

Roll No.

BCA-202(N)

B. C. A. (Second Semester)
EXAMINATION, May, 2013

(New Course)

Paper Second

DIGITAL ELECTRONICS AND COMPUTER ORGANIZATION

Time : Three Hours]

[Maximum Marks : 75

Note : Section A is compulsory. Attempt *seven* questions out of ten questions from Section B and *one* question from Section C.

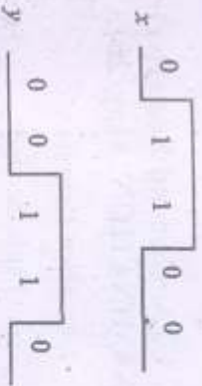
Section – A

1. (a) If 73_x (in base- x number system) is equal to 54_y (in base y number system), the possible values of x and y are : 4
 - (i) 8, 16
 - (ii) 10, 12
 - (iii) 9, 13
 - (iv) 8, 13
- (b) Implement EX-OR Gate with the help of NAND Gate. Show the output at each step. 4
2. Draw the logic diagram for BCD to Excess-3 code converter. Discuss each step through truth table and K-map. 10

P. T. O.

Section - B

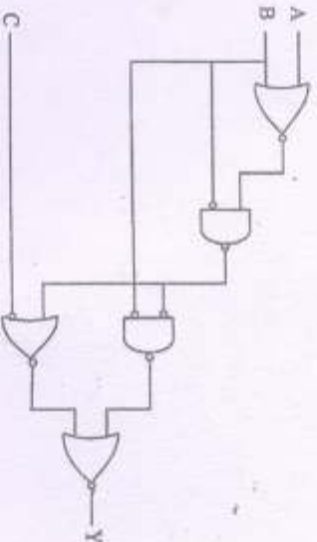
3. Draw the block diagram of digital computer and explain each unit. 6
4. Two digital signals x and y are as follows : 6



Find AND, OR, NOT, EX-OR, EX-NOR operations.

5. (a) What is Cache memory ? What is the need of Cache memory in computer system ? 3
- (b) How many $32\text{ K} \times 1$ RAM chips are needed to provide a memory capacity of 256 K bytes ? 3
6. (a) Express the Boolean function $F = X + Y'Z$ in a sum of minterms. 3
- (b) Express the Boolean function $F = AB + A'D$ in a product of maxterm form. 3
7. (a) Implement a full-adder circuit. 3
- (b) Discuss Half subtractor and draw the boolean function for the two outputs. 3
8. Construct a 5×32 decoder with four 3×8 decoder and a 2×4 decoder. 6
9. What is Flip-Flop ? Discuss J-K flip-flop in detail. 6
10. Draw the block diagram of 4 bit register with parallel load. 6

11. For the logic circuit shown in the figure, the simplified Boolean expression for the output Y is : 6



12. Simplify the following boolean function through K-map : 6
- $$F(w, x, y, z) = \Sigma (1, 3, 4, 6, 9, 11, 12, 14)$$

Section - C

13. (a) Simplify the boolean function : 6
- (i) $x'y' + xy' + x'y$
- (ii) $\overline{AB} + ABC + A(B + A\overline{B})$
- (iii) Find the dual of :
 $F = A'B'C' + A'B'C$
- (b) (i) What is the maximum number of different boolean function involving n Boolean variable.
 (ii) The hexadecimal representation of $(657)_8$. 4
 (c) Simplify using K-map : 5
 $F(w, x, y, z) = \Sigma (0, 4, 5, 7, 8, 9, 13, 15)$
14. (a) Design a counter with the following binary sequence 0, 1, 2, 3, 4, 5, 6, 7 and repeat using T flip-flops. 10
 (b) Draw the block diagram of 4 bit full adders circuit. 5