SE-Comp.
III - CBSGS)
DLDA

08/12/2014

QP Code : 14644

(3 Hours) **[Total Marks : 80**

N.B. (1) Question No. 1 is **compulsory**.
(2) Assume suitable **data** if **necessary**.
(3) Attempts any **three** questions from **remaining** questions.

1. (a) Represent $(29)_{10}$ into Excess-3 code and Gray code. **2**
   (b) Convert the following hex no. $(67{\cdot}4A)_{16}$ into equivalent Octal no. **2**
   (c) Convert decimal (215·32) into base '7'. **4**
   (d) Convert $(670{\cdot}17)_8$ into binary and hex. **4**
   (e) Add $(57)_{10}$ and $(26)_{10}$ in BCD. **2**
   (f) Explain uses of Gray code. **4**
   (g) Add $(DDCC)_{16}$ and $(BBAA)_{16}$. **2**

2. (a) (i) State the boolean algebra laws used in k-map simplification. **5**
   (ii) Simplify $Y = ABC\left(\overline{CD}\right) + \overline{B}CD + \left(\overline{A}\,\overline{C}\right)(B + D)$. **5**
   (b) A misquided mathematician would like to subtract term. $A\overline{C}$ from both sides of equality. **10**

$$BC + ABD + A\overline{C} = BC + A\overline{C}$$

Would they still be equal if he did so. Justify and simplify the expression.

$$F = (x + \overline{z})\left(\overline{Z + WY}\right) + (VZ + W\overline{x})\left(\overline{Y + Z}\right)$$

3. (a) Simplify using boolean theorems and implement using AOI gate only.
   (i) $\overline{\overline{AB + \overline{A}\,\overline{B}} + \overline{(A + B)\cdot(\overline{A} + B)}}$ **5**
   (ii) Implement the following expression using NAND-NAND logic $y = \Sigma m(0, 1, 5)$ **5**
   (b) Simplify using k-map obtain SOP equation and realize using NAND gate. **10**
   $f(A, B, C, D) = \Pi M(1, 2, 3, 8, 9, 10, 11, 14) + d(7, 15)$.

4. (a) Implement the following expression using 8 : 1 mux **4**
   $f(A, B, C, D) = \Sigma m(0, 1, 3, 5, 7, 10, 11, 13, 14, 15)$.
   (b) Explain with example 4 bit BCD adder using IC-7483. **8**
   (c) Compare the performance of TTL, CMOS and ECL logic. **8**

5. (a) What is shift register ? Explain 4 bit bi-directional shift register. **10**
   (b) Convert JK FF to SR and DFF. **10**

6. Write short note on (any **three**) :— **20**
   (a) State table
   (b) VHDL
   (c) Difference between CPLD and FPGA
   (d) Decade counters.
