

DIGITAL ELECTRONICS

Sub Code – ETT-421

Full Marks: 70

Time: 3 Hours

Answer any FIVE Questions

The figures in the right-hand margin indicate marks

1. (a) Convert $(101011110.1011)_2$ to octal and hexadecimal numbers. [2]
(b) Discuss 1: 4 De-multiplexer with circuit, truth table and implementation by gates. [5]
(c) Which gates are referred to as universal gates and why? How other gates can be implemented by using one of these gates? [7]
2. (a) Define racing condition. How it can be avoided. [2]
(b) Design an 8 : 3 encoder with neat circuit diagram. [5]
(c) Show the logic diagram of clocked JK-Flip Flop. Explain its working with a functional table with a neat circuit diagram. [7]
3. (a) State De-Morgan's theorem. [2]
(b) Simplify and minimize the 4-variable logic expression $F(A, B, C, D) = \sum m(1, 3, 7, 11, 15) + \sum d(0, 2, 5)$ by using k-map and implement its circuit by NAND gates only. [5]
(c) Draw the logic circuit of full subtractor. Give its logic expression and truth table. Implement the logic circuit with any one of universal gates. [7]
4. (a) Define the term fan in, fan out and propagation delay. [2]
(b) Explain the working of SISO, PISO shift register with the help of suitable logic diagram. [5]
(c) Explain the working of a mod - 8 binary counter with neat diagram. [7]
5. (a) Find 2's complement subtraction of 10110-11010. [2]
(b) Simplify the Boolean expression $Y = AB + A(B+C) + B(B+C)$.
And draw the logic circuit for the simplified function. [5]
(c) Design a magnitude comparator circuit. Whose outputs are $A > B$, $A = B$, $A < B$.
Where A and B are 2 bit binary numbers. [7]
6. (a) Distinguish between combinational and sequential logic circuit. [2]
(b) Explain weighted and non-weighted binary codes. [5]
(c) Define SOP & POS term. Obtain canonical SOP & POS from the function $Y = A + B\bar{C}$. [7]
7. (a) Write the truth table of a Exclusive NOR gate. [2]
(b) Explain the operation of seven segments display. [5]
(c) Draw the diagram of D-Flip flop. Explain its working with functional table. [7]