

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2023**

**DIGITAL ELECTRONICS**

[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. Convert binary number 111000 into decimal number.
2. Show symbol and truth table of 2 input Exclusive-OR gate.
3. Define the term fan-out in logic families.
4. List any 2 applications of shift registers.
5. Write types of ADCs. (5 x 2 = 10)

**PART-B**

[Maximum Marks: **30**]

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

1. State and explain De-Morgan's theorem.
2. Describe different binary codes.
3. Design a half subtractor using logic gates and truth table.
4. List some features of CMOS and ECL logic families.
5. Explain the working of SR flip-flop using NAND gates only with circuit diagram.
6. Draw the block diagram of serial in serial out (SISO) shift register and explain.
7. Describe specifications of DACs. (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. Perform the following operation.

- (i)  $(F329)_{16} = ( \quad )_2$                       (ii)  $(48.625)_{10} = ( \quad )_2$   
(iii) Gray code number 110011 to binary      (iv)  $(423)_{10} = ( \quad )_{16}$ . (8)

b. Construct basic gates and EX-OR gate using NAND gates only. (7)

**OR**

- IV. a. Design and implement a logic circuit for given expression using  
K-Map reduction  $f(A,B,C,D)=\Sigma m(0,1,2,3,5,7,8,9,11,14)$  (9)  
b. State the laws of Boolean algebra. (6)

**UNIT – II**

- V. a. Explain with circuit diagram the working of CMOS NAND gate. (8)  
b. Explain the working of 4x1 multiplexer with circuit diagram. (7)

**OR**

- VI. a. Explain the operation of 3 bit encoder with truth table and logic diagram. (8)  
b. Draw and explain the circuit diagram of full subtractor using logic gates. (7)

**UNIT- III**

- VII. a. Explain the working of Master Slave JK Flip-flop with circuit diagram. (9)  
b. Explain the working of right shift registers. (6)

**OR**

- VIII. a. Explain the working of Johnson counter with diagram. (9)  
b. Explain D Flipflop with its characteristic table. (6)

**UNIT - IV**

- IX. a. Draw and explain the working of Weighted resistor DAC. (8)  
b. Explain the working of 3 bit asynchronous counter. (7)

**OR**

- X. a. Explain the working of Mod-8 Synchronous counter with JK flipflop. (8)  
b. Explain working of Counter type DAC with suitable diagram. (7)

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