BITS, PILANI – DUBAI CAMPUS

Course No: CSE/EEE/EIE UC391
Class: B.E (Hons.)-III Year
Course Title: Digital Electronics and Computer Organization
TEST-1 (Closed book)

Date: October 31, 2004   **Time: 50 Minutes**   **M.M. = 30**

Note:

(i)   Answer all the questions.
(ii)   All questions to be answered in the answer sheet only.
(iii)   Question paper contains Two Pages.
(iv)   Answer all the parts of a question in continuation.
(v)   Do not leave any blank space/page(s) in between the answers.
(vi)   Do not write any thing on the question paper except your ID/hall ticket No.
(vii)   Cross the blank space/page (s), if any.
(viii) <u>Calculator is not allowed.</u>

Q.1   Solve the following arithmetic operation and comment on the result.

    (a)   Subtract B8H from 33H using 15's &16's compliments method.   **[2]**

    (b)   Use 1s compliment arithmetic and 8-bit register to subtract: **[2]**
                   $(-37)_{10}$ - $(91)_{10}$

    (c)   Add $(+112)_{10}$ **and** $(+65)_{10}$ using 2s compliment arithmetic and 8-bit   **[2]**
        register.

Q.2 (a)   Convert the SOP equation **F= AB'C + A'BC'** in to its POS form.   **[3]**

    (b)   Implement using NAND gates only: **F = (ABC + A'B'C' + C'D).**   **[3]**
        How many ICs are needed?

    (c)   Determine the Boolean function whose truth table is given below. Draw   **[3]**
        the logic circuit.

A	B	C	F
0	0	0	0
1	0	0	0
0	1	0	0
1	1	0	1
0	0	1	1
1	0	1	1
0	1	1	1
1	1	1	1

Q.3 (a) Minimize the function given below using Karnaugh map as shown in figure-1. [2+2]

$$F(A,B,C,D) = \sum(1,2,6,7,8,13,14,15) + d\,(3,5,12)$$
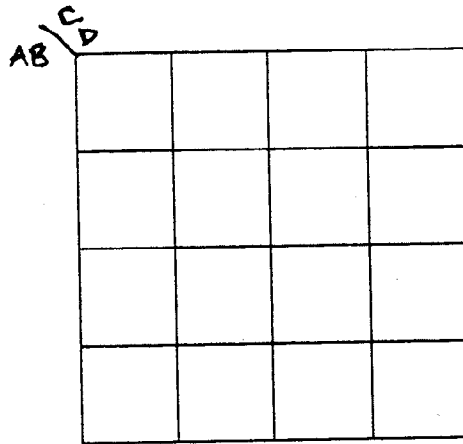
(b) Draw and explain 2x2 bit word binary multiplication circuit with the help of following binary signal. [3+2]

Multiplicand=11   Multiplier=10

Q.4 (a) Implement the following Boolean function using a decoder and basic logic gates.. [4]

$$F(A,\,B,C,D) \;=\; \sum(0,3,5,6,9,10,12,15)$$

(b) Identify the function. [2]

Course No.: CS / EEE / EIE UC 391   **Course Title: DECO**

Date: December 19, 2004   **Time: 50 Minutes**   **Max. Marks = 30**

(Answer all questions. Calculators are not permitted)

1. Tabulate the truth table for an 8 x 3 ROM that implements the Boolean functions
   $A(x,y,z) = \Sigma\ (\ 1,2,3,5,7)$
   $B\ (x,y,z) = \Sigma\ (1,2,4,6)$
   $C\ (x,y,z) = \Sigma\ (\ 0,1,6,7)$
   Considering the ROM as a memory, specify the memory contents at 2 and 5.
   Draw the programming logic of the 8 x 3 PROM   (9)

2. Write the state table of a sequential circuit with two T flip flops A and B and one input x whose change in states are described as follows.
   When x = 0, the state of the circuit remains the same. When x = 1, the circuit goes through the state transitions from 00 to 10 to 11 to 01 back to 00, and repeats.

   Also draw the state diagram for the circuit.   (6)

3. Using J-K flip flop, design a synchronous counter to count the repeated sequence 1,2,3,5,7   (7)

4. With the help of a neat block diagram, describe the unsigned number multiplication algorithm used in digital computers. Demonstrate the operation with the data 11 and 8   (8)

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