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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION
DURATION: 1 HOUR 30 MINUTES

SUMMER SEMESTER, 2022-2023
FULL MARKS: 75

CSE 4461: Computer Science and Technology II

Programmable calculators are not allowed. Do not write anything on the question paper.
Answer all 3 (three) questions. Figures in the right margin indicate full marks of questions with corresponding COs and POs in parentheses.

1. a) What issues are encountered when data is stored in plain text files rather than in databases? Explain each of them with relevant examples. 10
(CO1)
(PO1)
- b) Consider the information given in Table 1 that holds information about different projects: 5 × 3
(CO1)
(PO1)

Table 1: Description of table called "Project" for Question 1b

Project_ID	Name	Budget	Employee_count
C-01	Customer Management System	12000.0	8
P-01	Uber	200000.5	56
P-03	Pathao	120000.0	32
C-04	Sales Tracker	34000.0	6

Here, Project_ID is the primary key. Now, write SQL queries for the following cases:

- i. Create the table shown in Table 1.
- ii. Show only the project(s) having budget at least double of the lowest budget.
- iii. Remove the projects which have less than 10 employees working on them.
2. a) What is "Cardinality" in the context of the Entity-Relationship Model? Explain each type of cardinality with suitable examples. 10
(CO1)
(PO1)
- b) Draw the entity-relationship diagram based on the following scenario by highlighting the entities, relations, and cardinality between them: 15
(CO2)
(PO2)
- The National Science Foundation (NSF) provides grants to different programs. Each grant has a unique ID, a name, an amount, a start date, and an end date. A university offers different programs and each program possesses a program code, name, and a group of researchers. One of the researchers under each program acts as the program head. Researchers have an ID, name, and field of research. Some researchers can supervise other researchers in their field of research.

3. a) What are the potential drawbacks associated with tight coupling between abstraction layers in database design?

5
(CO1)
(PO1)

b) Consider the information in Table 2 that provides data on employees:

5 × 3
(CO1)
(PO1)

Table 2: Description of table called "Employee" for Question 3.b

<u>Employee_ID</u>	<u>Name</u>	<u>Designation</u>	<u>Salary</u>	<u>Project_ID</u>
11	J. Monroe	Manager	18000.0	P-03
1	T. Iqbal	Programmer	16000.0	P-01
31	E. Haque	Sales Executive	9000.0	C-04
16	S. Ballinger	Manager	19000.0	P-01

Here, Employee_ID is the primary key and Project_ID references the primary key in Table 1. Now, write SQL queries to answer the following cases:

- Create the table shown in Table 2.
 - Show the average salary of employees for each project.
 - Show the employees whose names contain at least three vowels (i.e., a, e, i, o, u).
- c) What are "Aggregate Functions" in the context of Structured Query Language (SQL)?

5
(CO1)
(PO1)