RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2014

SECOND YEAR

Date : 19/12/2014 Time : 11 am – 1 pm

COMPUTER SCIENCE (General)

Paper : III

Full Marks : 50

[Use a separate Answer Book for each group]

Group – A

Answer any one question from Q.No 1-2 : [1×5] a) Explain foreign key constraint and its importance. [2] 1. b) Mention the advantages of database management system over file processing system. [3] a) Explain the term Data integrity. Explain also its types. $[2\frac{1}{2}]$ 2. b) Explain deletion anomaly with an example. $[2\frac{1}{2}]$ Answer any two questions from Q.No 3-6 : [2×10] Consider a relation R(A,B,C,D,E) with the following functional dependencies. 3. a) $AB \rightarrow C; CD \rightarrow E; DE \rightarrow B$ Is AE a candidate key for this relation What do you mean by trivial and non trivial functional $[2+\frac{1}{2}+\frac{1}{2}]$ dependency? b) Explain three schema architecture of DBMS with suitable diagram. [4] What do you mean by Armstrong axioms? c) [3] a) Explain dependency preservation property of normalization. [2] 4. "Primary key is a subset of super key" —Justify. [2] b) c) Differentiate between heap file organization and sorted file organization. [2] d) Are normal forms alone sufficient as a condition for a good schema design? Explain. [2] e) Define full functional dependency. [2] Differentiate between natural join and equi join. 5. a) [2] What do you mean by primary index? b) [2] When null values are present in a relation? c) [2] d) Explain spurious tuple. [2] "A join operation is a cartesian product operation followed by a select operation"—Justify. [2] e) Consider the universal relation R(A,B,C,D,E,F,G,H,I,J) and the set of functional dependencies : 6. a) $AB \rightarrow C; A \rightarrow DE; B \rightarrow F; F \rightarrow GH; D \rightarrow IJ$ What is the key of R? Decompose R into 2NF and 3NF relations with proper explanation. [1+2+2]b) State the lossless join property of decomposition. What is its significance? [2] Consider the following relation schema for SALES database. c) CUSTOMER (Cust_No, C_Name, City) ORDER (Order_No, Order_Date, Cust_No, Amount) ORDER_ITEM (Order_No, Item_No, Qty) ITEM (Item No, Unit Price) On the basis of this relation schema write the following query in relational algebra. • Retrieve the details of the customers who have placed an order for the item number 101. [2] [1]

Define attribute inheritance. d)

<u>Group – B</u>

| Answer any one question from <u>O.No 7-8</u> : | | | [1×5] |
|---|--|---|--------|
| 7. | Describe roles of Stack Pointer (SP) and Program Counter (PC) with proper example. | | [5] |
| 8. | Describe various types of ROMS. | | [5] |
| Answer any two questions from Q.No 9-12 : | | | [2×10] |
| 9. | a) | Calculate 3×-5 using Booth's multiplication algorithm. | [6] |
| | b) | Represent $(-39)_{10}$ in signed 2's complement format. | [2] |
| | c) | Give the difference between CISC vs. RISC. | [2] |
| 10. | a) | Draw and explain the memory hierarchy. | [4] |
| | b) | Briefly explain different write policies of cache memory. | [4] |
| | c) | Define seek time and rotational delay. | [2] |
| 11. | a) | Differentiate between Hardwired vs Micro programmed control unit. | [3] |
| | b) | Represent $(-13.25)_{10}$ in IEEE 32 bits floating point format. | [3] |
| | c) | Draw the basic block diagram of a Control unit. | [4] |
| 12. | a) | Explain IO mapped IO and Memory mapped IO. | [2+2] |
| | b) | What is the use of DMA? | [3] |
| | c) | What is meant by maskable and non-maskable interrupt? | [3] |

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