B.E./B.TECH. DEGREE EXAMINATION, December 2020

Second Semester

CS18201 - DIGITAL PRINCIPLES AND SYSTEM DESIGN

(Regulation 2018)

Time: Three hours Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. Which gate is equivalent to the output: Y=(AB)'?

   (A) NAND (B) NOR (C) AND (D) OR

2. A subtractor can be designed by converting an adder by using

   (A) 1's Complement technique. (B) 2's Complement technique.

   (C) 10's Complement technique. (D) 9's Complement technique.

3. The number of valid entries in a SR-flip flop is

   (A) 1 (B) 2 (C) 3 (D) 4

4. The number of states in a decimal counter is

   (A)5 (B) 10 (C) 15 (D) 20

5. Convert (A010) = ($)_2$

6. How can we convert an encoder into a priority encoder?

7. Represent the internal structure of 32 X 8 ROM.

8. Where a non-volatile memory cannot be deployed?

PART B - (4 X16 = 64 marks)

09. (a) Simplify the following 5-variable Boolean expression using Mc-Cluskey method. **(16)**

    F= Σm (0, 1, 9, 15, 24, 29, 30) + ∑d (8, 11, 31).

(OR)

(b) Simplify the following Boolean function by using Tabulation method **(16)**

F=∑m(0,1,2,8,10,11,14,15). Implement the circuit using universal gates.

10. (a) Implement a combinational circuit such that given a BCD number it has to produce its equivalent excess-3 code for it. **(16)**

(OR)

(b) Design an adder circuit such that the propagate delay employed it needs to be removed so as to achieve the fastness in it. **(16)**

11. (a) Design a sequence detector that detects a sequence of three or more consecutive 1's in a string of bits coming through an input line and produces an output whenever this sequence is detected. **(16)**

(OR)

(b) Design a binary counter using JK-flip-flops to count in the following sequences: 000,001,010,011,100,101,110,111,000 **(16)**

12. (a) Implement the following switching function F=∑m(1,3,5,7,8,9,14,15) by a static hazard free two level AND OR gate network. **(16)**

(OR)

(b) Implement the following function using PAL **(16)**

w(A,B,C,D)=∑m(2,12,13)

x(A,B,C,D)=∑m(7,8,9,10,11,12,13,14,15)

y(A,B,C,D)=∑m(0,2,3,4,5,6,7,8,10,11,15)

z(A,B,C,D)=∑m(1,2,8,12,13)