d) Describe the optimal strategy for R1 ∞ R2. Assume, both are large relations. Mention the number of block accesses. 6

6. a) What are the problems of NULvalue? 3

b) When decomposing a relation, explain the desired properties. 7

c) Consider the relations : RESULT (ROLL, SCODE, MARKS) and TOPPERS (ROLL, TOTAL MARKS)

Write a PL/SQL block to store Roll and total marks of top five (in terms of total marks) students in TOPPERS taking the help of RESULT data. 6

d) What is a Transaction? Describe the properties. 4

7. a) Describe a deadlock free concurrency control scheme that ensures recoverability 8

b) What do you mean by steal / no-steal and force/no-force approach? What combination is preferred and why? 8

c) What happens when check point is issued? 4

8. Write short notes on the following :

a) Functional units of DBMS. 6

b) Advantages of DBMS over file processing system. 5

c) Security features of DBMS. 4

d) Conflict semalizable schedule. 5

BACHELOR OF COMPUTER SCIENCE ENGINEERING EXAMINATION, 2011

(3rd Year, 1st Semester)

DATABASE MANAGEMENT SYSTEMS

Time : Three Hours Full Marks - 100

Attempt any **Five**

1. Consider the system as follows :

The system maintains the project information. Each project has unique project id. Title starting and end date, status (ongoing/over) of the projects are stored. A project is managed by a co-ordination. A co-ordinator may take care of multiple projects. For the co-ordinators name (unique) address, phone and e-mail-id are to be stored. Number of programmes are involved in a project. For each programmer name (unique), address, salary are to be stored. A programmer may work for different projects.

a) Draw the ER diagram. 6

b) Write the SQL statements to create necessary tables designed according to your ERD. 8

c) Write necessary trigger to ensure that number of ongoing projects for a co-ordinator does not exceed three. 6

2. a) What is foreign key? How does it affect DML operation? 8

b) How does ERD can help in identifying FK? 4

c) Draw the ER diagram for the system as follows :

A system maintains information about the Movie (like, its name, date of release). Persons involved in a movie are also noted. Person may be an actor, director, singer. In a movie a person very play one or more roles (actor, singer etc.). He may play different roles in different movies. Locations (indoor/outdoor) where the movie was shot are also noted. In a location number of movies may also be shot. The system maintains movie information along with the data of locations and persons. 8

3. a) Consider a data structure to store the following student information :

Roll, Name, Mail-id, Phone, Dept. Code, Dept. Name, Head of Dept. and for each subject subcode, sunbame, full names, passmarks and marks scored.

Consider, Roll is unique for each student – Discuss the problem of the data structure. 5

b) Normative the structure to avoid the difficulties. Assume, the following FDs also :
Deptcode ⟶ Deptname, Head of Dept.
Subcode ⟶ Subname, Full marks, Pass marks
Roll ⟶ Name, Maid-id, Phone, Deptcode
Roll, Subcode ⟶ Marks scored
Show the steps and FKs at different steps. 8

c) Compare BCNF and 3NF. 3

d) Define multivalued dependency. 4

4. Consider the following tables :

ORDER (<u>ORDER-ID</u>, ORDER-DT)

ITEM (<u>ICODE</u>, INAME, RATE)

ORDER DETAILS (<u>ORDER-ID, ICODE</u>, QTY)

An order may have the request for multiple items.

a) Write relational algebra expression to find out the order-id of those orders in which all the items have been requested. 3

b) Write relational calculus expression to find the name of items which donot appear in any order. 3

c) Write the SQL statement for the following :

i) And the total value (ΣGTY x RATE) for each order. 4

ii) Delete the rows from ITEM corresponding to the items not appearing in any order. 3

iii) Find the name of the most costly item. 3

iv) Find out the item codes for which total quantity ordered (considering all orders) is more than 100. 4

5. a) Compare ordered and unordered file. 4

b) Explain the advantage and disadvantage of multilevel indexing. What can be done to overcome the disadvantages? 7

c) How does secondary index help us for faster data access? 3