[Nov-23]

GITAM (Deemed to be University)

[CSEN2061]

GST/GSS/GSB/GSHS Degree Examination

V SEMESTER

DATABASE MANAGEMENT SYSTEMS

(Effective for the admitted batch 2021-22)

Time: 2 Hours **Max. Marks: 30**

Instructions: All parts of the unit must be answered in one place only.

Section-A

1. Answer all Questions: **(5×1=5)**

a) How does logical data independence differ from physical data independence?

b) Consider the following SQL query on relation Student (sid, name, login, age, gpa)

```
SELECT *
FROM Student S
WHERE S.age = 18
```

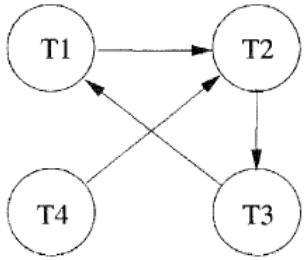
What will be the output of the above query?

c) Considering the schemas:
Suppliers (sid: integer, sname: string, address: string),
Parts (pid:integer, pname: string, color: string),
Catalog (sid: integer, pid: integer, cost: real),
Write the result of the RA query
$\prod_{sname}(\prod_{sid}((\sigma_{color='red'}Parts) \bowtie (\sigma_{cost<100} Catalog)) \bowtie Suppliers$

d) List all functional dependencies satisfied by the relation of figure given below.

A	B	C
a_1	b_1	c_1
a_1	b_1	c_2
a_2	b_1	c_1
a_2	b_1	c_3

e) Waits-for graph for the transactions T1, T2, T3, T4 in the diagram below.



What will be the result of executing these transactions? Justify your answer.

Section-B

Answer the following: **(5×5=25)**

UNIT-I

2. Model the following real world example using ER diagrams.
A Person married to another person, the role indicators for the marriage relationship are Male, Female.

OR

3. Make use of the XML, Key-Value data models to represent the following relational data

name	course	grade
Smith	Math2	B
Jones	Math2	A+
Brown	Phil5	A-

UNIT-II

4.

Construct equivalent DDL statements for the above ER model conversion to relational model?

OR

5.

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

Construct SQL CREATE TABLE commands for the tables given in the above diagram.

UNIT-III

6. Consider the following schemas.
employee(eno int primary key, ename char, job char, mgrid int, deptno int, hiredate date, salary int, commission int)
department(deptno int primary key, dname char, location char)
Write SQL queries for the following
a) List the employee name, job who are without manager.
b) List the names of the employees who are getting the highest salary department wise.
c) List the names of departments where atleast 3 are working in that department.
d) List the employees who are working as Managers using co-related sub-query.
e) List the Department number where there are no employees.

OR

7. Develop a PL/SQL implicit cursor to update employee commission as the 10% of employee salary and also print number of rows affected by that update?. Consider the employee table definition as given below.

Employee(empno number, name string, salary real, commission real, deptno number)

UNIT-IV

8. Suppose that we decompose the schema R = (A, B, C, D, E) into R1(A,B,C) and R2(A,D,E). Determine whether this decomposition is a lossless-join decomposition or dependency preserving if the following set F of functional dependencies holds:

{A → BC, CD → E,B → D,E → A}

OR

9. Consider the relation REFRIG(Model#, Year, Price, Manuf_plant, Color), which is abbreviated as REFRIG(M, Y, P, MP, C), and the following set of functional dependencies.

F = {M ->MP, {M, Y} ->P, MP ->C}

a.) Evaluate the candidate keys for REFRIG, giving reasons why it can or cannot be a key

b) Based on the above key determination, state whether the relation REFRIG is in 3NF and in BCNF, and provide proper reasons.

c) Consider the decomposition of REFRIG into *D* = {*R*1(M, Y, P), *R*2(M, MP, C)}. Is this decomposition lossless? Show why.

UNIT-V

10. Consider the following two transactions and schedule (time goes from top to bottom). Explain wheatehr its is this schedule conflict-serializable? Explain why or why not.

Transaction T_0	Transaction T_1
$r_0[A]$	
$w_0[A]$	
	$r_1[A]$
	$r_1[B]$
	c_1
$r_0[B]$	
$w_0[B]$	
c_0	

OR

11. When do two actions on the same data object conflict? Define the anomalies that can be caused by conflicting actions with examples.