

January 2019
Bachelor of Computer Applications (BCA) Examination
IIIrd Semester
BCA-303 ; DIGITAL COMPUTER ELECTRONICS

Time 3 Hours]

[Max Marks 70]

Note : Attempt all five questions. Solve any two parts from each question. All questions carry equal marks.

1. (a) (i) Subtract in binary form : $(47)_{10} - (23)_{10}$
(ii) Find the decimal equivalent of following binary number :
11001.0101
- (b) Encode the decimal numbers 45 and 291 in :
(i) Binary Code (ii) BCD Code (iii) Octal (iv) Hexadecimal Code.
- (c) (i) Multiply binary numbers : 1101 by 1010.
(ii) Divide binary number 1011011 by binary number 111.
2. (a) Verify the identify by truth table :
$$\overline{A + B} = \overline{A} \cdot \overline{B}$$

Implement $\overline{A + B}$ and $\overline{A} \cdot \overline{B}$ separately using suitable logic gates.
- (b) Implement the following gates using NOR gate only :
(i) NOT gate (ii) AND gate (iii) OR gate.
- (c) Explain the working of a full adder. Draw suitable circuit diagram and truth table.
3. (a) Convert the following : <http://www.davvonline.com>
(i) SOP expression to POS expression :
$$F = AB + CD + B\overline{D}$$

(ii) POS expression to SOP expression :
$$F = (\overline{A} + \overline{B} + \overline{C} + \overline{D})(B + D)(A + \overline{D})$$
- (b) Simplify the following function using Karnaugh Map :
$$F(w, x, y, z) = \Sigma (1, 2, 3, 12, 13, 15)$$
- (c) Obtain the simplified expression in product of sums :
$$F(A, B, C, D) = \Pi (0, 1, 2, 3, 6, 10, 11, 14)$$
4. (a) Implement a full adder circuit with a decoder and two OR gates.
(b) Explain an Octal to Binary encoder with circuit diagram and truth table.
(c) Enlist different types of TTL logic families and compare them on the basis of fanout, power dissipation, propagation delay and noise margin.
5. (a) (i) What is the difference between Sequential and Combinational Circuit ?
(ii) Explain the terms Edge Triggering and Level Triggering.
(iii) What is a Latch ?
(b) Draw and explain with excitation tables the RS and JK flip flop.
(c) Explain Shift Registers with examples.