Total No. of printed pages = 6

RETEST EXAMINATION – 2019

Semester : 4th (Old)

Subject Code : EI-CO-IT-403

DIGITAL ELECTRONICS

Full Marks – 70

Time – Three hours

The figures in the margin indicate full marks for the questions.

Instructions :

1. *All* questions of PART–A are compulsory.
2. Answer any *five* questions from PART–B.

PART–A

Marks–25

1. Fill in the blanks : 1×10=10

   (a) The base of hexadecimal system is _____.

   (b) _____ gate is also known as inverter.

   (c) NAND gate is basically a _____ gate followed by _____.

[Turn over

(d) Each term in the standard _____ form is called maxterm.

(e) 1's complement of 10001100010101011_2 is _____.

(f) $(3165)_8$ = _____ 2.

(g) $(1001110100111011)_2$ = _____ 16.

(h) $(6542)_{10}$ = _____ 8.

(i) The full form of LCD is _____.

2. Write true or false : 1×10=10

(a) $\overline{(A+B)} = \overline{A} + \overline{B}$.

(b) In octal number system, 10 digits are used.

(c) $A + \overline{A} = 1$.

(d) In decimal number system, LSD stands for Lowest Significant Digit.

(e) A table which lists all possible combination of inputs and the corresponding outputs is called a truth table.

(f) Flip-flop is a combinational circuit.

(g) Gray code of 10101101_2 is 11111011_2.

(h) The full form of ASCII is American Standard Code for Information Interchange.

(i) The output of an OR gate is HIGH when both the inputs are HIGH.

(j) 1's complement can be found out by changing all 1s to 0s and all 0s to 1s.

3. Choose the correct answer : 1×5=5

(a) The output of an AND gate is HIGH

(i) When any input is HIGH

(ii) When all inputs are LOW

(iii) When all inputs are HIGH

(iv) When any input is LOW

(b) A group of 4 ones that are horizontally or vertically adjacent in a K-map is known as

(i) Octet (ii) Quad

(iii) Pair (iv) Literal

(c) Parallel adders are

(i) Combinational logic circuits

(ii) Sequential logic circuits

(iii) Both of the above

(iv) None of the above

(d) A full adder can be realized using

(i) two half adders, two OR gate

(ii) one half adder, one AND gate

(iii) one half adder, two OR gate

(iv) two half adders, one OR gate

(e) The two universal gates are

(i) AND and NAND

(ii) NOR and OR

(iii) NAND and NOR

(iv) X-OR and X-NOR

PART – B

Marks – 45

4. (a) Show that $AB+\overline{AC}+A\bar{B}C(AB+C)=1$. 3

(b) Reduce the following :

$\bar{A}B+\bar{A}B\bar{C}+\bar{A}BCD+\bar{A}BC\bar{D}E$. 3

(c) Draw the logic circuit for the expression :

$Y=\bar{A}B\bar{C}+ABC+B\bar{C}+A\bar{B}$. 3

5. (a) State and prove Duality Theorem. 5

(b) Define ASCII and Gray code. 2

(c) Subtract using 1's complement

11011-10101. 2

6. (a) Draw and explain a full adder. 3

(b) Draw OR and AND gate using NAND gate only. 3

(c) Write the characteristics of TTL logic family. 3

7. (a) Define with truth table and symbol :

XOR, XNOR and NOT gate. 2+2+2=6

(b) Explain the working of a 3 to 8 decoder. 3

8. (a) Simplify the Boolean expression :

$F = \sum m\ (5,6,9,10,11,13,14,15)$ 5

(b) Draw the logic circuit for the above reduced expression. 4

9. (a) Differentiate between Sequential and Combinational circuits. 4

(b) Explain the JK flip-flop with diagram. 5

10. What is a register ? Mention its types. Explain any one of the register. 2+2+5=9

11. Write short notes on any three : 3×3=9

(a) LED and LCD

(b) Seven segment display

(c) Up-Down counter

(d) D flip-flop.