

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

WINTER SEMESTER, 2022-2023
 FULL MARKS: 75

CSE 4307: Database Management Systems

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 whereas corresponding CO and PO are written within parentheses.

1. a) "Cartesian Product is a superset of Natural Join." - Justify with suitable example. 5
(CO1)
(PO1)
 - b) What is the basic purpose of providing "data abstraction" in Database Management System? There are broadly 3 levels of abstraction. Briefly describe them. 5
(CO1)
(PO1)
 - c) Differentiate between "table" and "view". Mention two important purposes of creating a view. 5
(CO1)
(PO1)
2. Considering the requirements of the 3 relational tables as shown in Table 1, 2 and 3,

Table 1: Information about Department table for Question 2.

Attribute	Meaning and Requirement
DID	Primary key
Dept Name	can not be empty
Establishment Year	Exactly 4 digits with no decimal part

Table 2: Information about Employees table for Question 2.

Attribute	Meaning and Requirement
EID	Primary key, it is exactly a 6-digit number without any decimal part
Name	20 characters long irrespective of language
DOB	Date of Birth, must not be empty
Dept	Foreign Key referencing Department and it can not be empty
Blood Group	Must be any one from A+,A-, B+,B-,AB+,AB-
Salary	Monthly salary, must be greater than 5000
ManagerID	ID of his immediate reporting boss in the office, and he must be one of the existing employees

Table 3: Information about Salary table for Question 2.

Attribute	Meaning and Requirement
EmpID	Foreign key referencing Employees
PDate	Payment Date
Amount	Amount paid

a) Create the tables representing the information shown in Tables 1, 2, 3 using standard SQL. 10

(CO1)

(PO1)

5 × 2

(CO1)

(PO1)

b) Write the SQL to answer the following queries:

i. Find out the name, date of birth and name of the department of all employees who joined in the last 2 months (i.e. 60 days).

ii. Generate list containing department name and its total employees but include the department with at least 20 employees.

iii. List the employees name, yearly salary and name of their employer.

iv. A list containing department name and its total employees but include the department with at least 20 employees and whose departmental average salary is greater than 20000.

v. List 2 departments with the highest and the lowest number of employees.

c) Consider there exists two relations R1 and R2. Mention the two conditions must be met in order to execute UNION operation. Is it possible to get inconsistent records even if these two conditions are satisfied? Justify your position using example data. 10

(CO1)

(PO1)

3. Consider the following high-level description of a sales company:

ABC is a large company that sells different electronic items, such as: Laptop, Smart Phone, Smart Watch, etc. Each item has its name, a short description, and unit price. The country has a number of divisions. Each division has a number of districts. The company has branches at different districts of the country. Employees have basic information, such as name, DOB (date of birth), contact number, and current branch location (i.e. division and district). The company has a number of departments, such as sales, accounts, admin. Each employee must be attached to a specific department. Only customers who are pre-registered with basic information such as name, contact numbers, and address can buy items. The company also provides rental service for items, such as laptop/smart phone for its employees for a specific time duration. After the duration, items must be returned.

Based on the scenario, answer the following questions:

a) Draw the Entity-Relationship Diagram (ER-D) using the standard notations and symbols. 15

(CO2)

(PO3)

b) Implement the ER-D from Question 3.a) using standard SQL. 15

(CO2)

(PO5)