

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/
TECHNOLOGY—OCTOBER, 2014

DIGITAL COMPUTER PRINCIPLES

(Common to IF, CM and CT)

[Time : 3 hours

(Maximum marks : 100)

PART—A

(Maximum marks : 10)

Marks

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

1. Define parity bit.
2. Define positive and negative logic.
3. What is encoder ?
4. Define fan-out.
5. Write any two applications of flip flops.

(5×2=10)

PART—B

(Maximum marks : 30)

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

1. Explain alpha numeric codes.
2. Draw the truth table and logic symbol of NAND and NOR logic gates.
3. Prove that $AB + BC + B'C = AB + C$.
4. Explain the features of CMOS logic family.
5. Design and implement a full adder circuit.
6. Explain the working of a D flip flop with truth table and logic diagram.
7. Differentiate between synchronous and asynchronous counters.

(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 numbers into decimal number system :
- | | | |
|-----------------|------------------|---|
| (i) $1A2_{16}$ | (iii) 110110_2 | 8 |
| (ii) $2CA_{16}$ | (iv) 1110001_2 | |
- (b) Explain the features of octal number system. How it is converted into decimal and binary. 7

OR

- IV (a) Design EX-OR gate using NAND gate with truth table and circuit diagram. 8
- (b) Explain hamming code with an example. 7

UNIT—II

- V (a) State and explain the basic theorems in Boolean algebra. 8
- (b) Differentiate TTL and CMOS logic family. 7

OR

- VI (a) Simplify using Karnaugh Map $\Sigma m (5, 6, 7, 9, 10, 11, 13, 14, 15)$. 8
- (b) Explain TTL inverter circuit. 7

UNIT—III

- VII (a) Explain the working of a serial adder with neat diagram. 8
- (b) Design a BCD to 7-segment code converter. 7

OR

- VIII (a) Design a 4-bit binary to gray code converter. 8
- (b) Explain the working of a 4 to 1 multiplexer with diagram. 7

UNIT—IV

- IX With truth table and logic diagram explain the working of a JK flipflop. 15

OR

- X (a) Explain the working of serial in serial out shift register. 10
- (b) What are up/down counters ? 5