TED (15/19) -3133
(Revision- 2015/19)

A22-09371

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE –APRIL -2022.

## DIGITAL COMPUTER PRINCIPLES

(Maximum Marks : 100)                                              [Time : 3 hours]

### PART–A
(Max. Marks:10)                                                                Marks

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

1.  2's complement of  1011 is ……………

2.  Define minterm.

3.  State the function of  a latch.

4.  Define resolution of DAC.

5.  $10_{(16)} + 10_{(8)} =$ ……. (2)

(5x2=10)

### PART -  B
(Max. Marks: 30)

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

1.  Describe briefly about standard forms of  boolean functions.

2.  Reduce the expression **A'C + A'B + AB'C+ BC.**

3.  Draw the logic diagram of a 4 bit magnitude comparator and mark the output
    boolean expressions.

4.  Briefly explain about  multiplexer with examples.

5.  What are the features of sequential circuits ? How do they differ from
    combinational circuits?

6.  Draw the block diagram of a 3 bit ring counter and show the outputs.

7.  Describe briefly about error detection and correction using hamming code.

(5x6 =30)

## PART - C
### (Max. Marks: 60)

(Answer **one full** question from each unit. Each question carries 15 marks)

### UNIT I

**III** a) State distributive law and illustrate it using logic gates (8)

b) Draw truth table for the expression A'B'C + A'BC + AB'C + ABC (7)

### OR

**IV** a) Show that A+ A'B = A+ B (8)

b) Convert (A'+ B +C)(B' + C + D')(A + B' + C' + D) into standard form (7)

### UNIT- II

**V** a) What is a don't care term? Simplify F(A,B,C,D) =∑(1,3,7, 11, 15) + ∑d(0,2,5) (10)

b) Show the truth table and circuit diagram of a full-adder (5)

### OR

**VI** a) Show the arrangement of two half-adders to form a full-adder (8)

b) Implement f =∑(l,2,4,7) using a 3 to 8 decoder. (7)

### UNIT- III

**VII** a) Explain the working of JK-Flipflop with truth table and diagram (9)

b) Draw circuit diagram and truth table of a 3 bit Johnsons Counter (6)

### OR

**VIII** a) Draw the block diagram of a decade ripple counter (9)

b) Briefly explain about 3 applications of shift registers (6)

### UNIT – IV

**IX** a) What is hamming code? Determine the parity bits and their positions, if even parity is followed in hamming code, corresponding to the data 11000100. (9)

b) Write briefly about settling time and offset error in DAC. (6)

### OR

**X** a) Design a combinational circuit that generates the following boolean functions using PLA (i) p(A,B,C) = AB'+A'B (ii) q(A,B,C) = AB+BC+AC (8)

b) Write briefly i) Programmable Logic Devices ii) memory encoding (7)

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