c) Compare hash join and merge join scheme. 3

d) Explain, how does a user with only CONNECT privilege can work with the database. 3

e) In the context of database modification why is steal / no force approach is preferred? 4

8. a) When does a transaction enter into committed state? 4

b) Deadlock may arrise in two phase locking protocol-discuss with example. 4

c) Explain the disadvantage of cascading rollback? 4

d) What is the advantage of checkpoint? 3

e) In a concurrent environment for checkpoint based recovery, explain how are the REDO and VNDO lists prepared. 5

BACHELOR OF COMPUTER SCIENCE ENGINEERING EXAMINATION, 2012

(3rd Year, 1st Semester)

DATABASE MANAGEMENT SYSTEM

Time : Three Hours Full Marks - 100

1. a) In the context of relational model, explain intension and extension of a relation. 5

b) Explain key constraint and referential integrity. 6

c) Consider the following relation :

ITEM (ICODE, INAME) ORDER (ORDER_NO, ICODE, QTY)

i) Write down the relational algebra and relational calculus expression to find out the INAME(s) not appearing even in a single order. 5

ii) Write down the relational algebra and relational calculus expression to find out the order numbers in which item named 'ABC' has been requested. 4

2. a) What is ER diagram? What are entity type and entity set? 6

b) What are composite and multivalued attribute? 4

c) Draw the ER / EER diagram for the following system.

A manufacturing unit manufactures various products. Each product has product-id (unique), product name, product description, manufacturing cost and selling price. Product description shows different components and corresponding quantities used in the product. System also maintains information of various components like component-id (unique), name, rate and suppliers. For each supplier, system have information like supplier-id (unique), name and address. A supplier may supply one or more components. 10

3. a) What is functional dependency? Using Armstrong's axion prove the pseudo-transitive rule. 5

b) Explain, why normalization is done? 5

c) A manufacturing unit, on receiving the consignment from a supplier stores following information :

Consignment-id (unique), receipt-date, order-no, order-date, supplier-id, supplier-name, supplier-address and for each received item it stores item code, item name, description and quantity.

Further assume the following FDs :

Consignment-id $\longrightarrow$ receipt-date, order-no, supplier-id.

supplier-id $\longrightarrow$ supplier-name, supplier-address

Item code $\longrightarrow$ item name, description

$\bowtie$

b) Consider the following tables :

ORDER (<u>ORDER-NO, ICODE</u>, QTY-ORD)

DELIVERY (<u>DELIVERY-NO, ORDER-NO, ICODE</u>, QTY-DELVD)

PENDING (<u>ORDER-NO, ICODE</u>, QTY-PENO)

Assume, whenever a row is added in ORDER table it is also copied into PENDING. Now write down the trigger(s) to do the following :

Before adding a row in DELIVERY, check QTY-DELVD does not exceed QTY-PEND. If exceeds row cannot be added. After adding a row in DELIVERY, QTY-PEND has to be reduced by the amount QTY-DELVD. if QTY-PEND becomes zero then delete the row from PENDING. 10

c) What is a cursor in PL / SQL? 3

7. a) What is query optimization? Briefly explain the steps. 5

b) Consider EMP and DEPT relations with DCODE as their FK and PK respectively. EMP has a clustering index on DCODE DEPT has a primary index on DCODE. Explain an optional scheme for 5

$\sigma_{EMP.DCODE='D1'}$(EMP DEPT)

Order-no ⟶ order-date

Consignment-id, item code ⟶ quantity

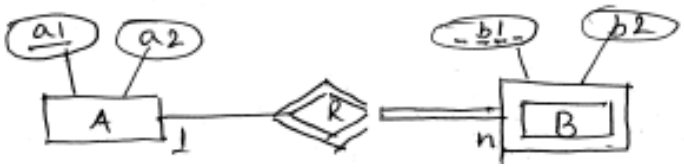
Normalize upto 3wF showing the steps. Also, indicate Pk and Fk (if any) at each step. 10

4. a) Compare ordered and unordered file. 4

b) Header of a file with variable length record requires to store various special characters as separator. Explain. 6

c) Consider, fixed length record of size 100 bytes for a file. Key field is of size 5 bytes. The file contains 20,000 records. Assume unspanned organization and blocks are of size 512 bytes. Show that use of primary index makes key field based access faster. 4

d) Specify the basic principle of multilevel indexing. Mention its difficulties. 6

5. a) 

Write down the SQL statements to create the tables necessary to implement the shown ER diagram. Assume, attribute types as you like. 7

b) Consider the following tables :

HOSTEL (HOSTEL_ID, H_NAME, MGR_NAME)

STUDENT (ROLL, NAME, ADDRESS

BOARDER (ROLL, HOSTEL_ID)

BOARDER contains tuples only for those students who reside in hostel.

Write down the SQL statement for the following :

i) Delete those records from HOSTEL for which there is no boarder. 3

ii) Find the name of the students who do not stay in the hostel. 3

iii) Show the list of hostels in which more than 50 boarders stay. List will show the name of hostels, manager's name and number of boarders. The list appears in the descending order of boarder numbers. 4

iv) Find the name of the students staying in hostel with hostel-id 'HI'. 3

6. a) What is the ulity of a PL / SQL block in oracle? Mention when NO-DATA-FOUND and TOO-MANY-ROWS exceptions are raised? 7