Bachelor of Computer Application (B.C.A.) Semester-III (C.B.S.) Examination

DIGITAL ELECTRONICS–I

Paper—VI

Time : Three Hours] [Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.
(2) Draw a well labelled diagram wherever necessary.

EITHER

1. (a) What is number system ? Explain binary, octal and hexadecimal number system with example. 5

(b) Do as directed :

(i) $(134F)_{16} = (?)_2$

(ii) $(3467)_8 = (?)_{10}$ 5

OR

(c) What is parity ? What are its types ? What are its advantages ? 5

(d) What is Excess-3 code ? Perform the following addition using excess-3 code :

(i) 22 + 44

(ii) 36 + 41. 5

EITHER

2. (a) How are positive and negative numbers separated in binary ? Explain with example. 5

(b) What is 1's complement of a number ? Perform the following subtraction using 1's complement method :

$(10110)_2 - (1011)_2$ 5

OR

(c) What are the different rules for binary addition ? Perform the following binary addition :

(i) $(1010)_2 + (111)_2$

(ii) $(1111)_2 + (1000)_2$ 5

(d) Explain the following with example :

(i) Underflow of data

(ii) Range of data

(iii) Overflow of data. 5

EITHER

3. (a) Explain AND, OR and NOT gate with their truth table. 5

(b) Explain how NOR gate can be used to construct :

(i) AND gate

(ii) OR gate

(iiii) NOT gate. 5

OR

(c) Explain the construction and working of Ex-OR gate using basic gates. 5

(d) Why NAND gate is called universal gate ? Explain. 5

EITHER

4. (a) State and prove De-Morgon's theorem with truth table. 5

(b) What is K-map ? Explain the following terms related to K-map :

(i) SOP

(ii) POS

(iii) Quad

(iv) Octate

(v) Pair. 5

OR

(c) State and prove :

(i) AND law

(ii) OR law

(iii) NOT law. 5

(d) Simplify the following equation using K-map :

$Y = \sum m\ (0, 2, 4, 6, 9, 11, 13)$

draw the logic diagram for simplified equation. 5

5. Attempt all :

(a) What is ASCII code ? What are its advantages ? 2½

(b) Find the 2's complement of :

(i) $(1000)_2$

(ii) $(1111)_2$ 2½

(c) Draw the logic diagram of Ex-NOR gate and give its truth table. 2½

(d) Prove :

$(A + \bar{A}\, B) = (A + B)$ 2½