Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. .....

EX–403(N)

B. E. (Fourth Semester) EXAMINATION, Dec., 2010

(New Scheme)

(Electrical & Electronics Engg. Branch)

DIGITAL ELECTRONICS LOGIC DESIGN – I

[EX–403(N)]

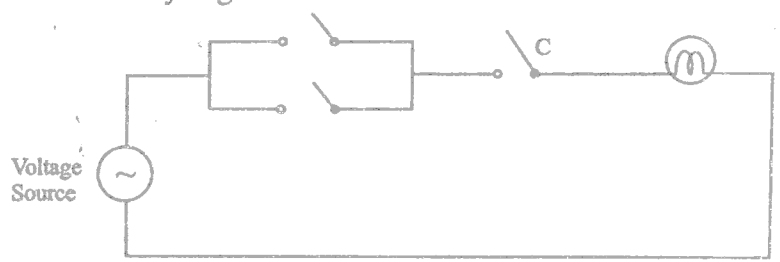
Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

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

1. (a) Express the following switching circuit given in figure in binary logic notation. 4



(b) Perform conversions as below : 10

(i) $(12 \cdot 0625)_{16} \rightarrow (\ \ )_2$

(ii) $(10 \cdot 1001)_2 \rightarrow (\ \ )_{10}$

(iii) $(1032 \cdot 2)_4 \rightarrow (\ \ )_{10}$

(iv) $(2AC5 \cdot D)_{16} \rightarrow (\ \ )_8$

(v) $(225 \cdot 225)_{10} \rightarrow (\ \ )_{16}$

P. T. O.

(c) Explain the terms SOP, POS, Maxterms and Minterms in brief. 6

Or

2. (a) Reduce the equation to 3 literals :

$$[(CD)' + A]' + A + CD + A B$$ 3

(b) Convert F (A, B, C, D) = Σ (0, 2, 6, 11, 13, 14) to other canonical form. 3

(c) Show that the dual of Exclusive - OR is equivalent to its complement. 2

(d) Simplify F $(x, y, z) = \Sigma (2, 3, 6, 7)$. 2

(e) Add 647 and 487 in BCD. 3

(f) What are gray codes ? Convert $(1001010)_2$ to gray code. 5

(g) Simplify F = Σm (1, 2, 4, 5, 6, 10, 11, 14, 15) using K map. 2

3. (a) Implement a full adder circuit using multiplexers. 10

(b) Implement the given function using NAND gates, assuming that both normal and complement inputs are available. 5

(c) What are decoders ? Explain Obtain a 4 × 16 decoder with two 3 × 8 decoders. 5

Or

4. (a) What is a look ahead carry generator ? Explain. 10

(b) A combinational circuit is defined as : 5

$$F_1 (x, y) = \Sigma (0, 3)$$

$$F_2 (x, y) = \Sigma (1, 2, 3)$$

Implement it using 2 × 4 decoder.

(c) Explain the working of a prority encoder. 5

5. (a) What is an RS flip-flop ? Explain with its logic diagram. Obtain its characteristic equation and truth table. 10

(b) Design a sequential circuit with JK flip-flops to satisfy the following state equations : 10

$A(t + 1) = A'B'CD + A'B'C + ACD + AC'D'$

$B(t + 1) = A'C + CD' + A' BC'$

$C(t + 1) = B$

$D(t + 1) = D'$

Or

6. (a) What is a T flip-flop ? Explain separately how is it obtained from RS and JK flip-flops respectively. 10

(b) Give three applications of flip-flops. Why triggering is required in flip-flops ? What are the different types of triggering ? Explain with example. Draw logic symbol for JK flip-flop with active low preset and clear. 10

7. (a) Draw the diagram of a MOD 8 ripple counter and waveforms at the output of flip flops. Why is it called a divide by 8 counter ? 10

(b) Design a synchronous counter using flip-flops which counts in the strict sequence (1, 2, 3, 5, 7). 10

Or

8. (a) What is a shift register ? What are the different types of shift registers ? 10

(b) Explain the working of a Johnson counter. 10

9. (a) Explain the working of a Ramp type A/D convertor. 10

(b) What is a PLA ? What is the difference between ROM and PLA ? 10

Or

10. (a) What is a ROM ? Explain the different types of ROM. 10

(b) What is a D/A convertor ? Explain R-2R D/A convertor. 10