Roll No. 6161300230.

Total No. of Questions : 9] [Total No. of Printed Pages : 3

(1048)

B.C.A. (CBCS) RUSA IInd Semester Examination

4029

DIGITAL ELECTRONICS

Paper : BCA-0203

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

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

Unit–I

1. (a) Explain Band theory in solids.

   (b) Discuss forward and reverse biasing of a *p-n* junction. 7,7

2. (a) Explain the characteristics of TTL, CMOS and ECL logic families.

   (b) Explain the working of Bipolar Junction Transistor. 8,6

7.0

Unit–II

3. (a) Explain basic logic gates and also give their truth tables. 8,6

(b) State and explain deMorgan's theorem.

4. (a) Simplify the following using Boolean Algebra :

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

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

(iii) $(A + B)(\bar{A} + C)$

(b) What are universal gates ? Show that NAND is a universal gate. 6,8

Unit–III

5. (a) Using four variable map, find the minimal SOP expression for the Boolean function :

$f(w, x, y, z) = \Sigma m(2, 5, 7, 9, 10, 11, 13, 15)$

(b) What is *k*-map ? What is the significance of pairs, quads and octets in a *k*-map ? 10,4

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

(b) Discuss Venn diagram by giving a suitable example. 8,6

Unit–IV

7. (a) Explain the working and logic diagram of a full adder with three inputs.

   (b) Design a decimal to BCD encoder circuit. 8,6

8. (a) What is a flip-flop ? Draw the circuit diagram of JK-flip-flop using NAND gate.

   (b) What is a multiplexer ? Give the logic diagram of 4 × 1 multiplexer. 7,7

Unit–V

(Compulsory Question)

9. Attempt all parts.

   (a) What is breakdown voltage ?

   (b) ..... and ..... are universal gates.

   (c) Give the Boolean expression for 2-input NOR gate.

   (d) What is a decoder ?

   (e) What is race-around condition in flip-flops ?

   (f) What do you mean by product of sum (POS) ?

   (g) What is CE configuration of a transistor ? 7×2=14