

Reg. No.

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B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019

Second Semester

CS16201 – DIGITAL PRINCIPLES AND SYSTEM DESIGN*(Common to CS and IT)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**

Answer ALL questions

PART A - (10 X 2 = 20 Marks)

	CO	RBT
1. What are min-terms?	1	R
2. Convert the following number from one base to other $(65.342)_8 = ()_7$	1	U
3. What is a combinational circuit?	2	R
4. Implement the following Boolean function using MUX $F(A,B,C) = \sum(2,4,5,6)$	2	E
5. Give the characteristic table and equation for JK flip flop.	3	R
6. Differentiate synchronous and asynchronous counters.	3	AN
7. State the use of merger diagram.	4	R
8. Define maximal compatible.	4	R
9. Define EPROM and EEPROM.	5	R
10. What is a Volatile memory? Give Example.	5	R

PART B - (5 X 16 = 80 Marks)

11. (a) Simplify the Boolean function using K-map and implement using gates. $F(w,x,y,z) = \sum(0,5,7,8,9,10,11,14,15)$ (16) 1 AN
- (OR)**
- (b) Using Tabulation method simplify the Boolean function $F(w,x,y,z) = \sum(2,3,4,6,7,11,12,13,14)$ which has don't care conditions $d(1,5,15)$. (16) 1 AN
12. (a) Design a combinational circuit to convert BCD to excess-3 (16) 2 E
- (OR)**
- (b) Design a half adder, full adder and derive the expression for SUM and CARRY. Realize using gates. Also discuss the need of carry-look ahead adder. (16) 2 E

13. (a) A sequential circuit with two D flip-flops A and B, two inputs x and y and one output is specified by the following next-state and output equations (16) 3 U

$$A(t+1) = x'y + xB$$

$$B(t+1) = x'A + xB$$

$$z = A$$

- Draw the logic diagram of the circuit.
- List the state table for the sequential circuit.
- Draw the corresponding state diagram.

(OR)

- (b) Explain the different types of shift registers with neat diagram. Also explain SISO register (16) 3 U

14. (a) Explain the hazards in combinational circuit and sequential circuit in detail with relevant examples. (16) 4 U

(OR)

- (b) An asynchronous sequential circuit has two internal states and one output. The two excitation and output function are as follows: (16) 4 E

$$Y_1 = x_1x_2 + x_1y_2 + x_2y_1$$

$$Y_2 = x_2 + x_1y_1y_2 + x_1y_1$$

$$z = x_2 + y_1$$

- Draw the logic diagram of the circuit.
- Derive the transition table and the output map.
- Describe the behavior of the circuit.

15. (a) (i) Design a Combinational Circuit using a ROM. The circuit accepts a 3-bit number and output a binary number equal to square of input number (12) 5 E

- (ii) Give the internal block diagram of 4X4 RAM. (4) 5 E

(OR)

- (b) Implement the following function using PLA (16) 5 E

$$A(x, y, z) = \sum m(1, 2, 4, 6)$$

$$B(x, y, z) = \sum m(0, 1, 6, 7)$$

$$C(x, y, z) = \sum m(2, 6)$$