

## Section-C

## (Long Answer Type Questions)

Note: Attempt any one question. Each question carries 15 marks. (15×1=15)

13. Write short notes on following-
- J-K flip-flop
  - De Multiplexers
  - Cache Memory
  - Virtual Memory
14. Write short notes on the following-
- Shift Registers
  - PROM and EPROM
  - Combination & Sequential circuit
  - Don't care condition

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Roll No.....

BCA-202 (N)

B.C.A. (Semester-II) Examination-2014

(New Course)

Paper: Second

### Digital Electronics and Computer Organization

Time: Three Hours] [Maximum Marks: 75

Note: Section A is compulsory. Attempt any seven questions from Section B and attempt any one question from Section C.

## Section-A

Note: Both questions are compulsory. Each question carries equal marks.

1. (a) Simplify the expression using Boolean algebra-
- $\overline{AB} + \bar{A} + AB$
  - $XY + \overline{XZ} + XYZ$  ( $XY + Z$ )

(4)

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- (b) (i) State the principle of duality in boolean algebra and give the dual of the boolean expression  $(X + Y).(\bar{X} + \bar{Z}).(Y + Z)$  (4)
- (ii) Implement EX-OR gate with the help of NAND gate. Show the output at each step. (4)
2. Simplify the following Boolean function through K-Map.  
 $Y(A, B, C, D) = \pi(0, 1, 3, 5, 6, 7, 10, 14, 15)$  (6)

## Section-B

## (Short Answer Type Questions)

Note: Attempt any seven questions. Each question carries 6 marks. (6x7=42)

3. Define Full Adder. Implement a full adder circuit using NAND gate only.
4. Design a combinational whose input is a four bit number and whose output is the 2's complement of the number.
5. Construct a 5x32 decoder with four 3x8 decoder and a 2x4 decoder.

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6. What is Multiplexer? Construct a 16x1 line multiplexer with two 8x1 and one 2x1 line multiplexer.
7. Construct a D flip-flop using
  - (a) SR flip-flop
  - (b) JK flip-flop
8. What is a ring counter? Draw its circuit and explain its working.
9. Design a Mod 7 binary counter. Draw its state diagram and circuit.
10. Discuss the memory hierarchy? How is the performance of memory system improved by using cache?
11. (a) Express the Boolean function  $F = X + Y'Z$  in a sum of minterms.  
 (b) Express the Boolean function  $F = AB + A'D$  in a product of maxterm form.
12. Design the basic gates by using NOR gate.

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