Total No. of printed pages = 3

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* : 7×2=14

(i) ASCII code

(ii) Semiconductor memory

(iii) LED and LCD display

(iv) Shift Register.