Code No. : 10754 E   Sub. Code : EECS 21

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2024.

Second Semester

Computer Science

Elective — DIGITAL LOGIC FUNDAMENTALS

(For those who joined in July 2023 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. What is the decimal equivalent of $(1101)_2$?

    (a) 13   (b) 11

    (c) 1011   (d) 19

2. Which code is used to send digital data over telephone lines

    (a) BCD   (b) GRAY code

    (c) ASCII   (d) EBCDIC

3. $AB + \overline{A}C + BC =$ _____

    (a) $(A + B)(\overline{A} + C)$ (b) $AB + \overline{A}C$

    (c) $AB + BC$ (d) $\overline{A}C + BC$

4. How many fundamental products are there for four variables?

    (a) 2   (b) 4

    (c) 8   (d) 16

5. $A \oplus B =$ _____

    (a) $A + B$ (b) $AB + \overline{AB}$

    (c) $A\overline{B} + \overline{A}B$ (d) $\overline{A} + \overline{B}$

6. 2's complement of $(-96)_{10}$ is _____

    (a) 11100000   (b) 10100000

    (c) 01010000   (d) 01001111

7. In $S - R$ flip-flop, if $Q = 0$ the output is said to be _____

    (a) Set   (b) Reset

    (c) Previous state   (d) Current state

8. In which flip-flop output follows the input?

    (a) RS   (b) D

    (c) JK   (d) T

9. Which of the following flip flop is not used to construct registers?

    (a) RS   (b) D

    (c) JK   (d) T

10. In parallel shift registers, data shifting occurs _____

    (a) 1 bit at a time   (b) Simultaneously

    (c) Two bit at a time   (d) Four bit at a time

PART B — (5 × 5 = 25 marks)

Answer ALL questions by choosing (a) or (b).

Each answer should not exceed 250 words.

11. (a) (i) Convert binary 110.001 to a decimal number.

        (ii) If a 16 bit number has all 1s, what is its decimal equivalent?

        Or

    (b) Write a note on Graycode.

12. (a) Write the consensus theorem.

        Or

    (b) What is the simplified Boolean equation for the following logic equation?

        $F(A,B,C,D) = \Sigma m(7,9,11,12,13,14,15)$

13. (a) Write a note on multiplexer.

        Or

    (b) Perform binary addition $(-43)_{10}$ and $(-78)_{10}$.

14. (a) Write a note on RS flip flop.

        Or

    (b) Write a note on edge triggered D flip flop.

15. (a) Give the sketch of serial in parallel out register.

        Or

    (b) Give the sketch of parallel in parallel out register.

PART C — (5 × 8 = 40 marks)

Answer ALL questions by choosing (a) or (b).

Each answer should not exceed 600 words.

16. (a) Tabulate the BCD representation and Excess-3 code for Decimal 0 - 9.

        Or

    (b) Explain the universal logic gates.

[P.T.O.]

17. (a) Construct the truth table for

    (i) two input NOR gate

    (ii) three input Ex-OR gate

Or

(b) Convert the following truth table to Karnaugh map and draw logic circuit.

A	B	C	Y
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

18. (a) Subtract $(-43)_{10}$ and $(-78)_{10}$ in binary form.

Or

(b) Explain 7 segment decoder.

19. (a) Explain edge triggered RS flip flop

Or

(b) Explain JK Master-Slave flipflop.

20. (a) Explain serial in parallel out register.

Or

(b) Explain universal shift register.

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