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**BCACAC 108**

**Credit Based First Semester B.C.A. Degree Examination, Oct./Nov. 2013**  
**(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 question from each Unit in Part - B.

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**PART - A**

- (2x10=20)
- Convert  $(153.513)_8$  to Binary.
  - Write the BCD and Excess - 3 code of  $(345)_{10}$ .
  - Write the Truth Table and logic symbol of XNOR gate.
  - How to write complement of a Boolean function ? Also write the complement of  $F(X, Y, Z) = X'YZ' + X'Y'Z$ .
  - What is the difference between canonical forms and standard forms ?
  - Write the general structure of 2 and 3 variable K-Map.
  - What is a Half Subtractor ? Write the Truth Table of Half Subtractor.
  - Write the logic expression of 2 to 4 line decoder.
  - Draw SR latch circuit using NAND gate.
  - Write the Excitation table of SR flip-flop.
  - Define state table and state diagram.
  - What is counter ? How many number of flip-flops are required to design mod 7 counter ?

**PART - B**  
**UNIT - I**

2. a) Perform the following conversion.

i)  $(1101.11)_2 = ( )_{10}$       ii)  $(37)_8 = ( )_{16}$       iii)  $(45)_{10} = ( )_2$

b) State and prove any three theorems of Boolean algebra.

c) Perform following Subtraction using 9's and 10's Complements.

i)  $(8052)_{10} - (3250)_{10}$       ii)  $(6320)_{10} - (8659)_{10}$

(4+6+4)

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3. a) Using Venn diagram prove that  $X = XY + X$ .  
 b) Perform the following subtraction using 1's and 2's Complement.  
 i)  $(1001)_2 - (1011)_2$                       ii)  $(10011)_2 - (1001)_2$   
 c) State five Postulates of Boolean algebra. (4+6+5)

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## UNIT – II

4. a) Prove that NAND is universal gate.  
 b) Using K map simplify the following expression.  
 $F(A, B, C, D) = \sum(0, 1, 2, 4, 5, 6, 8, 9, 12, 13, 14)$   
 c) Using theorems and Postulates Simplify  
 $F(A, B, C, D) = A' B(D' + C' D) + B(A + A' CD)$  (5+5+5)
5. a) Write the Sum of Minterm and Product of Maxterm for given expression.  
 $F(X, Y, Z) = XY + X'Z$   
 b) Write the Truth Table and logic circuit for following expression.  
 $F(X, Y, Z) = X'Y + X'Z$   
 c) Using K map simplify the following expression.  
 $F(A, B, C) = \sum(0, 2, 3, 4, 6)$  (6+5+4)

## UNIT – III

6. a) What is full adder ? Explain its working.  
 b) Design BCD to Excess - 3 convertor.  
 c) Design 2 bit Magnitude Comparator. (5+5+5)
7. a) What is Decoder ? Design 3 to 8 line Decoder.  
 b) Explain the working of BCD adder with block diagram.  
 c) What is Multiplexer ? Design  $4 \times 1$  Multiplexer. (5+6+4)



UNIT – IV

8. a) Design the 4 bit Binary Ripple counter.  
b) Explain the JK Flip Flop with logic diagram and characteristics table.  
c) What is register ? Design 4 - bit register. **(5+6+4)**
9. a) Explain the working of D - Flip Flop using NAND gate.  
b) Design MOD - 6 Synchronous counter using JK Flip Flop.  
c) What are shift register ? Explain the 4 - bit shift register with block diagram. **(4+6+5)**
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