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BIEL-003

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B.Tech. ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

June, 2012

BIEL-003 : DIGITAL ELECTRONICS

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Design NAND gate using CMOS and Explain it. 5

   (b) Differentiate between ROM, PLA and PAL. 5

2. (a) Design a 4-digit 7-segment LED display system with leading zero blanking 6

   (b) Construct Hamming code for BCD data 0110. Use even parity. 4

3. (a) Make K-Map for the following function 5

   $f=AB + A\overline{C} + C + AD + A\overline{B}C + ABC$

   Express f in canonical SOP form and Minimize it. Realize the minimized expression using NAND gates only.

   (b) Design JK flip-flop. Explain Race Around condition in JK flip-flop. 5

4. Draw TTL circuit for Totempole output and explain its working. Why it is not used for WIRED AND connection. **10**

5. (a) Explain Quine-Mc-cluskey method and differentiate between Prime Implicant and Essential Prime Implicant. **6**

   (b) Write and Explain Excitation table for D flip-flop. **4**

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

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

   If A_3=1, E $\leftarrow$ 1 and 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 for the sytem.

7. (a) Draw the circuit of 4-bit ring counter and explain its operation. Write its applications. **5**

   (b) What is the difference between static RAM and Dynamic RAM. **5**

8. (a) Implement with 8 : 1 Mux 5

$F(A, B, C, D) = \Sigma m(0, 1, 3, 4, 7, 8, 9, 11, 14, 15)$

(b) Realize the J-K flip flop using SR flip flop. 5

9. (a) Design a Decade synchronous up counter. Use JK flip-flop. 5

(b) Why Asynchronous counters are called Ripple counters ? Explain. 5

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

(a) Flash Memory

(b) MOS as a switch.

(c) ASCII and ESCII codes.