MASTER OF COMPUTER APPLICATION EXAMINATION, 2011

(2nd Year, 2nd Semester)

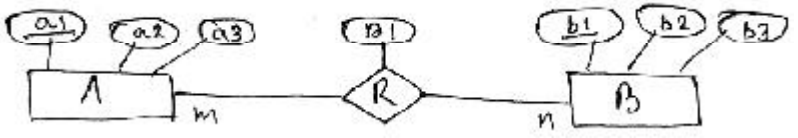
DATABASE MANAGEMENT SYSTEM

Time : Three hours Full Marks : 100

Answer any ***five*** questions.

1. a) What are the advantages of DBMS over file processing system? 5

   b) Consider the following ERD



   How will you implement R? Write down the necessary SQL statement (assume the attribute types as you like). 5

   c) Define primary key and foreign key. Mention the effect of foreign key in DML operation. 5+5

2. a) How will you implement a weak entity set? 4

   b) Consider, X is a general entity set. Y and Z are specialised sets of X. How will you design the tables? 6

   c) Draw the ERD/EERD for the system given below.

   In a cricket tournament, number of countries will participate. For each country its name (unique), name of the captain, coach, manager, number of matches played, won,

lost, tied and points scored to be stored. Players information like name, age, total runs scored, wickets taken, number of century, half century is to be stored. Each player has player-id which is unique within the country he plays for. Matches are played between two countries. Each match has unique match-id for each match date, time, venue, name of the two countries, name of four umpires, runs scored by two teams, winner, man of the match are stored. Detailed scores showing batting and bowling performances of the individual players of both the teams also have to be maintained. 10

3. Consider the following relations :

MATCH (MATCH-ID, TEAM1, TEAM2)

PLAYER (PLAYER-ID, NAME, TEAM)

BATTING-INFO (MATCH-ID, PLAYER-ID, RUN-SCORED)

In MATCH, name of the two teams are stored in TEAM1, TEAM2. In PLAYER, TEAM stands for the name of team the player plays for. BATTING-INFO will have no record for a player who did not got the opportunity to bat in a match.

Write down the SQL statements for the following :

a) Show players' name and total runs scored in the descending order of total runs scored. 4

b) Find out the number of matches played by INDIA. 4

c) For each match, find out the highest individual score and corresponding player-id. 4

d) In a time stamp based protocol, read operation on a valid data may lead to roll back. Explain. 4

e) What is the fundamental difference between immediate and deferred databse modification? 3

8. Write short notes on :

a) Database manager and database administrator. 5

b) Two phase locking protocol. 5

c) Database security. 4

d) Log based recovery using checkpoint in concurrent environment. 6

d) Create a table CENTURY-INFO by taking the records with runs scored 100 or more from BATTING-INFO. 4

e) Find out the name of the players who did not bat. 4

4. a) Consider the relations described in Question 3.

i) Write down the relational calculus expression to find out the name of the players who have scored at least one century (century means runs scored in a match is 100 or more). 4

ii) Write down the relational algebra expression to find out the name of the teams against which India has played. 4

b) Explain, what is a trigger? Write a trigger so that whenever a record is added in BATTING-INFO (as described in question 3), if runs scored is 100 or more, automatically a record will be added in table CENTURY-LIST (structure same as that of BATTING-INFOK). 3+5

c) Explain the concept of "single row SELECT statement" in PL/SQL. 4

5. a) What is functional dependency? 3

b) Explain, why normalization is required? 5

c) Explain that in order to be in 3NF, a relation must be in 2NF. 3

d) Normalize the following data structure upto 3NF showing the steps and also indicate PK and FK. For each player following information is stored.

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Player-id (unique), name, age, country, coach, manager, sponsor and for each match he has played store match-id, date, venue, team1, team2, runs scored, wickets taken, catch taken.

Consider the FDS :

Player-id → Name, age, country

Country → Coach, manager, sponsor

Match-id → Date, venue, team1, team2

Player-id, match-id → runs scored, wickets taken, catch taken. 9

6. a) Compare ordered and unordered file. 3

b) Compare primary and secondary indexing. 4

c) Explain the concept of multilevel indexing. 4

d) What is query processor? Explain, how an index file can help in joining the relations. 5

e) What will be the minimum number of block accesses in joining two sufficiently large relations i) if they are sorted on join attributes, ii) they are not sorted. 4

7. a) What is a transaction? Explain its properites. 4

b) Compare i) steal/no steal ii) force/no force approaches. 5

c) When do we say that two instructions in a schedule conflict? 4