

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

DIGITAL CIRCUITS

[Maximum marks: 100]

[Time: 3 Hours]

PART – A

Maximum marks: 10

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

1. Define Radix of a number system.
2. Write Identity rule of Boolean expression.
3. Write the truth table of a NOR gate.
4. Define Shift register.
5. Define the term Capacity of a Memory.

(5 x 2 = 10)

PART – B

Maximum marks: 30

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

1. Convert (i) $(572)_8 = (\dots)_{16}$ (ii) $(34F)_{16} = (\quad)_{10}$ (iii) $(72.3125)_{10} = (\quad)_2$
2. Implement AND, OR and NOT gates using NAND gates.
3. With diagram explain the operation of 4 to 1 Multiplexer.
4. Explain the working of D Latch.
5. Describe the working principle of 4-bit Synchronous counter.
6. Explain the operation of binary weighted resistor type DAC.
7. Explain the specifications of digital meter display.

(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) Solve the following (i) 11011-10110 (using 2's complement method)

(ii) 1100 - 1001 (iii) $101111 \div 101$ (iv) 1110×101 (8)

(b) Simplify the Logic expression $AB + A(B+C)+B(B+C)$ (7)

OR

- IV.** (a) Simplify the Boolean Function $F(A, B, C, D) = \sum m (1,3,7,11,15) + \sum d (0,2,5)$ (8)
(b) Compare weighted and Un weighted code. (7)

UNIT - II

- V.** (a) With diagram explain the operation of a Parallel Binary Adder. (8)
(b) With neat diagram explain the operation of TTL NOT gate. (7)

OR

- VI.** (a) Describe the operation of 2-bit Comparator. (8)
(b) Describe the operation of 1x4 De-Multiplexer. (7)

UNIT - III

- VII.** (a) Explain the operation of JK Flip Flop. (7)
(b) Describe the operation of asynchronous UP counter. (8)

OR

- VIII.** (a) Explain the operation of Serial-in-Serial-out Shift Register. (7)
(b) Explain D Flip Flop with help of truth table. (8)

UNIT – IV

- IX.** (a) Explain the operation of Successive approximation A/D Convertor. (8)
(b) Compare RAM and ROM. (7)

OR

- X.** (a) Describe about various types of ROM. (7)
(b) Explain the operation of R-2R D/A converter. (8)
