Printed Pages : 4 | 932 | EEC-302

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 131322 | Roll No. | | | | | | | | | |

B. Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

DIGITAL ELECTRONICS

[Time : 3 hours] **[Total Marks : 100]**

SECTION-A

1. Attempt **all** sections . All sections carry **equal** marks. Write answer of each section in short. (2×10=20)

   (a) Explain Self-Complementing codes with an example.

   (b) What is the basic difference between Latch and Flip Flop?

   (c) Perform subtraction using 2s complement: 80-65

   (d) What are don't care conditions ? Explain with example.

   (e) Construct 4 to 16 line decoder with five 2 to 4 line decoders with enable.

(f) What is the difference between conventional flow-chart and ASM chart ?

(g) What is the difference between Combinational and Sequential circuits ?

(h) Convert the following SOP Boolean expression into POS from: ABC+A'B'C

(i) Implement a two-bit Magnitude Comparator.

(j) Design a Full adder using two Half adders.

SECTION - B

Attempt **any five** questions from this section. (10×5=50)

2. Explain J-K flip flop. What is Race-Around condition in J-K flip flop and what is its remedy ?

3. Define an encoder. Also describe an 8×3 Priority encoder.

4. Explain Carry-Look Ahead Generator. Also draw the logic diagram of a BCD Adder.

5. What are Shift Register Counters ? Explain in detail.

6. With the help of neat diagram, explain the operations of a Universal Shift Register.

7. What is a multiplexer ? Implement the given function with:

(a) 8:1 MUX

(b) 4:1 MUX

(c) 2:1 MUX

$F(A,B,C,D) = \sum(0,1,2,3,4,7,8,9,11,14,15)$

8. Find the minimal sum of products for a 5-variable function using Quine Mc-Cluskey (or, Tabulation) method. $F = \sum m(0, 1, 2, 9, 11, 12, 13, 27, 28, 29)$

9. A sequential circuit has two JK flip-flops A and B, two inputs, x and y and one output, z. The flip-flop input equations are:

$J_A = Bx + B'y'$ $KA = B'xy'$

$J_B = A'x$ $K_B = A + xy'$

$Z = Axy + Bx'y'$

Obtain the logic diagram, state table, state diagram and state equations.

SECTION - C

Attempt **any two** questions form this section. (15×2=30)

10. What is the difference betwaeen Synchronous and Asynchronous Counters? Explain in detail Design a 4-bit Synchronous UP/DOWN Counter.

11 (a) An asynchoronous sequential circuit has two internal states and one output. The two excitation functions and one output function describing the circuit are respectively given by:

$Y_1 = x_1x_2 + x_1y_2' + x_2'y_1$

$Y_2 = x_2 + x_1y_1'y_2 + x_1' y_1$

$z = x_2 + y_1$

(i) Draw the logic diagram of the circuit.

(ii) Derive the transition table and output map.

(iii) Obtain a flow table.

(b) What are Static and Dynamic Hazards ?

12. Give the classification of Semiconductor Memories. Implement the following functions with PLA and PAL:

$F_1 = AB'+AC+A'BC'$

$F_2 = (AC+BC)'$

—x—