

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

OR

- IV (a) Explain about alpha numeric codes with examples.
- (b) Reduce the expression $F = (A + (BC)')' (AB' + ABC)$ using Boolean algebra.

UNIT — II

- V (a) Design a full adder with minimum number of gates.
- (b) Reduce the expression $F(x,y,z) = \sum m(0, 1, 2, 3, 6)$

OR

- VI (a) Explain the working of a 4×1 Multiplexer with diagram.
- (b) Explain the working of a magnitude comparator.

UNIT — III

- VII (a) Explain the working of JK Master slave flip flop with logic diagram.
- (b) Explain the working of 3 bit Johnson counter.

OR

- VIII (a) Explain the working of a parallel in serial out shift register.
- (b) Explain the working of 4 bit ring counter.

UNIT — IV

- IX (a) Explain the working of counter ramp type ADC with diagram.
- (b) Write notes on error correction codes.

OR

- X (a) Draw a logic diagram to implement the Boolean function.
- $F1 = (AB + AC + BC)'$
- $F2 = AB + AC + A'B'C'$ in PLA
- (b) Write notes on the following DAC parameters.
- (i) Monotonicity
 - (ii) Setting time.