Con. 5192-09. SP-7412

(REVISED COURSE)

S·E (EXTC) Sem III (R) 12/12/09

(3 Hours) [Total Marks : 100

Digital Logic Design 2.30 to 5.30 p.m

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume suitable data if **necessary**.

1. (a) (i) Convert octal $(236{\cdot}2)_8$ decimal. 2
(ii) Convert $(1022)_{10}$ to hexadecimal. 2
(iii) Convert binary 1101101·101 to hexadecimal. 1
(b) A and B are two one bit binary numbers. Draw a logic circuit for a magnitude comparator for the two numbers. 5
(c) Draw a logic circuit of a 4 L : 1L multiplexer using all NANO gates. 5
(d) Draw a logic circuit of SR Flip-flop using NOR gates. 5

2. (a) For decimal number of 0 to 15, write the straight binary code and the gray code. Indicate the steps for converting a binary to a Gray number. 10
(b) (i) What are alphanumeric codes ? Give examples of alphanumeric codes. 10
(ii) Write the ASC II code for alphabets
A, a, B, b, C, c, D, d, E, e, F, f.

3. (a) What are universal gates ?
(i) Implement the X-OR using minimum no. of universal gates. 6
(ii) Also implement AND operating using universal gates. 4
(b) Draw the logic circuit for the function 10

$$f = \overline{A}\,B\,C\,D + A\,\overline{B}\,C\,D + \overline{A}\,B\,\overline{C}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,\overline{D}.$$

then simplify the function using Boolean Algebra and draw the simplifier circuit.

4. Using the Quine-McCluskey method, simplify the following function. 20
$f = \Sigma\,(1, 2, 6, 8, 10, 11, 14, 15, 16, 17, 20, 21, 24, 30) + \Sigma d(13, 18)$.

5. (a) Design a mod and synchronous Up/Down counter using JK flip-flops. 10
(b) Design a sequence generator which will go through states 1, 2, 4, 5, 3, 7 and repeat. Use any flip-flops. Draw the state diagrams. 10

6. (a) What is PAL and PLA ? 5
(b) Using a ROM implement the following function— 15

$f_1 = \Sigma\,(0, 1, 2, 5)$
$f_2 = \Sigma\,(1, 2, 3, 4)$
$f_3 = \Sigma\,(0, 3, 5, 6)$

7. Write short notes on any **three** of the following :— 20
(a) Encoder and Decoder
(b) Comparison between TTL, CMOS, ECL-logic families.
(c) Twisted ring counter using 4 flip-flops
(d) Conversion of S-R Flip-flop to JK flip-flop.
