N19-02201

TED (15) –3133

(REVISION — 2015)

Reg. No. ....

Signature ....

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