Paper Code : 21306

F-406

B. C. A. (Second Semester) EXAMINATION, 2019

(New Course)

Paper No. BCA— (N)—201

DIGITAL ELECTRONICS

Time : Three Hours] [*Maximum Marks : 70*

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Perform the following conversions :

   (i) $(ABC)_{16} = (?)_{10}$

   (ii) $(47.6)_8 = (?)_{10}$

   (iii) $(5137)_{10} = (?)_{BCD}$

   (iv) $(62.7)_8 = (?)_{16}$

   (b) Find 9's and 10's complements of the following decimal numbers :

   (i) 2431

   (ii) 5299

2. (a) What do you mean by the base of a number system ? Give examples to illustrate the role of base in positional number system.

   (b) What is logic gates ? Discuss the various types of gates. Why is the NAND gate called Universal gate ?

3. (a) Simplify the following Boolean function, using Karnough maps :

$$F(A, B, C, D) = \Sigma(0, 1, 2, 5, 8, 10, 13)$$

   (b) Express the Boolean function :

$$F = AB + AC + AD$$

   in sum of minters form.

4. (a) State and prove two basic De-Morgan's theorems.

   (b) Convert the given expression in standard POS form :

$$f(A, B, C) = (A + B)(B + C)(A + C).$$

   (c) What do you mean by general switching problem ?

5. (a) Implement a full adder and explain.

   (b) Design a full adder using NAND gates.

6. Differentiate between the following :

   (i) Multiplexer and De-multiplexer

   (ii) Combinational and Sequential circuit

   (iii) POS and SOP

   (iv) Analog and Digital signal

   (v) Serial and Parallel register

7. (a) Explain the working of master slave JK flip-flop.

   (b) What is race around condition ? Explain in brief.

   (c) How can one convert D flip-flop to T flip-flop ? Explain.

8. Write short notes on the following (any *four*) :

   (i) Floating point number representation

   (ii) Counters

   (iii) Venn diagram representation of Boolean algebra

   (iv) Signed and unsigned number representation

   (v) Encoders

   (vi) Weighted number systems