

VR20



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VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, DECEMBER - 2023

Third Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

20EI3303 DIGITAL CIRCUITS AND SYSTEMS

Time: 3 hours

Max. Marks: 70

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1. a. Convert $(10101)_2$ into decimal number system. (CO1 K1)
- b. What do you mean by BCD? (CO1 K1)
- c. Write the carry expression for half subtractor. (CO2 K1)
- d. Define Demultiplexer. (CO2 K1)
- e. Write the characteristic equation of SR Flip-Flop. (CO3 K1)
- f. Define register. (CO3 K1)
- g. List various types of ROMs. (CO4 K1)
- h. Mention any two characteristics of digital IC's. (CO4 K1)
- i. List data types used in VHDL. (CO5 K1)
- j. What are the basic uses of EDA tools. (CO5 K1)



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PART-B

4 x 15 = 60M

UNIT-I

2. a. List various logic gates and explain. **(CO1 K2) 8M**
b. Convert the following to Octal then hexa decimal. **(CO1 K2) 7M**
(i) $(568)_{10}$ (ii) $(1100110011)_2$ (iii) $(23.45)_{10}$

(or)

3. a. Explain Quine-Mcclusky method of minimization with suitable example. **(CO1 K2) 9M**
b. Explain the generation of 4-bit Gray code. **(CO1 K2) 6M**

UNIT-II

4. a. Design BCD to 7 segment decoder. **(CO2 K3) 8M**
b. Design Full adder using two half adders and required gates. **(CO2 K3) 7M**

(or)

5. a. A certain logic circuit has four inputs A, B, C, and D. The output X of the circuit is logic 1 if two or more inputs are logic 1. Implement by using decoder with active low output. **(CO2 K3) 8M**
b. Implement the function $F(A,B,C,D) = \sum (1,3,4,11,12,13,14,15)$ using 8×1 Multiplexer. **(CO2 K3) 7M**

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UNIT-III



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6. a. Design a JK flip flop using AND gates and NOR gates. Explain the operation of the JK flip flop with the help of characteristic table and characteristic equation. **(CO3 K3) 8M**

- b. Explain the D flip-flop with the help of truth table and excitation table. **(CO3 K3) 7M**

(or)

7. a. With suitable logic diagram explain a 4-bit bidirectional shift register? **(CO3 K2) 8M**

- b. What are the different types of registers? Explain the Serial Input Serial Output shift register. **(CO3 K2) 7M**

UNIT-IV

8. a. Write a VHDL code for Half adder and full adder. **(CO5 K3) 5M**

- b. Explain the functional diagram and operation of various memory devices. **(CO4 K2) 10M**

(or)

9. a. Write the VHDL code for Implementation of logic gates. **(CO5 K3) 6M**

- b. Write a detailed note on logic families. **(CO4 K2) 9M**
