TED (15) – 4032

(REVISION — 2015)

Reg. No. .....

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FOURTH SEMESTER DIPLOMA EXAMINATION IN ELECTRICAL AND ELECTRONICS ENGINEERING — APRIL, 2017

DIGITAL ELECTRONICS AND MICROPROCESSORS

[*Time* : 3 hours

(Maximum marks : 100)

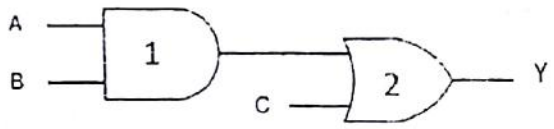
PART — A

(Maximum marks : 10)

Marks

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

1. Define the term 'Bit' in binary number system. State the possible values it can take.
2. Identify the two gates represented by 1 and 2 in the figure below. Write the Boolean expression for the output Y.



3. Draw the circuit symbols of Positive and Negative edge triggered JK Flip Flops.
4. Give two examples for sequential logic devices.
5. State the reason that 8085 microprocessor is called an 8 bit microprocessor.

(5×2 = 10)

PART— B

(Maximum marks : 30)

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

1. Convert the hex number $(F8E6.39)_{16}$ to decimal number. Show the steps.
2. Diagrammatically represent the basic gates and explain the operations with truth table.
3. With the help of the logic diagram and truth table describe the operation of a positive edge triggered clocked R-S flip-flop with ACTIVE HIGH R and S inputs.
4. Apply De Morgan's Theorems to the following expression and simplify it.

$$\overline{(A\bar{B} + \bar{C}D + EF)}$$

5. A data 1011 has to be stored in a register using a Parallel in Parallel Out Shift register. Draw the schematic diagram of this Shift register using a negative edge triggered D Flip Flop and explain its operation.

6. Construct a MOD 8 asynchronous Binary Down counter using negative edge-triggered *JK* flip-flops and write its count sequence.

7. Explain the different buses used in 8085 microprocessor system. (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 operation in binary. Show all the conversion steps.
$(6.375)_{10} \times (2.625)_{10}$ 9

(b) Draw the logic implementation of following output expression using basic gates.
$Y = \bar{A}BC\ \overline{(A + D)}$ 6

OR

IV (a) Execute the following operation in One's Compliment Method. Convert the result back to decimal number. (Use 8 bit format)
(i) $(72)_{10} - (48)_{10}$ (ii) $(48)_{10} - (72)_{10}$ 9

(b) Convert the following decimal numbers to equivalent binary numbers. Show the steps $(100.6)_{10}$ 6

UNIT — II

V (a) Draw the logic diagram of a JK Master Slave Flip Flop and explain its operation with truth table for master and slave Flip Flops. 6

(b) Write down Boolean expressions representing the SUM and CARRY outputs for a Half adder circuit. Draw a suitable combinational circuit to implement the design using basic gates. 9

OR

VI (a) Draw the logic diagram of a 4 × 1 multiplexer and write its Truth Table. Implement it using basic gates. 9

(b) Simplify the following boolean expression using K map.
$Y = \bar{A}.\ \bar{B}.\ C + \bar{A}.\ \bar{B}.\ \bar{C} + \bar{A}.\ \bar{B}.\ C + A.\ B.\ C$ 6

UNIT — III

VII Organize a BCD Ripple UP counter using negative edge-triggered *J-K* flip-flops with waveforms and count sequence. 15

OR

Marks

VIII (a) Draw a serial in serial out right shift register and explain with truth table how a data 1101 is stored in a register (use Negative edge Triggered JK Flip Flop). 9

(b) Explain with block schematic the concept of successive approximation type analog to digital converter. 6

UNIT — IV

IX (a) Draw the internal architecture of 8085 microprocessor and label it. 9

(b) Explain the following with reference to 8085 microprocessor.

(i) Arithmetic Logic Unit

(ii) Flag Register 6

(iii) Timing and Control Unit

OR

X (a) Explain the following pin functions with reference to 8085 microprocessor. 9

(i) $10/\overline{M}$ (ii) $\overline{WR}$ (iii) $\overline{RD}$

(b) Explain with examples the following instructions in 8085. 6

(i) MOV (ii) MVI