Roll Number:_____	
Thapar Institute of Engineering and Technology Patiala	
Computer Science and Engineering Department	
Mid Sem Test	
BE Second Year (4th Semester) 09 March, 2023	**UCS310: Database Management System**
Time: 2 Hours, Max Marks:30	**Coordinators: Dr Geeta Kasana, Dr.Ranjit Kumar Ranjan**
Instructors: Geeta Kasana, Ranjeet K. Ranjan, Deepak Dewangan, Sumit Sharma, Sanjeev Rao, Manisha Kaushal, Rakesh Kumar Yadav	

Note: Attempt all questions. All parts of a question must be answered in order. Assume any missing data.

Q1

a) Mr. ABC is the owner of a retail shop and he wants to store information (about customers, products, orders, employees, etc.). The volume of data compels him to buy a database system. To save money, he wants to buy one with the fewest possible features, and he plans to run it as a stand-alone application on his PC. Of course, Mr. ABC does not plan to share his data with anyone. Discuss with justification, which of the following DBMS features Mr. ABC should pay for or not. **3+2**

i) A security facility ii) Concurrency control iii) Crash recovery

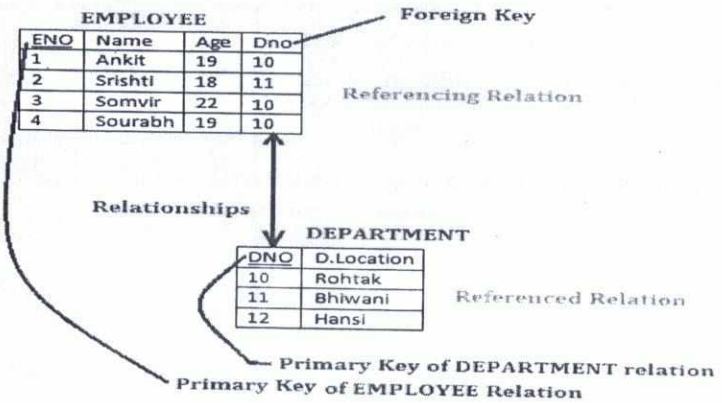
b) Describe why would you choose a database system instead of simply storing data in operating system files. When would it make sense not to use a database system?

Q2

a) Design an ER-diagram for the following description; **Make sure cardinalities and primary keys are clear.** **3+2**

Company named **Reliance** has several departments. Each department may have several Location. Departments have name, dept_no and location. A Manager control a particular department. Each department is associated with number of projects. Employees are identified by name, id, address, dob, date_of_joining. An employee works in only one department but can work on several project. Keep the track of number of hours worked by an employee on a single project. Each employee has dependent. Dependent has D_name, Gender and Relationship as attributes.

b) Consider two existing relations



Discuss which constraint get violated or not if we make following change in the employee relation:

i) **Somvir** having employee number 3, changes **department number from 10 to 16**
ii) Assume we have not applied *on delete set null* or *on delete cascade* while creating **employee** relation. What will happen if we tried to remove department number 11 details from **department** relation?
iii) Let's remove/delete the record of Department number 11 from Department relation. How does this affect the employee relation? Explain.
iv) Write a SQL query to add **ON DELETE SET NULL** in existing employee relation.

Q 3	a) Describe the different types of anomalies which occurs due to redundancy with suitable examples. b) Given the relation *R(ABCDEFGH)* with the following functional dependencies. *F: {CH → G, A → BC, B → CFH, E → A, F → EG}* List the all-possible **candidate keys** for the relation R.	3+2
Q 4	Consider the relation PLAYER with relational schema *PLAYER (Player_no, Player_name, Team, Team_color, Coach_no, Coach_name, Player_position, Team_captain)* and set of functional dependencies as follows; *F: {**Player_no** → Player_name, **Player_no** → Player_position, **Player_no** → Team, **Coach_no** → Coach_name, **Team** → Team_color, **Team** → Coach_no, **Team** → Team_captain}* Find the **highest normal** form for the relation *PLAYER*. If it is not in 3NF, convert the relation *PLAYER* into 3NF. Show all the steps of decomposition up to 3NF.	5
Q5	Consider Three tables named Employee, Department, and Location to answer the given queries using SQL. The schemas are: ***Employee**(eid number, ename varchar2, ejob varchar2, did number, ecity varchar2, esal number, mid number)* ***Department**(did number, dname varchar2, locid varchar2)* ***Location**(locid number, lname varchar2, ldesc varchar2)* i. List the location of all employee where they work. ii. List the name of employee whose manager id matches the employee id. iii. List the name of all employee who work in a department and who do not work in any department. iv. List the number of employees working in each department and location. v. Calculate the average salary of each department where max salary is less than 3000.	5
Q6	a) Discuss the differences between following terms with example/SQL syntax i. Equi-Join and Normal Join (with example in SQL) ii. Generalization and Specialization iii. Referential Integrity and Entity Integrity Constraint b) Write a SQL sub-query using given employee schema to display the department number (Dept_id) and the lowest salary of the department with the highest average salary. ***Employee**(Emp_id, First_name, Last_name, Hire_date, Job_id, Salary, Dept_id).*	3+2

**********All The Best**********