RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. THIRD SEMESTER EXAMINATION, DECEMBER 2012

SECOND YEAR

Date : 20/12/2012 **COMPUTER SCIENCE (General)**

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

Use separate answer script for each group

Group-A

(Answer **question no. 1** and **any two** from question 2 to 5)

1. Answer **any two** questions from the following: 2½x2
   a) Describe the role of DBA.
   b) "Types in a relation is not ordered"- Justify.
   c) What is normalization?
   d) Why 3NF is better than 2NF?

2. a) "SQL is relationally complete"- Justify. 5
   b) Find the minimal cover for the following set of depending F, where
   $F = \{AB \to c, C \to A, BC \to D, ACD \to B, BE \to C, EC \to FA, CF \to BD, D \to E\}$ and the relation is $R(A, B, C, D, E, F)$. 5

3. a) Consider universal relation R={A, B, C, D, E, F, G, H, I} and the set of functional dependencies $F = \{AB \to C, A \to DE, B \to F, F \to GH, D \to IJ\}$ what is the key of R? Decompose R into highest normal form. 2+4
   b) List all FDS satisfied by the following table T 2

T

A	B	C	D
a_1	b_1	c_1	d_1
a_1	b_1	c_1	d_2
a_1	b_2	c_2	d_1
a_1	b_2	c_4	d_4

   c) What do you mean by Amstrong axioms? 2

4. a) Describe the three layer architecture of DMBS. 5
   b) What are disadvantage of conventional file based system. 5

5. a) What is referential integrity? Difference between privacy and security database. 3+3
   b) Give an example of an unmobilized form. Hence explain the importance of normalization. 4

Group-B

Answer **question No. 6** and **any two** from question No. 7 to 10

6. Answer any two questions: 2½x2
   a) What is an instruction?
   b) What do you mean by hardware and software interrupts.
   c) What is the role of status Flags in computer architecture?
   d) State differences between RISC and CISC architecture.

7. a) Briefly explain the instruction cycle. 5
   b) Illustrate the basic three instruction code formats of a 16 bits of a basic computer. 5

8. a) Explain the role of stack in programming. 4
   b) Explain the role of Stack Pointer and Program Counter during execution of a program with example. 5
   c) What do you mean by machine cycle? 1

9. a) Differentiate between register addressing mode and indirect addressing mode. 3
   b) An instruction pipeline has four stages named FE(Fetch), De(Decode), EX(Execute) and WB(write back) consider the following instruction

$$I_1 : R_1 \leftarrow R_1 + R_2$$
$$I_2 : R_3 \leftarrow R_3 * R_4$$
$$I_3 : M[A] \leftarrow R_3$$

   Calculate the speedup for these instructions for the given pipeline system. Given multiplication operation takes three execution cycle and addition and memory access takes one execution cycle each. 5
   c) Evaluate A = B + C using one address instruction. 2

10. a) Draw the flowchart for floating point multiplication in computer arithmetic. 3
    b) Calculate (-4)x3 using Booth's multiplication algorithm. 5
    c) How arithmetic overflow can be detected in computer. 2