

**III-SEM./ETC/AE&IE/CSE/IT/MECHATRONICS/  
ELECTRICAL(INST & CTRL/ECE/ 2021(W)  
TH-III 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. State De-Morgan's theorems.
  - b. Convert  $(10110101)_2$  from binary to grey code.
  - c. Find out the number of input lines, output lines and select lines in : (i)1:8 De-Mux (ii)16:1 Mux
  - d. Write down the truth table of half subtractor.
  - e. Define race-around condition in flip flop and suggest a method to overcome it.
  - f. Difference between combination and sequential logic circuit.(any 4)
  - g. Mention the type of flip flops used in : (i)Ripple Counter (ii)Shift Register
  - h. Write the excitation table of D-flip flop.
  - i. List down different types of: (i) Analog to Digital Convertors ,(ii) Digital to Analog Convertors
  - j. Define Fan In and Fan Out.
  
2. Answer **Any Six** Questions 6 x 5
  - a. Simplify the below given expression using Karnaugh's map and draw the logic circuit using logic gates.  
 $F(a, b, c, d) = \sum m (0,2,3,4,7,9,10,11,15) + d (1,6,8)$
  - b. Explain the function of 4: 1 MUX with neat diagram and truth table.
  - c. Design the operation of full adder with the help of truth table and circuit diagram.
  - d. Design a JK flip flop using a RS flip flop.
  - e. With neat circuit diagram, Explain the working of R-2R ladder type DAC.
  - f. Write any 5 differences between SRAM and DRAM.
  - g. Draw CMOS logic circuit of NAND and NOR gates.
  
3. Realize all the logic gates (NOT, AND, OR, NAND, NOR, XOR, XNOR) using NAND gates only. 10
4. Design a 2-bit magnitude comparator using logic gates. 10
5. Sketch the logic diagram of clocked JK Flip - Flop. Explain its working with functional table. 10
6. Explain briefly SISO, SIPO, PISO and PIPO shift register. 10
7. Design a mod-6 synchronous up counter. 10