

B.Sc. (Honours) Examination, 2019

Semester-IV

Computer Science

Course : CC-10

(Database Management System)

Time : 3 Hours

Full Marks : 40

Questions are of value as indicated in the margin

Answer Question No.1 and **any three** from the rest

1. Answer **any five** questions: 2×5=10
 - a) How natural full outer join can be used to preserve lossless join property?
 - b) What are stored and derived attribute?
 - c) How primary key is different from the alternate key?
 - d) Explain specialization and generalization concepts in ER diagram with suitable examples.
 - e) What is the function of Query Evaluation Engine?
 - f) Explain different types of participation constraint.
 - g) With examples define DDL and DML.
2. United Parcel Service (UPS) is an American multinational package delivery and supply chain management company. UPS prides itself on having up-to-date information on the processing and current location of each shipped item. To do this, UPS relies on a company-wide information system. Shipped items are the heart of the UPS product tracking information system. Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the UPS system at a single retail center. Retail centers are characterized by their type unique ID, and address. Shipped items make their way to their destination via one or more standard UPS transportation events (i.e. flights, truck deliveries). These transportation events are characterized by a unique Schedule Number, a type (e.g. flight, truck), and a Delivery Route.
Design an ER diagram and schema to capture the above requirements. State any assumption you have that affects your design. Make sure cardinalities and primary keys are clearly mentioned. 10
3. Consider the following relations:
Room (roomno:integer, capacity:integer, price:real)
Amenity (aid:integer, name:string, description:string)
Room Amenities (roomno:integer, aid:integer)
Guest (sin:integer, fname:string, lname:string, dob:date)
Reservations (sin:integer, roomno:integer, resdate:date)
'resdate' in the Reservations relation refers to the date for which a room is booked by a particular guest.
If a guest books a room for multiple consecutive days, then a separate tuple will appear for each date the room has been booked for by that guest.
Write the relational algebra and SQL expressions for the following queries:
 - a) Find the room number and capacity of rooms that have price less than Rs. 2500.
 - b) Find the name of amenities offered in rooms on the 4th floor. You may assume that rooms on the 4th floor have room numbers between 400-499. Make sure that each amenity is listed at most once.

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(2)

- c) Find the room number and price of rooms that have *Air-Conditioning* and that have been booked for *11-JUN-2015* by at least one guest.
- d) Find the first and last names of senior guests (guests with age 65 or higher) that have stayed on the 4th floor (i.e., rooms 400-499) on any date between 4-JUN-2015 and 11-JUN-2015. (1.5+1)×4=10
4. a) Consider a relation scheme $R = (A, B, C, D, E, H)$ on which the following functional dependencies hold: $\{A \rightarrow B, BC \rightarrow D, E \rightarrow C, D \rightarrow A\}$. What are the candidate keys of R?
- b) Given a relation $S(A, B, C, D, E, F, G)$ with the set of functional dependencies $F = \{A \rightarrow BC, E \rightarrow CF, B \rightarrow E, CD \rightarrow EF, A \rightarrow G\}$. Find the closure of A and canonical cover for F. 3+(4+3)=10
5. Write short note on the following topics (**any two**) : 5×2=10
- a) Integrity Constraints,
- b) ODBC,
- c) Nested Relational Model,
- d) Rename Operation
6. Describe and illustrate the process of normalizing the relation shown in Table 1 up to 3NF. State any assumptions you make about the data shown in this table. 10

Pet id	Pet name	Pet type	Pet age	Owner	Visit date	Procedure
246	rover	dog	12	sam cook	jan 13/2002 mar 27/2002 apr 02/2002	01-rabies vaccination 10-examine and treat wound 05-heart worm test
298	spot	dog	2	terry kim	jan 21/2002 mar 10/2002	08-tetanus vaccination 05-heart worm test
341	morris	cat	4	sam cook	jan 23/2001 jan 13/2002	01-rabies vaccination 01-rabies vaccination
519	tweedy	bird	2	terry kim	apr 30/2002 apr 30/2002	20-annual check up 12-eye wash

Table 1 : Pet Health History Report
