**DE–4030** **11**

DISTANCE EDUCATION

B.C.A. DEGREE EXAMINATION, DECEMBER 2008.

ELECTRONIC DEVICES AND DIGITAL CIRCUITS

(2003 onwards)

Time : Three hours Maximum : 100 marks

Answer any FIVE questions.

All questions carry equal marks.

1. (a) What is an Excess - 3 code? Why is it called self-complementary code? (5)

(b) Write short notes on ASCII codes. (5)

(c) Convert the following :

(i) $(36C7)_{16} = (?)_{10}$

(ii) $(8697)_{10} = (?)_{16}$

(iii) $(1111101)_2 = (?)_{10}$

(iv) $(6245)_8 = (?)_2$ . (10)

2. (a) Subtract the following using 2's complement

(i) 101101 – 101

(ii) 1101 – 101010

(iii) 1110111 – 110111

(iv) 1011011 – 1001011. (10)

(b) State and prove De Morgan's theorems. (10)

3. (a) Using Boolean laws show that

(i) $(X+Y)\left(X+\overline{Y}\right)=X$

(ii) $X+\overline{X}Y=X+Y$

(iii) $X\overline{Y}+\overline{X}\overline{Y}+\overline{X}B=XY$. (6)

(b) Realize AND, OR and NOT logic using NAND gate alone. (8)

(c) Write a note on EX-OR gate. (6)

4. (a) Explain the half - adder and full-adder functions with truth table and circuit diagram. (12)

(b) Using k-map simplify the expression in sum of products form

$F(A,B,C)=\Sigma(0,4)+d(1,,2,7)$.

5. (a) What is a flip-flop? What is its function? Explain J-K flip-flop indetail. (10)

(b) What is the function of a shift register? Explain its various types. (10)

6. (a) Discuss the working principle of a synchronous counter with its block diagram. (10)

(b) What is D flip-flop? What is its advantage over S-R flip-flop? What is the difference between a Dlatch and a D flip-flop?

7. (a) What is Uni-Junction transistor? Explain its characteristics. (10)

(b) Explain the process of achieving breakdown in zener diode. (10)

8. (a) Give short note about

(i) Photo diode

(ii) Operational amplifier applications. (10)

(b) With suitable diagram, explain the structure and the operation of N-channel FET. (10)

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