01242

B.Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

December, 2011

BIEL-003 : DIGITAL ELECTRONICS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any seven questions. All questions carry equal marks.*

1. (a) Simplify the Expression   2

        $[ABC(C+BD)+AB]C$

    (b) Realize XOR gate using four 2 - input   3
        NAND gates.

    (c) Design a 4 bit Gray codes to Binary codes   5
        convertor.

2. (a) Design Full Adder using two Half Adders.   5
        Use

        (i) Block Diagram of Half Adder.

        (ii) Circuit of Half Adder.

    (b) Simplify the logic function using Quine -   5
        Mcluskey method.

        $f(A, B, C, D) = \pi M(2, 7, 8, 9, 10, 12)$.

3. Explain the operation of TTL as NAND gate. **10**
   What happens if output accidently gets shorted
   to ground in :
   (a) NMUS ?   (b) PMOS ?

4. Design a 3-bit up/down counter with a control **10**
   bit C. Use JK flip flops.

5. (a) Design a 4 - digit 7 - segment LED display **6**
       system with leading zero blanking.
   (b) Given the logical equation **4**
       $f = ABC + \overline{A}BC + \overline{B}CD$. Simplify using
       K-Map.

6. (a) What is the difference between Encoders **5**
       and Decoders ?
   (b) Why Excess-3 known as self-complementing
       codes ? Find the excess-3 code of the
       following : **2+3=5**
       (i) 0100   (ii) 1001

7. (a) Design and explain 4-bit comparator. **5**
   (b) What is the difference between ROM, **5**
       PROM and EPROM ?

8. (a) Design 32 : 1 Multiplexer using two 16 : 1 **5**
       Multiplexers and one 2 : 1 Multiplexer.
   (b) Explain Master-slave JK flip flop. **5**

9.   Design a digital system with two flip flops E and   10
     F and one 4-bit binary counter, A. The individual
     flip flops in A are denoted by A_4, A_3, A_2, A_1, with
     A_4 holding the MSB of the count. A starting signal
     S initiates the system operation by clearing the
     counter A and flip flop F. The counter is then
     incremented by 1 starting from next clock pulse
     and continues to increment until operation stops.
     Counter bits A_3 and A_4 determine sequence of
     operations :

     If $A_3 = 0$, $E \leftarrow 0$ and count continues.

     If $A_3 = 1$, $E \leftarrow 1$ then if $A_4 = 0$ count continues but
     if $A_4 = 1$, $F \leftarrow 1$ on next clock pulse and system
     stops counting.

     Draw the ASM chart of the system also.

10. Write short notes on *any two* of the following :   5x2=10

     (a)   Pseudo Random Generator

     (b)   BCD Adder

     (c)   ALU

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