Dept. of Computer and Communication Engineering
Patuakhali Science and Technology University
4th Semester (Level-2, Semester-II), Final Examination of B.Sc. Engg. (CSE), July-December: 2021
Course Code: CCE-224 Course Title: Database Sessional
Credit Hour: 2.00 Full Marks: 70 Duration: 80 Minutes

1. Viva Voce
2. **MY SQL Lab exam** 15
   a. First Create a new course "CS-001", titled "Weekly Seminar", with 0 credits or with 3 credits.
   b. Create a section of this course in Autumn 2009, with sec_id of 1, and with the location of this section not yet specified but you can choose based on existing data.
   c. Enroll every student in the Comp. Sci. department in the above section.
   d. Delete enrollments in the above section where the student's name is Chavez.
   e. Delete all takes tuples corresponding to any section of any course with the word "database" as a part of the title; ignore case when matching the word with the title.
3. **Oracle Lab Exam**
   c) Install and Run oracle database 10g using command prompt (give oracle password 1234)
   d) Creates a new user,
      v. give your 'one word nick name' as user name, with the password 'r+your registration number' as password,
      vi. connect to your user,
      vii. lock the user you created,
      viii. Unlock the user you created.
4. Database project 20
5. Lab Problem Solving 15
   05

Dept. of Computer and Communication Engineering
Patuakhali Science and Technology University
4th Semester (Level-2, Semester-II), Midterm Examination of B.Sc. Engg. (CSE), July-December: 2022
Course Code: CCE-223 Course Title: Database System Session 2020-2021
Credit Hour: 3.0 Full Marks: 15 Duration: 60 Minutes

1 a) Assume that two students are trying to register for a CCE 224 course in which there is only one open seat. What component of a database system prevents both students from being given that last seat? Explain with an example. 3
b) Why Studying Databases? Write the purposes of Database Systems courses. 3
c) Explain the Levels of Abstraction with university database system 3
d) Explain why NoSQL systems emerged in the 2000s, and briefly contrast their features with traditional database systems. 3
e) Think of different users for the university database schema as 3
STUDENT(Name, Student_number, Class Major)
COURSE(Course_name, Course_number, Credit_hours, Department)
SECTION(Section_identifier, Course_number, Semester, Year,Instructor)
GRADE_REPORT(Student_number,Section_identifier,Grade)
PREREQUISITE(Course_number,Prerequisite_number)
What types of applications would each database user need? To which user category would each belong, and what type of interface would each need.

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4th Semester (Level-2, Semester-II), Midterm Examination of B.Sc. Engg. (CSE), July-December: 2021
Course Code: CCE-223 Course Title: Database System
Credit Hour: 3.0 Full Marks: 15 Duration: 60 Minutes

1 a) Assume that two students are trying to register for a CCE 223 course in which there is only one open seat. What component of a database system prevents both students from being given that last seat? Explain with an example. 3
b) Explain the DBMS three schema architecture with example. 4
c) Sketch and explain a simplified database system environment. Write some more specific research topics in the field of database systems now a days. 4
d) Difference between DBMS and RDMS, Filesystem DBMS with example. 4

Patuakhali Science and Technology University
Faculty of Computer Science and Engineering Set A
Mid: I Semester: 4th Batch : 18th
Course Code: CCE 224 Time: 60 Min Course Title: Database System Sessional Total Marks 15

1. (i) Create a database name as your name. Create the course table in your database and insert the some tuples in your table as provided file. After completion of the query export the database in your desktop. 3
(ii) Find the names of those departments whose budget is higher than that of Astronomy. List them in alphabetic order 3
(iii) Find the names of all instructors in the Computer Science department who have salary less than 90,000. 3
(iv) Find the number of instructors in each department who teach a course in the Spring-2010 semester. 3
(v) Increase salaries of instructors whose salary is over $100,000 by 3.03% and all others by 4.5% 3

Dept. of Computer and Communication Engineering
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Dumki, Patuakhali-8602, Bangladesh

Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: II Session: 2020-2021

Course Code	Course Title	July-December	Credit: 03
CCE 223	Database System	2022	Time: 03 Hr
			Marks: 70

Answer any 05 out of 06 Questions (Split answers are highly discouraged)

1 [A.] Explain the various terminology with properties of the below RDBMS. 4

EMP_ID	ENAME	POST	Salary
E1	Rahul	Clerk	20000
E2	Kapil	Manager	80000
E3	Mukesh	Clerk	20000
E4	Manoj	Peon	10000

[B.] Consider the university database schema as follows. Write the relational algebra expression based on the query. 5

classroom(*building*, *room_number*, *capacity*)
department(*dept_name*, *building*, *budget*)
course(*course_id*, *title*, *dept_name*, *credits*)
instructor(*ID*, *name*, *dept_name*, *salary*)
section(*course_id*, *sec_id*, *semester*, *year*, *building*, *room_number*, *time_slot_id*)
teaches(*ID*, *course_id*, *sec_id*, *semester*, *year*)
student(*ID*, *name*, *dept_name*, *tot_cred*)
takes(*ID*, *course_id*, *sec_id*, *semester*, *year*, *grade*)
advisor(*s_ID*, *i_ID*)
time_slot(*time_slot_id*, *day*, *start_time*, *end_time*)
prereq(*course_id*, *prereq_id*)

$\pi_{ID.name}(\sigma_{dept\_name = 'physics'}(instructor))$

a. Find the ID and name of each instructor in the Physics department.
b. Find the ID and name of each instructor in a department located in the building "Watson".
c. Find the ID and name of each student who has taken at least one course in the "Comp. Sci." department.
d. Find the ID and name of each student who has taken at least one course section in the year 2018.
e. Find the ID and name of each student who has not taken any course section in the year 2018.

[C.] Draw the ER diagram of your 18th batch management system. 3
[D.] Consider the foreign-key constraint from the dept_name attribute of instructor to the department relation. Give examples of inserts and deletes to these relations that can cause a violation of the foreign-key constraint. Follow above schema. 2

2 [A.] Suppose you are given a relation grade points (grade, points) that provides a conversion from letter grades in the takes relation to numeric scores. Given the preceding relation, and our university schema, write each of the following queries in SQL. You may assume for simplicity that no takes tuple has the null value for grade. 6

a. Find the total grade points earned by the student with ID '12345', across all courses taken by the student.
b. Find the grade point average (GPA) for the above student, that is, the total grade points divided by the total credits for the associated courses.
c. Find the ID and the grade-point average of each student.
d. . Insert every student whose tot cred attribute is greater than 100 as an instructor in the same department, with a salary of 10,000 taka.

[B.] a. The SQL like operator is case sensitive (in most systems), but the lower() function on strings can be used to perform case-insensitive matching. To show how, write a query that finds departments whose names contain the string "sci" as a substring, regardless of the case. 5

b. Consider the SQL query:

```
select p.a1
from p, r1, r2
where p.a1 = r1.a1 or p.a1 = r2.a1
```

Under what conditions does the preceding query select values of p.a1 that are either in r1 or in r2? Examine carefully the cases where either r1 or r2 may be empty.

c. Using the university schema, write an SQL query to find the IDs of those students who have retaken at least three distinct courses at least once (i.e, the student has taken the course at least two times).

[C.] Differentiate between SQL, MySQL, and SQL Server. 3

3 [A] Perhaps the most important data items in any database system are the passwords that control access to the database. Suggest a scheme for the secure storage of passwords. Be sure that your scheme allows the system to test passwords supplied by users who are attempting to log into the system. 3

[B During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur. 3

[C] Explain the transaction property with an example of transaction T1 and T2. 4

[D] Consider this schedule of two transactions: 4

(a)

T1	T2
Read(X)	
	Read(X)
Write(Y)	
	Write(Y)
commit	
	commit

(b)

T1	T2
Read (A)	
	Write (B)
Write (A)	

Is this schedule: serializable? Conflict serializable? Or both explain your own answer?

4 [A.] UGC wants to give scholarship to some students on the following criteria: 7

a. Student must be of CSE Faculty of PSTU (02 in the student ID means CSE Students)
b. Students must be female
c. Student do not get any other private scholarships such like **Ankur** scholarship
d. Grade must be at least 3.75
e. Student should not be punished for any awful activity

Create necessary table (yourself) and write necessary query for i, ii, iii, iv and v.

[B.] Clarify the different types of database keys with examples. 7

5 [A.] a. "An 'expired' account is different from a 'locked' account"-explain the statement with appropriate example. 7

b. "PASSWORD_ REUSE_MAX or PASSWORD_REUSE_TIME are mutually exclusive"- provide an explanation for the assertion with appropriate instance.

[B.] Explain what normalization is and provide specific examples for each kind of normalization. 7

6 [A.] Give an example which shows a statement-level BEFORE DELETE trigger on the BOOKSHELF table. When a user attempts to delete a record from the BOOKSHELF table, this trigger is executed and checks two system conditions: that the day of the week is neither Friday nor Saturday, and that the Oracle username (Student ID) of the account performing the delete include the Student ID's 3rd and 4th digit equal "02" in respect of PSTU ID management of the students. 7

[B.] Describe the various types of attributes with an appropriate example. 7

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Final Examination of B. Sc. Engineering in CSE Level: 2 Semester: II Session: 2018-2019

Course Code	Course Title	July-December 2020	Credit: 03
CCE-223	Database System		Time: 03 Hr
			Marks: 70

Answer any 05 out of 06 Questions (Split answers are highly discouraged)

1 [A.] Write the five responsibilities of a database-management system. For each responsibility, explain the problems that would arise if the responsibility were not discharged. 4

[B.] Assume that three students are trying to register for a database course in which there is only one open seat. What component of a database system prevents of the three students from being given that last seat? Explain. 4

[C.] Discuss the main characteristics of the database approach and how it differs from traditional file systems. 4

[D.] List at least two reasons why database systems support data manipulation using a declarative query language, instead of just providing a library of procedure language functions to carry out data manipulation. 2

2 [A.] Consider the following relational database: 4

employee(e-name, street, city)
works(e-name, c-name, salary)
company(c-name, city)
manages(e-name, m-name)

For each of the following queries, give an expression in the relational algebra,

i) Find the names, street address, and cities of all employees who work for Rupali Bank and earn more than 50,000 taka per month. Assume each person works for at most one company.

ii) Find the names of all employees in this database who live in the same city as the company for which they work.

iii) Find the names of all employees who live in the same city and on the same street as do their managers.

iv) Find the names of all employees in this database who do not work for the First Bank Corporation. Assume that all people work for exactly one company.

[B.] The lost update anomaly is said to occur if a transaction Tj reads a data item, then another transaction Tk writes the data item (possibly based on a previous read), after which Tj writes the data item. The update performed by Tk has been lost, since the update done by Tj ignored the value written by Tk 4

a. Give an example of a schedule showing the lost update anomaly.
b. Give an example schedule to show that the lost update anomaly is possible with the read committed isolation level.
c. Explain why the lost update anomaly is not possible with the repeatable read isolation level.

[C.] Consider a database for an airline where the database system uses snapshot isolation. Describe a particular scenario in which a nonserializable execution occurs, but the airline may be willing to accept it in order to gain better overall performance. 3

[D.] Differentiated between primary key, candidate key and foreign key with example. 3

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[D.] Differentiated between primary key, candidate key and foreign key with example. 3

3 [A.] Distinguish among SQL, MYSQL , Oracle and SQL Server. What is the difference between CHAR and VARCHAR? 3

[B.] Explain different types of SQL constraints and integrity constraints. 3

[C.] Draw the schema diagram of the PSTU university database. 3

[D.] Consider above university database 5

i. Find the titles of courses in the Comp. Sci. department that have 3 credits.
ii. Find the IDs of all students who were taught by an instructor named Einstein; make sure there are no duplicates in the result.
iii. Find the ID and name of each student who has taken at least one Comp. Sci. course; make sure there are no duplicate names in the result.
iv. Find the course id, section id, and building for each section of a Biology course.
v. Output instructor names sorted by the ratio of their salary to their department's budget (in ascending order).

4 [A.] Explain the different types of attributes with an appropriate example. 7

[B.] What is the significance of normalization in database design? Describe different types of normalization with appropriate example. 7

5 [A.] Define various types of keys with appropriate examples and distinguish them from one another. 7

[B.] i. Why and in which case *Triggers* can be used? What system privileges are required to create a *trigger* on a table? 7

ii. Specify the total and partial participation in the data base management system seen.

6 [A.] i. Define relationship and relationship set.

ii. If you want to *Lock* after five consecutive failed connection attempts to the JANE account, what will have to do in *Oracle* for this? 7

[B.] University wants to give scholarship to some students on the following criteria: 7

i. Students must be female
ii. Student do not get any other private scholarships such like DBBL (Dutch-Bangla Bank Ltd.) scholarship
iii. Grade must be at least 3.50
iv. Student should not be punished for any awful activity

Create necessary table (yourself) and write necessary query for i, ii, iii and iv.