

Computer Organisation and

Architecture

2009 May

Technology BCA

Semester 2

University Exam

Mangalore University

BCACAC 153

Reg. No.

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20/1-27

**Credit Based Second Semester B.C.A. Degree Examination**  
April / May 2009

**COMPUTER ORGANISATION AND ARCHITECTURE**

Time : 3 Hours

Max.Marks: 80

**Note: Answer any TEN questions from PART A and answer any one full question from PART B.**

PART-A

1. a. Convert  $(BCA)_{16}$  to binary and octal. (2x10=20)
- b. Write the truth table and logic diagram of XOR gate.
- c. What is IC? Give the classification of IC based on number of transistor.
- d. What is the difference between Canonical and standard form?
- e. Prove  $X+XY=X$ .
- f. What is meant by principle of duality? Write the dual of the given expression  
 $F=(X+Y)(X+Y')(X+Y+Z)$
- g. What are characteristic table? Write the characteristic table of SR flip flop.
- h. Write BCD and Binary equivalent of  $(98)_{10}$ .
- i. Draw the circuit diagram of SR latch using NOR gate.
- j. Write the truth table and logic expression of Half Adder.
- k. What is a counter? Minimum of how many flip-flops are required to design 3 bit counter.
- l. Differentiate between 1's and 2's complements.

PART-B

UNIT-I

2. a. What is Instruction? Explain the following Assembly level language instruction with example.  
i) ADD ii) MUL iii) BRM
- b. Write the Assembly level language code to evaluate  $Y = X^2+Y^2+Z^2$
- c. Perform following conversion.  
i)  $(1101.101)_2 = ( )_{10}$   
ii)  $(125.48)_{10} = ( )_8$   
iii)  $(BCD.A1)_{16} = ( )_2$  (7+2+6)

Contd... 2

3. a. Explain floating point number Addition and Multiplication with an example.  
 b. What are Octal and Hexadecimal number system? Explain conversion from Decimal to Octal and Hexadecimal with an example.  
 c. Explain following.  
 i) Decimal codes.  
 ii) Alphanumeric codes. (5+6+4)

UNIT-II

4. a. Simplify given Boolean expression using theorems and postulates.  
 $F(W,X,Y,Z) = XY'Z + X'Y'Z + W'XY + WX'Y + WXY$  and draw the logic diagram for minimized expression.  
 b. Using K-Map simplify the following expression.  
 $F(A,B,C,D) = \sum (0,2,4,5,6,7,8,10,13,15)$   
 c. Express the Boolean function  $F = xy' + x'z$  in sum of minterm and product of Maxterm form. (6+4+5)
5. a. State any 5 postulates of Boolean algebra.  
 b. Minimize  $F(A,B,C,D) = \sum (0,3,4,7,8) + \sum d(10,11,12,13,14,15)$  and draw the logic diagram for minimized expression.  
 c. Prove that NAND is Universal gate. (5+5+5)

UNIT-III

6. a. Explain the working of JK flip-flop.  
 b. Design MOD 7 synchronous counter using JK flip-flop.  
 c. What is shift register? Explain with neat diagram. (5+5+5)
7. a. Design BCD ripple counter.  
 b. Design MOD-4 synchronous counter using T-flip flop.  
 c. Explain state table, state diagram and state equation using example. (5+5+5)

UNIT-IV

8. a. Design and explain BCD adder.  
 b. Perform following subtraction using 1's and 2's complement method.  
 i)  $(58)_{10} - (12)_{10}$  ii)  $(10011.11)_2 - (11000.10)_2$   
 c. Explain 2's complement addition with example. (5+6+4)
9. a. Explain the working of Full-Adder with logic diagram.  
 b. Explain shift operation with suitable diagram.  
 c. Perform following subtraction using 9's and 10's complement method.  
 i)  $(8752)_{10} - (3250)_{10}$  ii)  $(6320)_{10} - (8659)_{10}$  (5+6+4)

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