

BCA 203

B.C.A. (PART-I) EXAMINATION, 2023-24

(Second Semester)

Paper : III

Digital Circuit and Logic Design



5516

Time : Three Hours]

[Maximum Marks : 70

- Note:** (i) Answer **Five** Questions in all.
(ii) Question No. 1 is Compulsory.
(iii) Answer remaining **four** questions, selecting **two** questions from each Section A and B.
(iv) All questions carry equal marks.
1. Answer **all** parts of the following :
- (a) Explain basic logic gates with truth table and symbol.
(b) Convert 13 and -13 into binary and find its 1's complement.
(c) Find the complement of the function $f1 = xyz' + x'y'z$ and $f2 = x(y'z' + yz)$
(d) Simplify the Boolean function $xy + x'z + yz$ to a minimum number of literals

Section-A

2. Draw the circuit diagram of full adder and subtractor explain its working.
3. What do you mean by universal logic gate ? Explain the implementation of AND and OR gate using universal logic gate.

4. Sketch and explain the function of SR Flip Flop.
5. What do you understand by Karnaugh map ? Explain it for 3 and 4 variables. Simplify the following Boolean expression using K-map in POS form :

$$F = A'B'C' + B'CD' + A'BCD' + AB'C'$$

Section-B

6.
 - (a) Draw the circuit diagram of decimal to binary encoder.
 - (b) Draw the circuit diagram of binary to decimal decoder.
7.
 - (a) What do you mean by multiplexer ? Explain the working of 4×1 Mux.
 - (b) What is Ex-OR logic gate ? Design an EX-OR gate with the help of basic gates.
8.
 - (a) How NAND and NOR logic can be implemented with Invert-OR and Invert-AND respectively ?
 - (b) Express the Boolean function $f = xy + x'z$ In a product of maxterm.
9. Write notes on any two of the following :
 - (a) Gray Code
 - (b) Minterms and Maxterms.
 - (c) Floating Point Number representation in standard binary format.

