

- (b) (i) What are universal gates ? Write symbol and Boolean equations for universal gates. 5
- (ii) What is an ASCII code ? List its any two features. 5

## SECTION - II

3. (a) (i) Write any 5 Boolean identities. 5
- (ii) Reduce the given Boolean equation using Boolean laws and rules and draw logic circuit. 5

$$Y = A B C + \bar{A}BC + \bar{A}\bar{B}\bar{C} + \bar{A} B \bar{C}$$

- (b) State and prove Demorgan's theorem. 10
4. (a) Reduce the given equation using Karnaugh Map and write logic circuit for the reduced equation. 10

$$Y = \bar{A}\bar{B}C\bar{D} + \bar{A}B\bar{C}\bar{D} + \bar{A}B\bar{C}D + \bar{A}BCD + ABCD + \bar{A}BC\bar{D} + ABC\bar{D}$$

- (b) (i) Convert the SOP equation  $Y = ABC + \bar{A}\bar{B}\bar{C}$  to POS equation. 5
- (ii) Convert the POS equation  $Y = (A + B + C)(\bar{A} + \bar{B} + \bar{C})$  to SOP equation. 5

## SECTION - III

5. (a) (i) What are combinational circuits ? Give three examples. 5
- (ii) Write truth table, equations, and logic diagram for Half Adder. 5
- (b) What is full subtractor ? Write truth table, equations, and logic diagram for full subtractor. 10
6. (a) With neat circuit diagram explain operation of 3-bit parallel Adder. 10
- (b) Write truth table, equations, and logic diagram for 2-bit comparator. 10

## SECTION – IV

7. (a) What are multiplexers ? Write truth table, equations and logic diagram for 2 : 1 MUX. 10
- (b) Write truth table, equations for 4 : 1 MUX. Implement 4 : 1 MUX using 2 : 1 MUX. 10
8. (a) (i) Realize AND gate and OR gate using MUX. 5
- (ii) Write truth table, equations, and logic diagram for 1 : 4 DEMUX. 5
- (b) Write truth table, equations and logic diagram and explain decimal to BCD Encoder. 10

## SECTION – V

9. (a) Write truth table, equations and logic diagram for BCD to decimal decoder. 10
- (b) Write truth table, equations and logic diagram for 4 : 2 priority encoder. 10
10. (a) (i) Mention advantages and disadvantages of ICs. 5
- (ii) Classify ICs based on scale of integration. 5
- (b) (i) Mention features of standard TTL. 5
- (ii) Describe the interfacing between TTL and CMOS. 5
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Code : 20EC11T

**1166**

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I Semester Diploma Examination, August/September-2022

## DIGITAL ELECTRONICS

Time : 3 Hours ]

[ Max. Marks : 100

- Instructions :** (1) Answer **one** full question from each section.  
 (2) One full question carries **20** marks.

### SECTION - I

1. (a) Perform following operations : 10
- (i)  $192_{(10)} = \dots\dots\dots(2)$
- (ii)  $101.111_{(2)} = \dots\dots\dots(10)$
- (iii)  $ABC.12_{(16)} = \dots\dots\dots(10)$
- (iv)  $976_{(10)} = \dots\dots\dots\text{BCD}$
- (v)  $82_{(10)} = \dots\dots\dots(8)$
- (b) (i) Subtract  $72_{(10)}$  from  $98_{(10)}$  using 2' complement method. 7
- (ii) Compare analog and digital signals. 3
2. (a) Perform following operations : 10
- (i)  $FC12_{(16)} + ABFD_{(16)}$
- (ii)  $11011_{(2)} - 10111_{(2)}$
- (iii)  $10111_{(2)} + 11011_{(2)}$
- (iv) Convert decimal number 972 to Excess 3 code
- (v)  $712_{(8)} + 531_{(8)}$

