3RD SEM./ AE & IE /CSE /EE(I& C) / ETC & COMM./ ETC & TELECOMM./ IT/ MECHATRONICS/ 2022(W)

Th-3 Digital Electronics

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

   a. Define Racing conditions.

   b. Covert the decimal number $(1000)_{10}$ into hexadecimal.

   c. Write down the difference between synchronous and asynchronous Counter.

   d. Design a Half adder using basic logic gates.

   e. Perform 2's complement subtraction of 1000011 – 1010111.

   f. What is difference between weighted and non-weighted binary code?

   g. What is Max term and Min term?

   h. State two difference between counter and register.

   i. Write down the truth table of Exclusive-NOR gate.

   j. Convert $(101011110.1011)_2$ to Octal and hexadecimal number.

2. Answer **Any Six** Questions 6 x 5

   a. Which gates are referred as universal gates and why? How other gates can be realized using NAND gate?

   b. Design an 8:3 Encoder with neat circuit diagram.

   c. Distinguish between combinational and sequential logic circuit.

   d. Describe the operation of full subtractor with the help of truth table and circuit diagram.

   e. Convert D-type flip flop to SR flip flop.

   f. Explain the operation of seven segments displays.

   g Design a 2 bit magnitude comparator circuit for whose outputs are A>B, A<B and A=B where A and B are 2 bits binary numbers

3	Define SOP and POS term. Obtain the canonical SOP and POS form and draw the truth table of the given function. Y(A,B,C)=A+$\overline{BC}$	10
4	What is shift register? Explain the working of SISO and PISO register with the help of suitable logic diagram	10
5	Sketch the logic diagram of clocked JK flip flop. Explain it's working with the functional table.	10
6	With neat circuit diagram explain the function of 4:1 multiplexer and 1:4 demultiplexer.	10
7	What is Karnaugh map? Simplify the given expression using Karnaugh's map and draw the logic Circuit using NAND gate only. F(a,b,c,d)=∑m(5,6,7,8,9)+d(10,11,12,13,14,15).	10