

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2017

**DIGITAL ELECTRONICS**

[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. List any two non-weighted code.
2. Identify ASCII code.
3. Define a half adder.
4. List any two types of flip-flops.
5. Define resolution of Digital to analog converter.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. Change the following hexadecimal numbers to binary.  
(i) 10A4      (ii) CF8E      (iii) 9742      (iv) 3F.3A
2. Describe BCD code and Excess-3 code.
3. Define the terms in connection with logic gates.  
(i) Noise margin      (ii) Propagation delay      (iii) fan-out
4. Draw and explain a 1 × 4 De-multiplexer.
5. Describe the working of right shift register with figure.
6. Differentiate between synchronous and asynchronous counters.
7. List different types of ADC and 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) Construct basic logic gates using NAND gates only. 8
- (b) Compute the following binary arithmetic operation.
- (i)  $101010 \times 11101$  (ii)  $1111001 \times 10101$
- (iii)  $100011 + 11001$  (iv)  $1010101 + 1111111$  7

OR

- IV Design a logic circuit by reducing the logic expression  
 $F = \sum m(0,1,2,3,4,7,8,9) + d(10,11,12,13,14,15)$  using K-Map. 15

## UNIT — II

- V (a) Explain the operation of  $4 \times 1$  multiplexer with logic diagram. 8
- (b) Draw and explain a full adder. 7

OR

- VI (a) Draw and explain CMOS NAND gate. 8
- (b) Explain half subtractor using NAND gates only with logic diagram. 7

## UNIT — III

- VII (a) Explain the working of Johnson counter. 8
- (b) Discuss JK flip-flop using NAND gates with truth table. 7

OR

- VIII (a) Draw and explain the working of serial - in serial - out shift register. 8
- (b) Explain D flip-flop with its characteristic table. 7

## UNIT — IV

- IX (a) Implement mod - 8 synchronous counter using JK flip-flop. 8
- (b) Draw and explain weighted resistor type DAC. 7

OR

- X (a) Discuss counter type ADC with figure. 8
- (b) Draw a 3 - bit up-down counter. 7