RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FIRST SEMESTER EXAMINATION, DECEMBER 2013

FIRST YEAR

Date : 19/12/2013 **COMPUTER SCIENCE (General)**

Time : 11 am – 1 pm Paper : I Full Marks : 50

[Use Separate Answer Scripts for each group]

Group - A

Answer **any one** question from the following :

1. a) Find out 7's complement of $(206 \cdot 67)_8$
   b) State advantage and disadvantage of BCD code. [2+3]

2. a) Given a weighted code in which weights are considered as 4 4 3 –2 for decimal digits. Is this code a "Self-Complementary" code?
   b) Perform subtraction for the following using 1's complement method : (100101 – 110011) [3+2]

Answer **any two** questions from the following :

3. a) Simplify the Boolean function in SoP form using K-map :
   F = w´xz + w´yz + x´yz´ + wxy´z
   d = wyz [5]
   b) State generalized DeMorgan's Law. Using this law —prove that complement of an odd function is an even one. [2+1]
   c) Express the following function in Product of maxterm : F(x,y,z) = 1. [2]

4. a) Test whether the bit 0111001 is correct using even parity Hamming Code. [3]
   b) List the Huntington Postulates of Boolean-Algebra. [7]

5. a) State drawback of K-map method. [2]
   b) Simplify the following Boolean expression : AB + A´C´+ AB´C(AB+C) [3]
   c) Define Non-weighted Code. [2]
   d) Prove that A + BC = (A+B).(A+C) [3]

6. a) "In One's complement there are two representations of zero" —Critically comment on it. [3]
   b) Convert the binary number $(110011)_2$ into its equivalent gray code. [2]
   c) Write down steps to convert a number from base b1 into base b2. [2]
   d) Express the Boolean function F = xy + x´z in product of maxterm form. [3]

Group - B

Answer **any one** question from the following :

7. Design an asynchronous 4-bit up-down. Counter & explain its operation with a truth-table. [5]

8. a) How can you convert a Decoder into DEMUX?
   b) Differentiate between Combinational & Sequential Circuit. [2+3]

Answer **any two** questions from the following :

9. a) Design an Octal-to-binary encoder. [4]
   b) Design the following function using MUX : Σm(0, 2, 4, 6, 7). [4]
   c) Why DEMUX is called 'Data Distributor'? [2]

10. a) Using Logic Diagram convert a J-K Flip-Flop into a D Flip-Flop. [5]
    b) Draw a Circuit Diagram & Write the truth table of J-K Flip-Flop. [3]
    c) What do you mean by edge triggering and level triggering Flip-Flop? [2]

11. a) Explain the difference between asynchronous and synchronous Counter with logic diagrams. [4]
    b) Design and implement Mod-6 up synchronous Counter. [4]
    c) Define Shift register. [2]

12. a) Differentiate between Flip-Flop and Latch. [2]
    b) What is Race-Around Condition? [2]
    c) State disadvantages of Riple Counter. [2]
    d) Design a full adder circuit using two half-adder circuits. Write down the truth table and Boolean function also. [4]