RAMAKRISHNA MISSION VIDYAMANDIRA
(Residential Autonomous College under University of Calcutta)

FIRST YEAR
B.A./B.SC. FIRST SEMESTER (July – December), 2011
Mid-Semester Examination, September, 2011

Date : 13/09/2011   **COMPUTER SCIENCE (General)**
Time : 11 am – 12 noon   Paper : I   Full Marks : 25

Answer <u>any two</u> questions out of three questions: [12·5×2 = 25]

1. a) Find the 10's complement of $(935)_{11}$
    b) Convert the following :
        i) $(0·342)_6 = (?)_2$
        ii) $(1032·2)_4 = (?)_{16}$
    c) Is 8-4-2-1 code a self-complementary code? If so, justify.
    d) Is NAND operation associative? Justify your answer using an illustration.   [3+5+2+2½ = 12½]

2. a) What do you mean by Universal gate? Show NOR gate is an Universal gate.
    b) i) $F(w, x, y, z) = \Sigma m$ (0, 1, 2, 3, 4, 5, 6, 8, 9, 11, 12, 13, 14). Simplify the boolean function using K-map.
        ii) "Gray code technique is used in K-map" —Justify
    c) Express the Boolean function $F = xy + x´z$ in product Of maxterm form.
    d) The equation $5x^2 - 50x + 125 = 0$ has its roots as 5 and 8. Find base of the number system.

                                        [(1+2)+(3+1)+2½+3 = 12½]

3. a) Convert $(2AC5·D)_{16}$ to decimal, octal and binary.
    b) If $xy = 0$, then prove that $x´y + xy´ = x+y$
    c) Design a combinational circuit that take 3 bits binary number as input and convert them into their equivalent Gray Code.   [2½+2+8 = 12½]