[Apr-24]

GITAM (Deemed to be University)

[CSEN2061]

GST/GSS/GSB/GSHS Degree Examination

VI 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

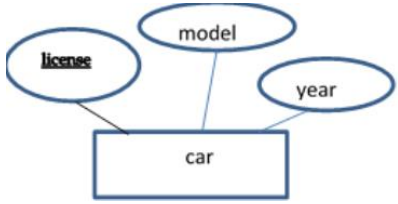
1. Answer all Questions: (5×1=5)

a) When you attempt booking a ticket on IRCTC website, it is possible that many other users are also trying to book a ticket at the same time for the same train on same date and same class. IRCTC Database Management system is able to enable each of the users view the data, request reservation, pay the amount and reserve the seat/berth simultaneously, without inconsistency in the number of seats/berths data. The components that manage your transaction's atomicity are

1. Transaction manager
2. Recovery Manager
3. Concurrency Manager
4. Lock Manager

Choose all those relevant and give reasons in not more than 2 sentences.

b) The following entity is mapped to car relation in relational model. What is the degree of the relation car?



The car pool agency maintains a fleet of 1000 cars. What is the cardinality of the relation car when the data is populated in the relation?

c) Relations Employee, department, Employee Department are attempted to be created using the following DDL Commands. Are the relations created? Give reasons for your answer.

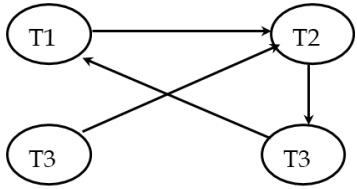
Create table Employee (
Empno number (4),
Empname varchar (10),
Designation varchar (10),
Deptno number (3),
Salary number (8,2));

Create table department (
Deptno number (3),
Dptname varchar (10),
Location varchar (10));

Create table EmployeeDepartment(
Empno number (4) references employee (empno),
Deptno number (3) references department (deptno));

d) Which normal form the Relation R(SBDC)), that is Reserves(Sailor_id, Boat_id, Reserve_date, Card_number) with Functional Dependencies SBD → C, S → C, C → S, is in? Justify your answer in not more than two sentences.

e) What type of schedule is indicated by the Waits-for graph for the transactions T1, T2, T3, T4 given in the diagram below? Justify your answer.



Section-B

Answer the following: **(5×5=25)**

UNIT-I

2. Your neighboring Kirana (provisions) store owner wants to store information(names, addresses, descriptions of argument, etc.) about the many customers that visit his shop. The volume of data compels him/her to buy a database system. To save money he/she

wants to buy one with the fewest possible features, and he/she plans to run it as a stand-alone application on his PC clone. He/She does not plan to share his/her list with anyone. Indicate which of the following DBMS features the shop owner should pay for; in each case, also indicate why he/she should (or should not) pay for the feature in the system he/she buys.

a) A security facility b) Concurrency control c) Crash recovery

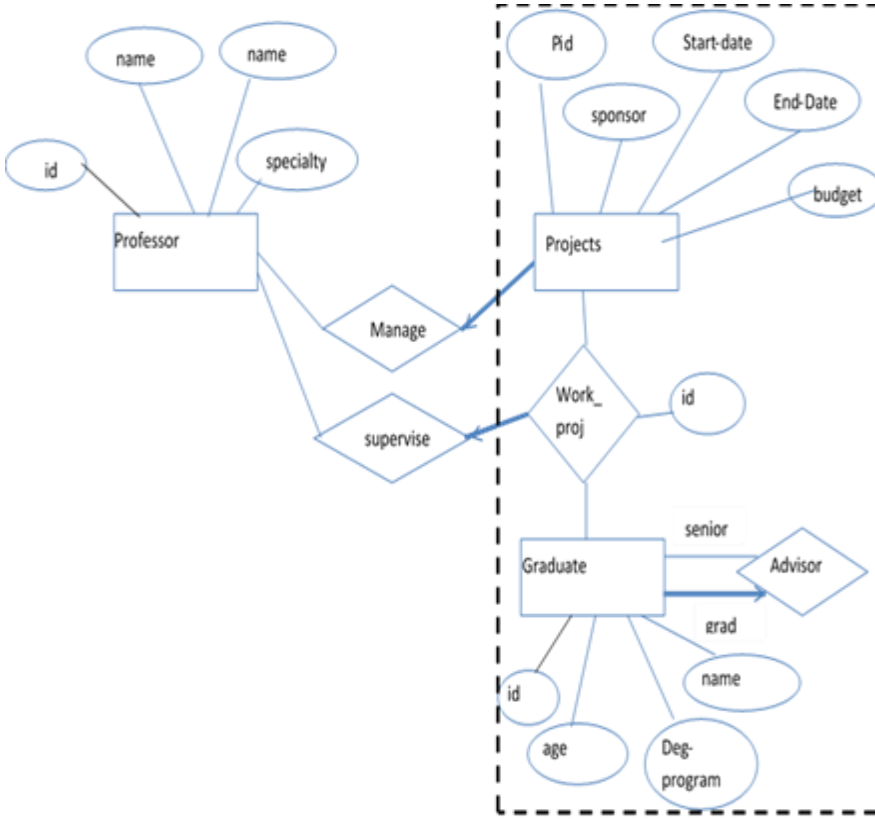
d) A view mechanism e) A query language

OR

3. Given the following ER diagram to store data about professors managing projects and supervising students on projects, identify

a. Key constraints, participation constraints, Type and Mapping cardinality of relations

b. Is Supervise a Ternary relation? if not modify the ER diagram to represent Supervise as ternary relation.



UNIT-III

6. Consider the following relational schema:

Employee (eid: integer, ename: string, age: integer, salary:real)

Works (eid: integer, did:integer, pcttime: integer)

Department (did: integer, dname: string, budget:real, managerid: integer)

a. Identify the integrity constraints that involve the department relation. what are the options for enforcing these constraints when a user attempts to delete a Department tuple?

b. Write the SQL statements required to create the relations. Include all integrity constraints

c. Write an SQL statement to delete the Toy department. Given the referential integrity constraints you chose for this schema, explain what happens when this statement is executed.

OR

7. Given the following schema

Sailors (sid: integer, sname:string, rating: integer, age: real)
Boats (bid: integer, bname: string, color: string)
Reserves (sid: integer, bid: integer, day: date)
Express the following queries in Relational Algebra. (you are expected to write optimized queries)

a. Find the names of sailors with age over 20 who have not reserved a red boat

b.Find the names of sailors who have reserved a red or a green boat

c. Find the names of sailors who have reserved a red and a green boat

UNIT-IV

8. Consider an IT services Agency, which tests products of various companies. Three tables exist: Agency, Product, Company. Company can offer one or more products, Agencies can test one or more products from one or more companies. A product can be tested in one or more agencies and can be offered by one or more companies. If an IT services Agency is equipped to analyze a product from a given company, this information can be recorded using a relation schema:

Agency_Product Company (Agency_Id, Product_Id, Company Id).

What type of dependencies the relation schema, Agency_ Product_ Company has?

Is this relation in BCNF? What normal form the relation is in? Give reasons. What better structure of relation schemas do you suggest? What advantages /disadvantages do you see with the decomposition you suggest?

OR

9. Given the relational schema- R (ABCDEFGH and the set of functional dependencies, F

F = {A→B, ABCD→E, EF→G, EF→H, ACDF→EG}. Find the minimal cover of F.

UNIT-V

10. Is the following schedule for transactions T1, T2 serializable? If not, identify the anomalies in the schedule. Elaborate on types of anomalies resulting due to Interleaved transactions in concurrent execution.

T1	T2
A = A + 100	
	A = 1.06% * A
	B = 1.06% * B
B = B - 100	

OR

11. The following Schedule of transactions is presented for concurrent execution. Does Strict 2 Phase locking protocol allow the execution of the schedule? Does 2 Phase locking allow this schedule?

Give reasons for your answer and specify advantages and disadvantages of the above locking protocols.

T1	T2
R(A)	
W(A)	
	R(A)
	W(A)
	R(B)
	W(B)
	Commit
Abort	

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