, Oct./Nov. 2014
(New Syllabus) (2012-13 Batch Onwards)
COMPUTER ORGANIZATION

Time : 3 Hours

Max. Marks : 80

Note : *Answer **any ten** questions from Part **A** and answer **any one**
full questions from **each** Unit in Part **B**.*

PART – A

1. a) Write BCD and Excess-3 code of $(276)_{10}$.   (2×10=20)
   b) Write 1's and 2's complement of $(1011)_2$.
   c) Differentiate combination and sequential circuits.
   d) Write the truth table and graphic symbol of NAND gate.
   e) Prove that $x + x'y = x + y$.
   f) Write a table to show the minterms for three binary variables x, y and z.
   g) Write dual of $F = AB' + C$.
   h) What is a half adder ? Write truth table for the same.
   i) Draw SR latch circuit using NOR gates.
   j) Write the excitation table of JK flip-flop.
   k) Write the diagram of 4 bit shift register using D-flip flops.
   l) Define counter. State any one differences between synchronous counter and ripple counter.

PART – B
UNIT – I

2. a) Perform following conversions
   i) $(75.75)_{10} = (?)_2$
   ii) $(BCA)_{16} = (?)_2$
   iii) $(11011.11)_2 = (?)_8$
   b) Perform following subtractions using 9's and 10's complement methods
   i) $(3762-975)_{10}$ ii) $(5310 - 7642)_{10}$
   c) State and prove any three theorems of Boolean Algebra.   (5+4+6)

P.T.O.

3. a) Using Venn diagram prove that x(x + y) = xy + xz.
   b) Perform the following subtractions using 1's and 2's complement methods.
      i) $(10101 - 1100)_2$
      ii) $(1000 - 1110)_2$
   c) Implement XOR and XNOR using NOR gates. (4+6+5)

UNIT – II

4. a) Simplify the following expression using K-map
      $F(w, x, y, z) = \Sigma(0, 2, 4, 7, 8)$ and $\Sigma_d(5, 10, 13, 14)$
   b) Write truth table and logic circuits for the Boolean function
      $F = XY + X'Y + Y'Z$
   c) Prove that NOR is universal gate. (5+5+5)

5. a) Express the following function in sum of minterms and product of maxterms
      $F(A, B, C, D) = AB'C + BCD$
   b) Simplify the following expression using K-map
      $F(A, B, C, D) = \Sigma(0, 1, 2, 6, 8, 9, 10)$
   c) Find the complement of following functions
      i) $F_1 = X'YZ' + XY'Z + Y'Z$
      ii) $F_2 = (A + B')(A' + B' + C)(B + C')$ (6+5+4)

UNIT – III

6. a) What is a full adder ? Write truth table, Boolean expression and logic diagram for the same.
   b) Design 2 bit magnitude comparator.
   c) Design 4 bit binary parallel adder using full adders. (6+5+4)

7. a) Explain the working of BCD adder with suitable block diagram.
   b) Define decoder. Design 3-to-8 line decoder.
   c) Design 4-to-1 line multiplexer. Write necessary table and block diagram. (6+5+4)

UNIT – IV

8. a) Explain clocked RS flip flop along with logic diagram and characteristic table.
   b) Design a Bi-directional shift register.
   c) Design a 4 bit binary ripple counter. (6+5+4)

9. a) Design a MOD 7 synchronous counter using JK flip flops.
   b) Explain the working of JK flip flop along with logic diagram and characteristic table.
   c) Explain state table, state diagram and state equation with example. (6+5+4)