Register Number | | | | | | | | | | |

Code: 20EC11T

I Semester Diploma Examination, Nov/Dec 2024

DIGITAL ELECTRONICS

TIME: **3 HOURS** MAX MARKS: **100**

Instructions:
(1) Answer one full question from each section - I, II, III, IV and V.
(2) Each one full question carries 20 marks.

SECTION – I

1. (a) (i) State and explain Demorgan's theorem 5
   (ii) List the features of ASCII code 5
   (b) (i) Convert the Octal number 27.35 to binary 3
   (ii) Convert Hexadecimal number $(123.45)_{16}$ to Decimal 4
   (iii) Convert Binary code 10101 into Gray code 3

2. (a) (i) Add $123_{(8)}$ and $456_{(8)}$ 3
   (ii) Add $110110_{(2)}$ and $110110_{(2)}$ 3
   (iii) Subtract $ABCD_{(16)}$ from $DCBA_{(16)}$ 4
   (b) (i) Compare Analog and Digital signals 5
   (ii) List any five laws of Boolean algebra. 5

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SECTION – II

3. (a) Define logic gate . Write the symbol, truth table and Boolean expression for AND, NAND and NOR gates 10
   (b) Realize NOT, AND ,OR and NOR gate using NAND gate 10

4 (a) Simply the following Boolean expression using K-map and draw the logic diagram 10
$Y=\bar{A}B\bar{C}\bar{D}+\bar{A}B\bar{C}D+AB\bar{C}\bar{D}+AB\bar{C}D+ABCD+ABC\bar{D}+A\bar{B}C\bar{D}+A\bar{B}CD$
   (b) (i) Convert the SOP $F(A,B,C) = \Sigma(2,4,7)$ to POS 5
   (ii) Convert the POS $F(A,B,C) = \Pi(3,5,6,7)$ to SOP 5

SECTION – III

5. (a) Explain the working of Full adder with truth table, Boolean expression and logic diagram. 10
   (b) (i) Explain Half Substractor with truth table, and logic diagram 5
   (ii) Explain the working of Serial binary adder 5

6. (a) Construct 3-bit parallel adder and explain with an example 10
   (b) Explain 2-bit magnitude comparator 10

SECTION – IV

7. (a) (i) Construct 4:1 mux using 2:1 mux 5
   (ii) Define multiplexer and list its applications 5
   (b) Explain the working of 8:1 mux with logic circuit, expression and truth table 10

8. (a) Explain the working of decimal to BCD encoder with truth table, expression and logic diagram 10
   (b) (i) Write truth table, equation and logic diagram of 1:4 Demux 5
   (ii) Realize AND and OR gates using 2:1 Mux 5

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SECTION – V

9. (a) (i) Classify ICs based on scale of integration 5
   (ii) Explain the operation of 4:2 encoder with truth table and logical expression 5
   (b) Explain BCD to Decimal decoder with truth table, Boolean expression and logic diagram 10

10. (a) (i) List the features of TTL family 5
   (ii) List advantages and disadvantages of ICs 5
   (b) Sketch and explain BCD to Seven segment decoder using truth table 10

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