N22 – 06551

Reg. No……………………
Signature ………………….

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2022

DIGITAL COMPUTER PRINCIPLES

[Maximum Marks: **100**]   [Time: **3** Hours]

PART-A
[Maximum Marks: **10**]

I.   (Answer **all** questions in one or two sentences. Each question carries **2** marks)

1. List two universal gates.

2. Define Combinational Logic Circuit.

3. Draw the circuit diagram for a 2 to 1 multiplexer.

4. Write any two applications of flip flops.

5. List any two type of digital to analog converter.   (5 x 2 = 10)

PART-B
[Maximum Marks: **30**]

II.   (Answer **any five** of the following questions.   Each question carries **6** marks)

1. Draw the truth table and logic symbol of NAND and NOR logic gates.

2. Define Minterm and Maxterm with examples.

3. Design and implement a full adder circuit.

4. Simplify using Karnaugh Map F=Σm (0,1,3,5,6,9,11,12,13,15)

5. Show how a JK flip - flop is converted to a T-FF and D-FF.

6. Differentiate between synchronous and asynchronous counters.

7. Explain a Counter type ADC with neat figure.   (5 x 6 = 30)

PART-C
[Maximum Marks: **60**]
(Answer **one** full question from each Unit. Each full question carries **15** marks)

UNIT – I

III. (a) Define universal property of NAND gate. Implement AND and OR gates using NAND gates

alone.   (9)

(b) Find: (i) Gray code equivalent of binary 1010 (ii) Binary equivalent of 1010 Gray code.   (6)

IV. (a) Draw the symbols and truth tables of EX-OR and EX-NOR gates and explain. (7)

    (b) Convert

        (i) Octal number 632 to hexadecimal (iii) Decimal 32.46 to binary

        (ii) Hexadecimal E0B3 to decimal   (iv) Decimal 83 to octal (8)

UNIT – II

V. (a) Distinguish between decoder and demultiplexer with neat figures. (8)

    (b) Design a circuit for the following function: $F(A,B,C,D) = \Sigma m(1,2,3,5,7,9,10,11,13,15)$ (7)

OR

VI. (a) State the need of decoders. Design a logic circuit to decode the binary number 1001 for

       producing HIGH level at the output. (7)

    (b) Design and implement a four bit binary to gray code converter. (8)

UNIT- III

VII. (a) With truth table and logic diagram explain the working of a JK flipflop. (8)

    (b) Explain the working of a 3 bit asynchronous counter using T Flip Flop with neat diagram. (7)

OR

VIII. (a) Explain the working of a mode-10 ripple counter with diagram. (8)

    (b) Explain the working of serial in serial out shift register with diagram. (7)

UNIT - IV

IX. (a) State the DAC Parameters-(offset voltage and Monotonicity, Accuracy and setting time) (8)

    (b) Explain a weighted resister type DAC with neat figure. (7)

OR

X. (a) Describe the need of DAC and ADC in digital systems. (8)

    (b) What are the difference between RAM and ROM. (7)

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