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

DIGITAL ELECTRONICS AND OP-AMPS

[*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. Which are basic gates ?

2. List the advantages of CMOS logic family.

3. $A + AB =$ ....

4. What is a register ?

5. Define CMRR. (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Convert the following decimal numbers to binary numbers

   (a) 28   (b) 108.5   (c) 45.89

2. Subtract 1010 from 11101 using 1's complement method.

3. Draw and explain the circuit of half subtractor.

4. Describe the working of D flip flop.

5. Explain the working of typical down counter.

6. List the characteristics of ideal op-amp.

7. Describe the working of op-amp differentiator. (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 given numbers to equivalent decimal.

    (i) 1101   (ii) 82F

    (iii) 110.1   (iv) A318   8

(b) Compare TTL and CMOS logic families.   7

Or

IV (a) Do the following.

    (i) $D2_{16} = (\ldots)_2$ (ii) 110 + 11

    (iii) 1011 − 11   (iv) 110 × 101   8

(b) Explain universal gates with symbol and truth table.   7

Unit — II

V (a) Draw the circuit of Full adder and explain.   8

(b) State and prove De-Morgan's theorems.   7

Or

VI (a) Simplify the expression $Y = AB\bar{C} + A\bar{B}C + \bar{A}BC + ABC$ and draw logic circuit.   8

(b) Draw and explain the circuit of 1:4 demultiplexer.   7

Unit — III

VII (a) Describe the working of SIPO shift register using D flipflop.   8

(b) Draw mod-8 asynchronous counter and give the transition table.   7

Or

VIII (a) Draw and explain mod-4 synchronous counter.   8

(b) Write the differences between asynchronous counter and synchronous counter.   7

Unit — IV

IX (a) Explain op-amp inverting amplifier.   8

(b) Describe op-amp integrator circuit.   7

Or

X (a) Explain the working of op-amp difference amplifier.   8

(b) Describe the working of op-amp Schmitt trigger circuit.   7

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