

A-1296

Total Pages : 4

Roll No.

BCA(N)-120

(Digital Electronics)

1st Semester Examination, Session December 2024

Time : 2:00 Hrs.

Max. Marks : 70

Note :- This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. *Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.*

Section-A

(Long Answer Type Questions) 2×19=38

Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only.

1. Compare the roles of ROM, RAM, and flash memory in a computing system. Provide examples of each.
2. Discuss the various types of logic gates. Also discuss their application with diagrams ?
3. (i) Derive the Boolean expression for the Circuit show below :

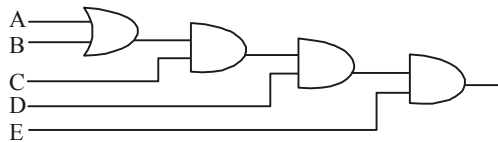


Fig. (a)

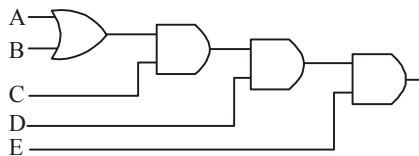


Fig. (b)

- (ii) Design the circuit for $(X' + Y')'$ using NAND gate.
4. What is K-Map (Karnaugh Map) ? Reduce the following Boolean expression using K-Map :
 - (a) $F(P, Q, R, S) = \Sigma(0, 3, 5, 6, 7, 11, 12, 15)$
 - (b) $F(A, B, C, D) = \Sigma(0, 1, 2, 4, 5, 8, 9, 10, 11)$

5. Simplify the following boolean expressions :

- (a) $(A' + B + B'A) D$
- (b) $A'BC' + ABC' + AB'C'$
- (c) $A'BC' + A'BC'D + BC'$
- (d) $ABC + A'B + ABC'$

Section-B

(Short Answer Type Questions) 4×8=32

Note :- Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

- 1. What is Full adder. Distinguish between Half Adders and Full Adders. Draw circuit diagram of Full adder using two half adder and one OR gate only.
- 2. Show the truth table for NOR gate along with symbolic diagram.
- 3. Write short notes on the following :
 - (a) Counter
 - (b) BCD Code
 - (c) 1's and 2's Complements
 - (d) Excitation table

4. What is Flip-Flop ? Construct a clocked R-S flip flop using NAND gates and explain its working.
5. Convert each of the following decimal numbers to binary number :
 - (i) $(3479)_{10}$
 - (ii) $(642)_{10}$
 - (iii) $(555)_{10}$
 - (iv) $(845)_{10}$
6. State DeMorgan's theorem and duality law. Differentiate between them. Give suitable examples.
7. Define decoder. Draw logic diagram and truth table of 3 to 8 – line decoder.
8. $F = x'y + x'y' + xy$ design the circuit using :
 - (i) Only NAND gates
 - (ii) Only NOR gates.
