S-E. Sem III (Comps) (CBGS)

8/12/14

DLDA

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 $(215{\cdot}32)$ 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 $Y = ABC\left(\overline{CD}\right) + \overline{B}CD + \left(\overline{A}\,\overline{C}\right)\left(B + D\right)$. **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.

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

3. (a) Simplify using boolean theorems and implement using AOI gate only.
(i) $\overline{\overline{AB + \overline{A}\,\overline{B}} + \overline{\left(A + B\right)\cdot\left(\overline{A} + B\right)}}$ **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.
