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ET-403/DE/4th Sem/ETC/2016/N

## DIGITAL ELECTRONICS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No.1 and any four from the rest.

1. (a) Convert the following decimal numbers to octal and hexadecimal form : 4

(i)  $(326)_{10}$

(ii)  $(289)_{10}$

(b) Encode the following into Excess-3 and Grey code : 4

(i)  $(54)_{10}$

(ii)  $(85)_{10}$

(c) Perform the following : 2

$$101101_2 + 100111_2$$

[Turn over

(d) Perform the following using 2's complement method : 4

(i)  $1101_2 - 1001_2$

(ii)  $10111_2 - 11011_2$

2. (a) Write the Demorgan's theorem and prove them with logic circuit and truth table. 6

(b) Realise the logic equation : 8

$$Y = (A+B) (C+D)$$

(i) only NAND gate

(ii) only NOR gate.

3. (a) Convert the Boolean expression into standard SOP form : 6

$$Y = AB + A\bar{B}C + BC + AC$$

(b) Minimize the following logic function using K-map method : 8

$$f(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 7, 8) + d(10, 11, 14)$$

4. (a) What is multiplexer ? Design a 8:1 multiplexer and explain.  $2+6=8$

(b) What is full adder ? Draw the logic circuit and explain the working principle of full adder using truth table. 6

5. What are different logic families ? Explain CMOS logic family with circuitry.  $5+9=14$

6. (a) What is a flip-flop ? Explain with truth table and neat diagram the working of R-S flip-flop. 8

(b) What is a Ring counter ? Explain a 4-bit Ring counter with diagram.  $2+4=6$

7. Write short notes on any two :  $7 \times 2 = 14$

(i) ASCII code

(ii) Semiconductor memory

(iii) LED and LCD display

(iv) Shift Register.