Pihu Kashyap

Total No. of Questions : 9] [Total No. of Printed Pages : 4

(1056)

BCA (CBCS) IInd Semester Examination

7074

DIGITAL ELECTRONICS

BCA-203

Time : 3 Hours] **[Maximum Marks : 70**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note :– Attempt any *five* questions in all. Select *one* question each from Units I, II, III and IV. Unit V (Q. No. 9) is compulsory.

Unit–I

1. (a) Discuss the characteristics of transistor-transistor logic and emitter-coupled logic digital families. 9

   (b) Write short notes on Integrated circuits. 5

2. (a) Explain the forward and reverse biasing of p-n junction. 10

   (b) Explain valence and conduction bonds in solids. 4

Unit–II

3. (a) Prove the following expressions using Boolean algebra :

(i) $(A + B) \cdot (\bar{A} + C) = AC + \bar{A}B$

(ii) $A + \bar{A}B + A\bar{B} = A + B$ 7

(b) Give the logic symbol and truth tables for the following combinational gates :

(i) Exclusive OR gate

(ii) Exclusive NOR gate 7

4. (a) Explain basic Boolean Law's with suitable examples. 5

(b) Apply Demorgan's theorem to the following expressions :

(i) $\overline{(W + X)Y}$

(ii) $\overline{(A + \bar{B} + C + \bar{D})}$

(iii) $\overline{\bar{X} + \bar{Y} + \bar{Z}}$ 9

Unit–III

5. (a) Simplify the following Boolean function by using K-map and implement it using NoR gates.

$f(ABCD) = \Sigma m(2, 3, 4, 5, 6, 7, 11, 14, 15)$ 10

(b) Give the sum of Product expression of AND-OR realization. 4

6. (a) Explain the minimization technique for 4-variables by giving minterms and maxterms. 7

(b) Distinguish between algebraic method and Karnaugh method for minimisation of Boolean expressions. 7

Unit–IV

7. (a) Give the logic diagram and truth table for a Half-Adder. 8

(b) What is an encoder ? Give the truth table for octal to binary encoder 6

8. (a) What is a sequential circuit ? Explain its types. 6

(b) Give the construction of Master-Slave JK flip-flop. 8

Unit–V (Compulsory Question)

9. Attempt all parts :

(i) Define K-Map.

(ii) .....is a universal gate.

(iii) Differentiate between intrinsic and extrinsic semiconductors.

(iv) Explain race around conditions in flip-flops.

(v) Give the truth table for NAND gate.

(vi) Write the Boolean expression for a 2-input NOR gate.

(vii) Simplify $Y = \bar{A}Q + AQ$ 2×7=14