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Department of Computer Science and Engineering

B.Sc. in Computer Science and Engineering (CSE)

Semester Final Examination 2019 (Jan-Jun)

Level 3 Semester I Course Code: CSE 303 Credit: 3.0

Course Title: Database

Duration: 3 Hours **Total Marks: 90**

[NB: The figure in the right margin indicates the marks for the respective question and split answer of any question is unacceptable]

Section-A

Answer any 3 (three) questions from the following

1. a) Explain the overall system structure of database management system. Abstract, Data Model 6

   b) What are the responsibilities of a *DBMS*? 3

   c) Illustrate the need for a database system, giving suitable examples. 6

2. a) Describe the issues that the designers may face to design *ER diagram*. 4

   b) Construct an ER model for student admission system. Students who apply for a course are registered in the system. Short listed candidates are called for interview and their marks recorded. Selected candidates are admitted. 7

   c) What are an instance and a schema? 4

3. a) The following database contains information about actors , play and roles performed: .8
   Actor(actor_id, name, year_born)
   Play(play_id, title, author, year_written)
   Role(actor_id, character_name, play_id)
   Write the sql statements that define the relational schema (tables) for this database. Assume that actor_id, play_id, year_born, and year_written are all integers and that name, title, author, and character_name are strings. Be sure to define appropriate keys and foreign key constraints.

   b) How would you use the feature of nested queries in SQL to develop complex queries? Give examples. 5

   c) Define primary key and foreign key. 2

4. a) Consider the schema in *Question 3. a)*. Now write the *SQL* for each of the following queries. 3*3
   i) Find the number of actors who have performed in three or more different plays written by the author "August Wilson".
   ii) Find the name of all actors who have performed some play by the author "Chekhov" and have never performed in any play written by author "Shakespeare". The list should not contain duplicates but does not need to be ordered.
   iii) Find the information about all persons who have acted in a play that they have written.

   b) Give a brief note on the different views of data, with the necessary diagram. 6

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Section-B

*Answer any **3 (three)** questions from the following*

1. a) What is meant by weak entity set? How does it make relationship with a strong entity set? Describe with example. 5

   b) Describe different types of join operation with example. 6

   c) Give example for complex selection operation. 4

2. a) Consider the relation with schema R(A,B,C,D,E,F) and the following functional dependencies: 5*2
   A→BC and D→AF

   i) What are the keys and superkeys of this relation? Justify your answer by showing the closures that are involves and be sure to clearly label which superkeys are also keys.

   ii) Is relation R in BCNF? If it is explain why it is. If it is not, explain why not and give a decomposition of R into a collection of relations that are in BCNF.

   b) Define generalization and specialization. Describe various types of constraints on generalization. 5

3. a) Define RAID. Describe the different RAID levels with example. 1+4

   b) Why is B+ tree efficient than B tree? Explain how data retrieval, insertion and deletion are done using B tree and B+ tree indices. 2+3

   c) Describe the ACID properties of a Transaction. 5

4. a) What is serializability? What are its types? What is a serializable schedule? Give examples. 1+2+2

   b) Define deadlock. Describe the reasons those may lead the concurrent of transactions to fall in deadlock condition. 1+4

   c) Describe simple locking protocol. What problems may arise while using simple locking? 2+3

shared
exclusive