Mid-Semester Examination

School of Computer Engineering, KIIT University, Bhubaneswar-24

Time: 02 hours **Full Marks: 40**

Answer either SECTION A OR SECTION B

SECTION A

Q.1 (a) Draw the ER diagram of an enterprise which stores information about the customers such as unique custid along with cust_name, dob, gender, address, emailed (only one value) and contact_no (may be multiple values) and memb_type. Each customer owns an accesscard (identified by cardid, along with dt_issue, dt_exp, payment, issueno, checkin, checkout, checkstatus, fine_amt). Each accesscard is owned by a customer. Using the accesscard, the customer can access the materials. The system should store unique mid, title, year and price of the materials. The materials are supplied by different suppliers (identified by unique supl_id along with name, contactno and address (can be decomposed into street, city and pin)). Similarly, the materials are stored in the libraries. We are interested to store the unique library_id, description, address and multiple contact_no about the libraries. Different employees are working in different libraries. The system should store the employee information such as eid, ename, desg, gender, doj, salary, address and phno. Some of the employees are managing the other employees. Make necessary assumption. [06]

(b) Convert the above ER diagram into relational schemas. [04]

Q.2 (a) Consider the following relational schema: [06]

Sales_Rep (repno, lastname, firstname, street, city, state, zip, commission, rate)
Customer (cust_no, cust_name, street, city, state, zip, balance credit_limit, repno)
Orders (orderno, order_date, cust_no)
Orderline (orderno, partno, no_ordered, quoted_price)
Part (partno, description, onhand, class, warehouse, price)
Solve the following queries using the relational algebra:

(i) List the details of customers staying at 'BBSR' and attended by sales repno 'S100'.

(ii) Display the cust_no and cust_name who have been attended by all sales rep.

(iii)Display the order details such as orderno, cust_name and partno whose quoted price is greater than 5000.

(iv)List the cust_name, order_date and parts' descriptions for the customers of 'Odisha'.

(v) Display the cust_name and the sales reps' name staying in the same city.

(vi)Display the orderno and part description where quoted price is equal to the parts' price.

(b) How is the OUTER JOIN operation different from UNION - discuss with suitable example [04]

Q.3 (a) What is the requirement of a key? Discuss the various types of keys with suitable examples [03]

(b) List out the important advantages and disadvantages of ER - model and relational data model. Explain why ER diagram is constructed before the construction of Relational schemas. [03]

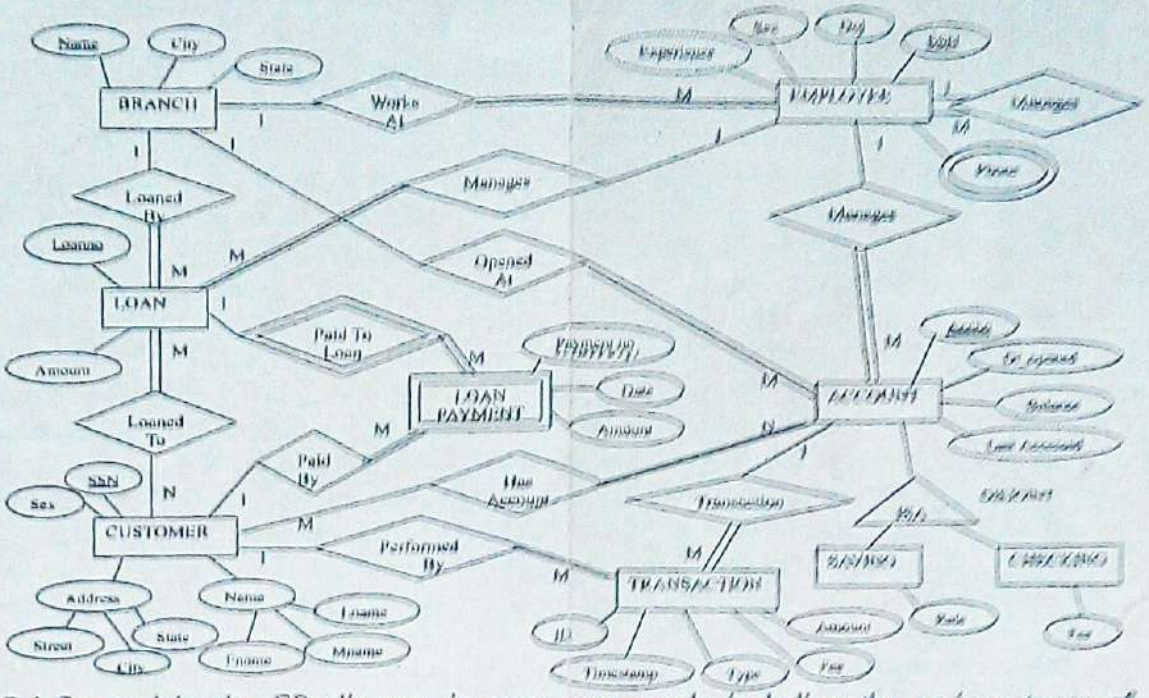
(c) Discuss the different types of constraints of Generalization and Specialization with suitable example. [4]

Q.4 (a) With suitable diagram explain the three layered database abstraction. Highlight the importance of physical and logical data independence in relation to these three layers. [06]

(b) What is traditional file approach? Explain the various limitations of file system and how database systems overcome these limitations. [04]

SECTION B

Q.1 (a) Construct the relations schemas of the ERD shown below: [06]



(b) Briefly explain the ER diagram in your own words including the various types of constraints and attributes. [04]

Q.2 (a) Consider the following relational schema: [06]

Sales_Rep(repno, lastname, firstname, street, city, state, zip, commission, rate)
Customer(cust_no, cust_name, street, city, state, zip, balance credit_limit, repno)
Orders(orderno, order_date, cust_no)
Orderline(orderno, partno, no_ordered, quoted_price)
Part(partno, description, onhand, class, warehouse, price)

Solve the following queries using the relational algebra:

(i) List the number and name of all sales reps.
(ii) List all information from the Part relation for part P135.
(iii) List order number, order date, customer number, and customer name from each order.
(iv) List the order number, order date, customer number, and customer name for each order placed by any customer represented by the sales rep whose last name is 'Sharma'.
(v) List the number and date of all orders that were placed on 12th Jan 2011 by a customer whose rep number is 50.
(vi) List the number and date of all orders that were placed on 12th Jan 2011 or that were placed by a customer staying at Mumbai.

(b) Using your own examples explain EQUI JOIN, NATURAL JOIN and CROSS JOIN [04]

Q.3 (a) Give the equivalent expression for the following algebraic operations by using basic algebraic operators: (i) Natural Join (ii) Intersection [03]

(b) What is data dictionary? How it is useful? Give suitable examples. [03]

(c) What is cardinality and degree with respect to a Relationship and a Relation? Also justify that 'Candidate Key is the minimal Super Key'. [04]

Q.4 (a) What is a database system? Explain the various characteristics of a database system. [06]

(b) Discuss various types of database constraints with suitable examples of your own [04]