

3) a) What is ER Diagram? Define an attribute of entity type as function and ensure the definition covers both single-valued and multi-valued attributes. 2+4

b) Explain the constraints on relation in ER model. 6

c) Draw the ER/EER diagram for the system described as follows.

Project coordinators propose various projects. A project is funded by one funding agency. Apart from the coordinators, number of scientists work for a project. A scientist may be involved in multiple projects. A project is periodically reviewed by number of reviewers. A reviewer may review multiple projects. A reviewer submits a report for each such project. System keeps track of information regarding the projects, scientists and coordinators, reviewers, report and funding agencies. It must be able to maintain their inter relationships. 8

4) a) What do we mean by legal extension of a relation? 3

b) What is dependency preserving decomposition? Why is it important? 5

(c) What is the problem of allowing transitive dependency in a relation? 2

d) Normalize the following (explaining the steps) to minimize redundancy and to avoid anomalies and also indicate the primary and foreign keys. Regarding the bank accounts following information is to be stored. Each account has unique ac_no. An account may be owned by number of persons. Corresponding to each account, its opening date (*dt_open*), last date of access (*last_dt_account_access*), balance amount (*balance*), information of all the owners (i.e. *owner_name*, *dt_birth*, *phone_no*, *last_dt_owner_access*) and information of all the transactions (i.e. *trans_no*, *trans_type*, *trans_dt*, *trans_amount*) are stored.

Further, consider the following FDs,

$ac_no \rightarrow dt_open, last_dt_account_access$

$owner_name \rightarrow dt_birth, phone_no$

$ac_no, owner_name \rightarrow last_dt_owner_access$

$trans_no \rightarrow trans_type, trans_dt, trans_amount$

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5) a) Consider the following tables.

ITEM(ICODE, INAME, PRICE, QTY_STOCK)

CUSTOMER(CCODE, CNAME)

ORDER(ORDER_NO, ORDER_DT, CCODE)

ORDER_DETAILS(ORDER_NO, ICODE, QTY)

Write down the SQL statements for the following:

- a) Find the count of orders in which highest priced item is requested. 5
- b) In ITEM table, reduce the price by 50% for the items not appearing in any order. 5
- c) For each item show INAME and total quantity ordered in the year 2014. 5
- d) From CUSTOMER table, drop the customers who have not placed any order. 5

6) a) What are the reasons behind variable length record? How will you convert it into fixed length record? 6

b) What is the utility of B/B+ tree in indexing? 4

c) Explain the steps for query processing. 3

d) A search is to be carried out on a file which is ordered on the primary key and search criteria also involve the primary key. Assume, primary index also exists. Justify that primary index based search strategy is the most suitable one. 3

e) Assume two large, unsorted relations are to be joined based on primary and foreign key. The join is frequently required. Write down a suitable strategy involving the index. Consider, for both the relations, records are physically stored together. 4

7) a) Consider the following tables.

SUBJECT(SCODE, INAME, FULL_MARKS, PASS_MARKS)

QUALIFIERS(ROLL, SCODE, SCORE)

While inserting into or updating SCORE in QUALIFIERS table, SCORE must not be less than the PASS_MARKS of corresponding subject. If it is less, then the operation will not be allowed. Take the necessary measures. 6

b) What is the utility of a PL/SQL block? When the following exceptions are raised?

NO_DATA_FOUND and TOO_MANY_ROWS 5

c) Why do we need concurrency control? 6

d) In a concurrent environment, what happens when checkpoint operation is performed? 3

8) a) Given a log file, how can we find out which transactions have successfully completed and which have not? 4

b) Suppose steal and no force approach is followed. At an intermediate stage of the session, the database may not be in valid state. Explain. Also mention, how is then recovery is ensured? 4+3

c) How cascading rollback can be avoided in two phase locking protocol and also in time stamp based protocol? 5

d) Discuss the security features in DBMS. 4

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Bachelor of Computer Science and Engineering Examination, 2014

(3rd Year, 1st Semester) (3rd Year, 1st Semester) (3rd Year, 1st Semester) (3rd Year, 1st Semester)

Database Management Systems Database Management Systems Database Management Systems Database Management Systems

Full marks: 100
Time: 3 hours

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Questions

Attempt any five questions

Attempt any five questions

Attempt any five questions

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