

f-dq

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

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 binary codes.
2. Define minterm.
3. What is the function of an encoder ?
4. Define a flip-flop.
5. What is mean by resolution in DAC ?

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Explain the behavior of universal gates with logic diagram and truth table.
2. Reduce the expression  $F = A + B[AC + (B + C')D]$
3. Convert  $(10110)_2$  to gray code and  $(11011)_{\text{gray}}$  to binary.
4. Design a half adder with truth table, expressions and logic diagram.
5. Differentiate synchronous and asynchronous sequential circuits.
6. Explain the working of a T-flipflop with logic diagram and truth table.
7. Describe the working of R-2R DAC.

(5×6 = 30)

## PART — C

(Maximum marks : 60)

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

## UNIT — I

III (a) Convert the following :

(i)  $163.875_{10}$  to binary(ii)  $4F7.A8_{16}$  to octal(iii)  $2056_8$  to decimal

9

(b) Construct an EX-OR gate using NAND gate.

6

OR

IV (a) Explain about alpha numeric codes with examples.

9

(b) Reduce the expression  $F = (A + (BC)')'(AB' + ABC)$  using Boolean algebra.

6

## UNIT — II

V (a) Design a full adder with minimum number of gates.

9

(b) Reduce the expression  $F(x,y,z) = \sum m(0, 1, 2, 3, 6)$ 

6

OR

VI (a) Explain the working of a  $4 \times 1$  Multiplexer with diagram.

8

(b) Explain the working of a magnitude comparator.

7

## UNIT — III

VII (a) Explain the working of JK Master slave flip flop with logic diagram.

9

(b) Explain the working of 3 bit Johnson counter.

6

OR

VIII (a) Explain the working of a parallel in serial out shift register.

9

(b) Explain the working of 4 bit ring counter.

6

## UNIT — IV

IX (a) Explain the working of counter ramp type ADC with diagram.

9

(b) Write notes on error correction codes.

6

OR

X (a) Draw a logic diagram to implement the Boolean function.

$$F1 = (AB + AC + BC)'$$

$$F2 = AB + AC + A'B'C' \text{ in PLA}$$

9

(b) Write notes on the following DAC parameters.

(i) Monotonicity (ii) Setting time.

6