RAMAKRISHNA MISSION VIDYAMANDIRA

(A Residential Autonomous College)

Belur Math, Howrah

B.A./B.Sc. 1st Semester (July – December 2010)

Mid-Semester Examination, September 2010

Date: 09.09.2010 **Computer Science (General)** Full Marks 25

Time: 11 am – 12 noon

*Answer Question number **1** and **any two** questions from rest*

1. (a) What do you mean by $(r-1)$'s complement? 5x1
   (b) What do you mean by Dual of a Boolean function?
   (c) What is universal gate?
   (d) What is K-map technique?
   (e) What do you mean by De Morgan's laws?
2. (a) Design a digital circuit of three input AND gate using only two input NAND gates. 7
   (b) Find the largest natural number (in decimal number system) which can be represented by 7 bits (in binary number system). 3
3. (a) Prove that $x \oplus y = x + y$ if $xy = 0$. 3
   (b) Prove that $f(x, y) = x.y'$ is universal. 4
   (c) Find value of r where $(101)_r = (10)_{10}$. 3
4. (a) The roots of the equation $5x^2 + 50x + 125 = 0$ are –8 and –5. Find the base of the number system. 5
   (b) Design a digital circuit which will accept a two bit number and produces its square as output. 5

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