TED (15) –3133

(REVISION — 2015)

## DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

### DIGITAL COMPUTER PRINCIPLES

[*Time* : 3 hours

(Maximum marks : 100)

## PART — A

(Maximum marks : 10)

Marks

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

1.  Define 2's complement of a number with example.

2.  What is weighted binary code ?  Give an example.

3.  Define combinational logic.

4.  List the asynchronous inputs of a flipflop.

5.  Name any one error detection and correction code.                     (5×2 = 10)

## PART — B

(Maximum marks : 30)

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

1.  Design two input AND and two input OR Operations using NAND gate.

2.  State and prove Demorgan's laws.

3.  Reduce the expression $F = A + AB + ABC + ABCD$

4.  Design and explain the circuit of a Half adder.

5.  Draw and explain the circuit of a Clocked D Flip-flop

6.  Draw the circuit of a 3 bit binary Up counter using JK Flip-Flop.

7.  Define the terms Resolution and Accuracy of a DAC                 (5×6 = 30)

[66]

[P.T.O.

Marks

## PART — C

### (Maximum marks : 60)

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

#### UNIT — I

III  (a) Covert the following

      (i)  $ABCD_{16}$ to OCTAL     (ii) $1000_{10}$ to Binary

      (iii) $476_8$ to Decimal                              9

  (b)  Draw the logic diagram and truth table of two input NOR gate and EXOR gate.    6

#### OR

IV  (a)  Explain different Boolean laws and theorems.    9

    (b)  Draw the logic diagrams and truth tables of basic gates.    6

#### UNIT — II

V  (a)  Simplify using Kmap and draw the logic circuit for
$F_{(ABCD)} = \Sigma(0,1,2,3,6,7,8,9)$    9

    (b)  Define Minterms and Maxterms.    6

#### OR

VI  (a)  Draw and explain the circuit of a 4 bit binary adder.    9

    (b)  Draw the circuit and truth table of 4 to 1 Multiplexer.    6

#### UNIT — III

VII  (a)  Explain the basic operations of different shift registers with neat sketch.    9

    (b)  Draw the circuit of a 4 bit ring counter.    6

#### OR

VIII  (a)  Draw and explain the operations of Master Slave JK with truth table.    9

    (b)  Compare synchronous and asynchronous counter.    6

#### UNIT — IV

IX  (a)  Explain the working of a R-2R ladder type ADC with neat sketch.    9

    (b)  Define monotonicity and offset voltage.    6

#### OR

X  (a)  Explain the working of Counter type ADC with neat sketch.    9

    (b)  Explain the operation of reading and writing a memory cell.    6