TED (15/19) – 4032
(Revision – 2015/19)

N22 - 03356

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE – NOVEMBER – 2022

DIGITAL ELECTRONICS AND MICROPROCESSORS

(Maximum Marks : 100) (Time : 3 hours)

PART – A
(Maximum Marks : 10)

Marks

I. Answer **all** questions in one or two sentences. Each question carries 2 marks.

1. Give an example for each nibble and byte used in binary number system.
2. Define an encoder. Give an example.
3. List the four types of basic shift registers used in digital system.
4. Specify any four functions of 8085 micro processor.
5. List any four classification of instruction group of 8085 microprocessor depending on their function. (5x2=10)

PART – B
(Maximum Marks : 30)

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

1. Diagrammatically represent the following gates and explain the operations with truth table.
   a) NAND b) NOR c) EX-OR
2. Compare the TTL, ECL and CMOS Logic families on the basis of propagation delay, power dissipation, fan in and fan-out capability.
3. Draw the logic diagram of a 8 x 1 Multiplexer and write its truth table.
4. Realize a suitable combinational circuit to implement a half adder circuit using basic gates. Write its truth table and expression for sum and carry output.
5. Explain with diagram the R-2R Ladder Network for a four-bit Digital to Analog conversion.
6. Explain with example any three addressing modes of 8085 Microprocessor.
7. List any six features of 8085 microprocessor. (5x6=30)

PART – C

(Maximum Marks : 60)

(Answer **one full** question from each unit. Each full question carries 15 marks)

UNIT – I

III. (a) Perform the Two's Compliment Method of subtraction using 8 bit format. Show the steps.

$$(101\ \ 1111)_2 - (100\ \ 0100)_2 \qquad (8)$$

(b) Convert the following binary number to decimal number. Show the steps.

$$(10\ \ 0111\ \ 1011\ .\ 0011)_2 \qquad (7)$$

OR

IV. (a) Execute the following operations in binary. Show the steps.

(i) $(1100\ .\ 11)_2 \times (1010\ .\ 1)_2$

(ii) $(11\ \ 0101\ .\ 11)_2 / (101)_2$ (8)

(b) Convert the following decimal number to binary number. Show the steps.

$(999.625)_{10}$ (7)

UNIT – II

V. (a) State the reason for calling NAND & NOR gates as universal gates. Justify your answer with the help of diagrams. (8)

(b) Simplify the following Boolean expression using K map

$$Y = \bar{A}\bar{B}C + \bar{A}BC + ABC + A\bar{B}C + A\bar{B}\bar{C} \qquad (7)$$

OR

VI. (a) State and explain De Morgan's Theorems and prove them using truth tables. (8)

(b) Draw the Logic symbol of positive edge triggered clocked R-S flip-flop and write its truth table for ACTIVE HIGH Operation. Realize the circuit using NAND gates. (7)

UNIT –III

VII. Implement an Asynchronous DECADE UP counter with a negative edge-triggered *J-K* flip–flops and write its count sequence and draw the waveforms. (15)

OR

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). (8)

(b) Draw the block diagram and explain the concept of Successive Approximation type Analog to digital Converter. (7)

UNIT – IV

IX. (a) Construct the PIN OUT diagram of 8085 Microprocessor and label all the pins. (9)

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

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

iv) ALE v) S1 vi) S0 (6)

OR

X. Draw the architecture of 8085 and explain following blocks (9)

i) General purpose registers.

ii) Accumulator.

iii) Flag register. (6)

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