

**NATIONAL INSTITUTE OF TECHNOLOGY**  
**KURUKSHETRA** Computer Engineering Department  
**B. Tech (CS), CSPC-25/Database System, Mid Term-II Exam, Odd Sem. 2021-22**

**Duration:** 50 Minutes

**Maximum Marks:** 15

<b>Q. 1</b>	<p>Answer the following (<b>briefly</b>)</p> <p>(a) What is the <i>Relational Data Model</i>? How '<i>Property of Uniqueness</i>' important to implement the data model, explain using suitable example?</p> <p>(b) Why does SQL not allow to compare an attribute value to <i>NULL</i> using '=' and '&lt;&gt;' operators? How is this problem resolved in SQL?</p> <p>(c) How '=' and '<i>IN</i>' operator are different? Explain with suitable example.</p>	(1*3)
<b>Q. 2</b>	<p>(a) Nulls were originally proposed as a solution to the problem of missing information. Now it's true that information is often missing in the real world. Therefore, if nulls are prohibited, how should we deal with missing information inside our database systems?</p> <p>(b) Consider the below database and relational tables:</p> <p style="padding-left: 40px;"><b>Employee</b> (<u><i>Emp_id</i></u>, Name, Salary, City)  <b>Manager</b> (<u><i>Mgr_id</i></u>, Name, City, Start_date)  <b>Manages</b> (<u><i>Emp_id</i></u>, <u><i>Mrg_id</i></u>)  <b>Company</b> (<u><i>Company-name</i></u>, City)  <b>Works</b> (<u><i>Emp_id</i></u>, <u><i>Company-name</i></u>)</p> <p>Write relevant <i>check</i> conditions for the schema to ensure that:</p> <p>(i) Every employee works for a company located in the same city as the city in which the employee lives.</p> <p>(ii) No employee earns a salary higher than that of his manager.</p>	(2,2)
<b>Q. 3</b>	<p>Specify the following queries on the <b>Company DB</b> schema (shown in <b>next page</b>), using both <b>SQL expression</b> and <b>Relational Algebra Expression</b>. Also list the query's result generated to the database state.</p> <p>a) List the last names of all department managers who have no dependents and supervisor of at least 2 employees.</p> <p>b) Retrieve the names of all female employees who work on every project.</p> <p>c) For each department that has more at least two employees, retrieve the department name and the number of its employees who are making more than \$25,000.</p> <p>d) Retrieve the project name and number, where at least 01 employee from the same city as project location (city) is working.</p>	(4,4)

# EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

# DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

# DEPT\_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

# WORKS\_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

# PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

# DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse