(6)

Exam.Code:0906
Sub. Code: 6682

1059

B.E. (Electronics and Communication Engineering)
Second Semester
EC-203: Digital Design

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. 1 (Section-A) which is compulsory and selecting two questions each from Section B-C*

x-x-x

Section –A

1	a) Show that a positive logic NAND gate is a negative logic NOR gate and vice versa. b) Implement a full adder with two 4x1 multiplexers. c) Differentiate synchronous and asynchronous counter. d) What is wired AND gate. Where it is used? e) List the specifications of A/D and D/A converter.	10
	Section B (Do any two questions)	
2	a) Design a counter with T flip-flops that goes through the following binary repeated sequence: 0, 1, 3, 7, 6, 4. Show that when binary states 010 and 101 are considered as don't care conditions, the counter may not operate properly. Find a way to correct the design.	6
	b) With the use of k-map, find the simplest form in sum of products of the function F=fg, where f and g are respectively, f = wxy' + y'z + w'yz' + x'yz' and g = (w + x + y' +z') (x' + y' + z) (w'+ y + z')	4
3	a) Derive the PLA programming table for the combinational circuit that squares a 3-bit number. Minimize the number of product terms.	6
	b) A combinational circuit is defined by the following three Boolean functions: $F_1 = x'y'z' + xz$, $F_2 = xy'z' + x'y$, $F_3 = x'y'z + xy$ design the circuit with a decoder and external gates.	4
4	a) Use Quine-McClusky method to simplify the following expression. Draw the circuit for simplified expression using only one type of universal gates. F (A, B, C, D) = ABCD + ABC'D + A'B'C + AC' + A'.	6
	b) An 8 X1 multiplexer has inputs A, B and C connected to the selection inputs S_2, S_1 and S_0 respectively. The data input I_0 through I_7 are as follows $I_1 = I_2 = I_7 = 0$: $I_3 = I_5 = 1$: $I_0 = I_4 = D$ and $I_6 = D'$, determine the Boolean function that the multiplexer implements.	4
	Section-C (Do any two questions)	
5	a) What is a dual slope A/D converter? Draw its circuit diagram and explain its working.	6
	b) A 12 bit BCD input D/A converter has a full scale output of 29.97 V. Find percentage resolutions.	4
6	a) What is a universal shift register? Explain a 4 bits universal shift register controlled by multiplexers.	4
	b) Draw the circuit of four input ECL OR-NOR gate and explain its working.	6
7	a) Draw and explain two input (a) CMOS NAND (b) CMOS NOR gate	4
	b) Explain working of a TTL with totem pole output. Can it be use for wired AND connection, justify your answer.	6

x-x-x