Total No. of printed pages = 4

EI/Co/It-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 the following : 2×5=10

(i) $(11{\cdot}0101)_2$ = _____$_{10}$

(ii) $(0{\cdot}6875)_{10}$ = _____$_2$

(iii) $(1001010)_2$ = _____$_8$

(iv) $(11A{\cdot}62)_{16}$ = _____$_{10}$

(v) $(10010)_2$ = _____ g

(b) Define : Excess – 3 code, BCD code. 4

[Turn over

2. (a) Subtract using 1's and 2's complement : $2\times2=4$

(i) $11001_2 - 10110_2$

(ii) $11011_2 - 11001_2$

(b) Convert $(126)_{10}$ to exces – 3 code. 2

(c) Define with symbol and truth table.

AND, EXOR, NAND and NOT gate. $2\times4=8$

3. (a) State duality theorem. Find dual of : $2+2+2=6$

(i) $A\overline{A}=0$

(ii) $A+1=1$

(b) Write and prove De Morgan's theorem. 8

4. (a) Prove the following identities : $2\times4=8$

(i) $\overline{A}\overline{B}\overline{C}+\overline{A}B\overline{C}+A\overline{B}\overline{C}+AB\overline{C}=\overline{C}$

(ii) $AB + ABC + \overline{A}B+A\overline{B}C=B+AC$

(b) Realise OR, AND, NOT gate using NAND gate. 6

5. (a) Reduce the following equation using K-map : 10

$$y = B\bar{C}\bar{D} + \bar{A}B\bar{C}D + AB\bar{C}D + \bar{A}BCD + ABCD$$

(b) Draw the logic diagram for the above minimize expression. 4

6. (a) What is half-subtractor ? Define with truth table and logic diagram. 6

(b) With truth table design a full-adder and draw the circuit diagram. 8

7. (a) What are the differences between combinational logic circuit and sequential logic circuit ? 4

(b) Explain with truth table the principle of a R-S flip-flop. 5

(c) What is register ? What are the different types of registers ? Draw a 4-bit serial-in-serial out register. 1+2+2=5

8. Write short notes on any *two* : 7+7=14

(a) LED and LCD

(b) Totem pole output of TTL.ICS

(c) Seven segment display

(d) J-K flip-flop

(e) Integrated chip.