DE& MP. 43.

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(REVISION — 2015)

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

## DIGITAL ELECTRONICS AND MICROPROCESSOR

[*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. Write the BCD equivalent of decimal number $(108.37)_{10}$
2. Draw the circuit symbol and write the truth table of a negative edge triggered D Flip Flop.
3. Construct the structure of a 2 variable Karnaugh Map and map the following expression in it.

   $Y = \bar{A}\bar{B} + \bar{A}B$
4. With the help of diagrams show the difference between a synchronous counter and an asynchronous counter with reference to the application of CLOCK signal.
5. List any four general purpose registers of 8085. (5×2 = 10)

### PART — B

(Maximum marks : 30)

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

1. Perform the following operation in binary

   $(1101.101)_2 + (111.011)_2$.
2. Convert the decimal number $(3289.32)_{10}$ to binary number. Show the steps.
3. Write the truth table of a Full Adder Circuit. Construct it using AND, OR, EX-OR gate combinations.
4. Construct a positive edge triggered clocked ACTIVE HIGH R-S flip-flop with NAND gates and write its truth table.

Marks

5. Explain MOD Number of a counter. Determine the number of flip-flops required to construct a MOD - 10 Counter.

6. Implement a MOD 8 Synchronous Binary UP counter and write its count sequence. (Use negative edge-triggered *JK* flip-flops).

7. Explain with examples any three addressing modes of 8085 Microprocessor.

(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) Execute the following operations in Two's Compliment Method. Convert the result back to decimal number. (Use 8 bit format)

(i) $(95)_{10} - (68)_{10}$ (ii) $(68)_{10} - (95)_{10}$ 10

(b) Compare the TTL, ECL and CMOS Logic families on the basis of Propagation Delay, power dissipation, fan in and fan-out capability. 5

OR

IV (a) List the basic gates in digital circuits. With the aid of truth tables and symbols describe their operation. Write the expression for their output. 10

(b) Execute the following operation in binary.

(i) $(110101.11)_2 / (101)_2$ (ii) $(10.111)_2 \times (1010)_2$ 5

### UNIT — II

V (a) Draw the schematic symbol of a positive edge triggered JK Flip Flop and write its truth table. Implement it using NAND gates only. 10

(b) Simplify the following boolean expression using K map.

$Y = \bar{A}\bar{B}C + \bar{A}BC + ABC + A\bar{B}C + \bar{A}B\bar{C}$ 5

OR

VI (a) NAND & NOR gate are called universal gates. Justify your answer with the help of examples. 10

(b) Apply De Morgan's Theorems to the following expression and simplify it. Implement the simplified circuit using basic gates.

$Y = \overline{(A + \bar{B})(C + \bar{D})}$ 5

Marks

UNIT — III

VII Implement a DECADE Ripple UP counter with a negative edge-triggered *J-K* flip-flops and write its count sequence with the waveforms. 15

OR

VIII (a) Draw a Serial in Parallel Out Right Shift Register and explain how a data 1011 is stored in a register (use positive edge triggered D Flip Flop). 10

(b) Explain with diagram the concept of R-2R Ladder Network for Digital to Analogue conversion. 5

UNIT — IV

IX (a) Construct the PIN OUT diagram of 8085 Microprocessor and label all the pins. 10

(b) Explain the following pin functions with reference to 8085 Microprocessor.

(i) $IO/\bar{M}$ (ii) ALE 5

OR

X (a) Explain the following with reference to 8085 Microprocessor.

(i) Flag Register.

(ii) Arithmetic & Logic Unit.

(iii) Program Counter.

(iv) Stack Pointer. 10

(b) Describe with examples the following instructions in 8085.

(i) ADD (ii) ADC 5