Birla Institute of Technology & Science, Pilani
Distance Learning Programmes Division
First Semester 2005-2006
Comprehensive Examination (EC-2 Regular)

Course No.   : ES ZC261
Course Title   : DIGITAL ELECTRONICS & MICROPROCESSORS
Nature of Exam   : Open Book
Weightage   : 60%
Duration   : 3 Hours
Date of Exam   : 30/10/2005   (FN)

| No. of Pages   = 2 |
| No. of Questions = 7 |

Note:
1.   Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2.   All parts of a question should be answered consecutively. Each answer should start from a fresh page.

Q 1.   Represent decimal number 6027 in (a) BCD (b) excess-3 code (c) 2421 code.   (6)

Q 2.   Given: Jones, Baker, Harris and Johnson are members of the board of trustees of a company.
        Decisions are made by the following criteria.

        A buy order is placed if:

- James, Baker and Johnson vote NO and Harris vote YES
- Or Jones and Harris vote NO and rest vote YES
- Or Baker and Harris vote YES and rest vote NO
- Or Jones vote NO and others vote YES
- Or Baker votes NO and others vote YES
- Or Baker and Jones vote YES and others vote NO
- Or Johnson votes No and others vote yes
- Or they all vote YES

        Design a simplified logic circuit (both SOP and POS) that will make the buy decision for these
        members of the trust. Use any combination of gates, but minimize use of inverters.
                                                                                          (12)

Q 3.   A sequential circuit given below has two inputs X and Y and one outputs S (Sum). It consists of a full
        adder circuit connected to a D flip flop. Derive the state table and state diagram of sequential circuit.
                                                          (10)
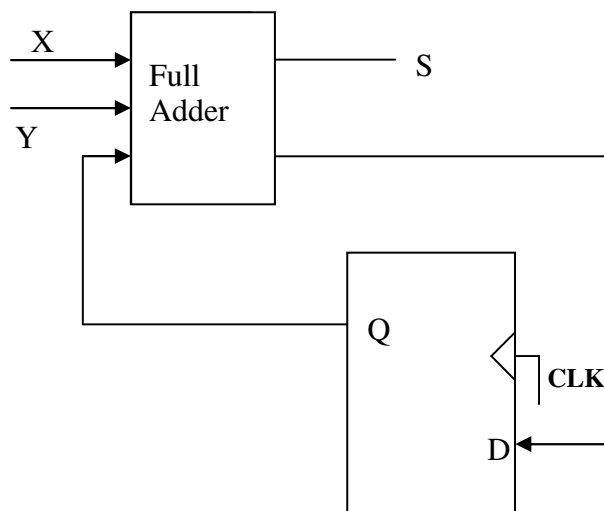
ES ZC261 (EC-2 REGULAR)   FIRST SEMESTER 2005-2006   PAGE 2

Q 4.   Implement the following four Boolean Expressions with three half adders   (5)

$$D = A \oplus B \oplus C$$

$$E = A'BC + AB'C$$

$$F = ABC' + (A' + B')C$$

$$G = ABC$$

Q 5.   Write an assembly language program for 8085 microprocessor that subtracts 700 from 900 and stores the answer in the H and L registers.   (10)

Q 6.   Give the contents of 8085 registers A, B and C and the contents of the memory locations 2020H, 2021H, 2080H after the following program is run.   (8)

```
LXI     H, 2020H
LXI     D, 2080H
XCHG
MVI     A, 2AH
MOV     M, A
MVI     A, 20H
MOV     B, A
XCHG
MOV     M, B
XCHG
MOV     C, M
MOV     A, C
STA     2021H
HLT
```

Q7 (a).   Write a one –byte instruction that will set the zero flag without affecting the 8085's 8 bit register contents.

   (b).   For the memory circuit of an 8085 microprocessor (a) what is the total size of the memory in the circuit (b) What are the beginning and ending address of the memory in chip(give answer in hexadecimal numbers)

                    (3 + 6 = 9)

****