Total No. of printed pages = 3

Et-403/DE/4th Sem/2014/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 $(0{\cdot}513)_8$ to binary. 7×2=14

   (b) Convert $(15AC)_{16}$ to octal.

   (c) Convert $(126)_{10}$ to excess-3 code.

   (d) Convert Gray code number 1110110 to binary.

   (e) Convert $(940)_{10}$ to hexadecimal.

   (f) Add $(736)_8$ and $(1234)_8$

   (g) Multiply $(1101)_2$ by $(1011)_2$.

[Turn over

2. (a) Subtract the following using 2's complement method. $2\frac{1}{2}\times2=5$

(i) 1011_2 from 1000_2

(ii) 10110_2 from 11100_2

(b) Prove the following : $2\frac{1}{2}\times2=5$

(i) $(A + B)(A + C) = A + BC$

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

(c) Design the logical equation $y = (A + \bar{B}C)(C + AB)$ using AND and OR gates. 4

3. (a) Convert $y = ABC + A\bar{B}D + BC + AD$ into standard SOP form. 4

(b) Simplify : $f(A, B, C, D) = \sum m(0, 1, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15)$ using K-map. 6

(c) State De-Morgan's theorem and explain it. 4

4. (a) What is full adder ? Explain its working principle with its circuit diagram and truth table. 6

(b) Explain in brief a 5-bit shift register (any one type) with neat diagram. 4

(c) Classify various secondary memory devices on the basis of their operation. 4

5. (a) Using NAND gate, draw a R-S flip-flop circuit and explain its operation principle with truth table. 6

(b) Explain a 4-bit ring counter with proper circuitry. 4

(c) What is multiplexer ? Explain a 8:1 multiplexer with its equation and circuit diagram. 4

6. Write short notes on any *four* : $3\frac{1}{2} \times 4 = 14$

(i) Master slave J-K flip-flop

(ii) A/D converter

(iii) Seven segment display

(iv) Alphanumeric code

(v) Universal logic gates.