

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year II Semester Supplementary Examinations May/June-2024

DIGITAL IC APPLICATIONS

(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Draw the circuit diagram of a two input LS-TTL NAND gate and explain the functional behavior? **CO1 L3 6M**
b Explain in detail about basic ECL logic circuit. **CO1 L2 6M**

OR

- 2 a Design a 2-input NAND gate using diode logic and a transistor inverter. Analyze the circuit with the help of transfer characteristics. **CO1 L6 6M**
b Explain the following terms with reference to TTL gate.
i) D.C noise margin ii) Logic levels **CO1 L2 6M**

UNIT-II

- 3 a Discuss about behavioral design element with an example. **CO2 L4 6M**
b Design the logic circuit and write a data-flow style VHDL program for the following function. $F(P) = \Sigma A, B, C, D (1, 5, 6, 7, 9, 13) + d(4, 15)$. **CO2 L6 6M**

OR

- 4 a Design the logic circuit and write VHDL program for the following functions. $F(X) = \Sigma A, B, C, D (0, 2, 5, 7, 8, 10, 13, 15) + d(1, 6, 11)$. **CO2 L6 6M**
b Design the logic circuit and write VHDL program for the following functions. $F(Y) = \Pi A, B, C, D (1, 4, 5, 7, 9, 11, 12, 13, 15)$. **CO2 L6 6M**

UNIT-III

- 5 a Explain the operation of standard IC for 3X8 decoder with necessary truth table and internal architecture. **CO3 L2 6M**
b Write a VHDL code for the above Standard IC **CO3 L2 6M**

OR

- 6 a Design the following functions using PAL and PLA.
 $F1 = \Sigma(0, 1, 2, 5, 7, 11, 13, 14) + d(4, 8, 10)$ **CO3 L6 6M**
b Design the following functions using PAL and PLA. $F2 = \Sigma(0, 3, 5, 6)$ **CO3 L6 6M**

UNIT-IV

- 7 Write a VHDL code for a serial adder using Mealy type FSM. **CO4 L2 12M**

OR

- 8 a Design a 4-bit Ring Counter and explain its operation. **CO4 L6 6M**
b Write a VHDL code for the above design. **CO4 L2 6M**

UNIT-V

- 9 Design a 8-bit barrel shifter using three control inputs. Write a VHDL program for the same in data flow style. **CO5 L6 12M**

OR

- 10 a Distinguish between the synchronous and asynchronous counters **CO5 L4 6M**
b What are the impediments to synchronous design? **CO5 L2 6M**

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