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School of Engineering Sciences & Technology
New Delhi-110062
Backlog ODD Semester Examination-2024

Paper Name: Introduction to Database Management System

Paper Code: BCA 302 /BSC 302

Time: 3 Hours

Maximum Marks: 75

Note: Mobile Phones or programmable calculator or any equipment with memory are not allowed inside the examination hall.

SECTION: A (35 Marks)

True or False

All questions are compulsory (35x1=35)

S.No	Questions	CO	BL
1.	CREATE DATABASE school; This SQL command creates a new database named school.	CO1	L4
2.	SELECT COUNT(*) FROM STUDENT; This SQL command counts the total number of records in the STUDENT table.	CO2	L3
3.	UPDATE EMPLOYEE SET SALARY = 50000 WHERE ID = 101; This SQL command updates the SALARY of the employee with ID 101 to 50000.	CO1	L4
4.	DELETE FROM STUDENT WHERE AGE > 25; This SQL command removes all records from the STUDENT table where AGE is greater than 25.	CO1	L2
5.	GRANT INSERT, SELECT ON EMPLOYEE TO 'manager'; This SQL command grants INSERT and SELECT privileges on the EMPLOYEE table to the user 'manager'.	CO1	L1
6.	DROP TABLE ORDERS; This SQL command deletes the ORDERS table and all its contents from the database.	CO3	L3
7.	SELECT DISTINCT CITY FROM CUSTOMER; This SQL command retrieves unique CITY values from the CUSTOMER table.	CO1	L1
8.	ALTER TABLE EMPLOYEE ADD COLUMN Department VARCHAR(50); This SQL command adds a new column named Department of type VARCHAR(50) to the EMPLOYEE table.	CO1	L2
9.	The relational model organizes data into tables called relations	CO2	L1
10.	A schema in the relational model is a physical representation of the database.	CO3	L2
11.	The flat-file model is the most complex and commonly used data model in modern DBMS.	CO4	L1
12.	In an ER diagram, entities are represented as diamonds.	CO3	L2
13.	The conceptual data model is used for designing the database without implementation details.	CO4	L3
14.	The relational model does not support NULL values	CO3	L1
15.	The ER model allows many-to-many relationships between entities.	CO1	L3
16.	TRUNCATE TABLE STUDENT; This SQL command removes all rows from the STUDENT table but retains its structure.	CO4	L1
17.	Multiple inheritance is supported in all programming languages.	CO4	L3
18.	RDBMS is an extension of DBMS with added support for relational structures.	CO3	L1

19.	Hierarchical and network models are examples of DBMS.	CO1	L3
20.	RDBMS supports a high level of data integrity through constraints.	CO4	L1
21.	DBMS does not support data security and access control mechanisms.	CO4	L2
22.	Codd's Rule 0 states that a database must be managed entirely through its relational capabilities.	CO4	L1
23.	Codd's Rule 10 states that all integrity constraints must be defined outside of the database schema.	CO1	L1
24.	The DBA does not handle the migration of databases between environments.	CO4	L1
25.	The E-R model is a high-level conceptual data model.		
26.	Second Normal Form (2NF) removes partial dependency from the database schema.	CO4	L3
27.	Normalization is necessary for all database designs.	CO3	L1
28.	Normalization increases data redundancy to simplify queries.	CO1	L1
29.	A primary key must always be present in an entity in an E-R model.	CO4	L2
30.	The cardinality of a relationship defines the number of instances of an entity that can participate in the relationship.	CO1	L1
31.	A multi-valued attribute can have multiple values for a single entity instance.	CO4	L2
32.	Aggregation is used when a relationship itself needs to be treated as an entity.	CO3	L1
33.	A DBA is responsible for managing and maintaining the database system.	CO4	L1
34.	Serializability ensures that the execution of transactions in a concurrent environment is equivalent to a serial execution.	CO1	L2
35.	Precedence graphs are used to test conflict serializability.	CO2	L2

SECTION-B (4x5=20 Marks)

Attempt any FOUR Questions.

1.	Explain the concept of Entity Relationship Model. Draw an ER Model for INDIAN RAILWAY CATERING AND TOURISM CORPORATION (IRCTC) an online ticket booking system	CO4	L2
2.	What are attributes in ER Model? Explain types of Attributes	CO3	L3
3.	Differentiate between STRONG entity and WEAK entity (7points)	CO2	L2
4.	What is Normalization? Explain 1 NF, 2NF and 3NF with the help of tables	CO4	L3

5.	Define Conflict Serializability. Check from a given schedule whether schedule is Conflict Serializable or NOT.	CO4	L5																					
	<table><tr><td>T₁</td><td>T₂</td><td>T₃</td></tr><tr><td>R(X)</td><td></td><td></td></tr><tr><td></td><td></td><td>R(Y)</td></tr><tr><td></td><td></td><td>R(X)</td></tr><tr><td></td><td>R(Y)</td><td></td></tr><tr><td></td><td>R(Z)</td><td></td></tr><tr><td>W(Z)</td><td></td><td></td></tr></table>			T ₁	T ₂	T ₃	R(X)					R(Y)			R(X)		R(Y)			R(Z)		W(Z)		
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6.	Explain transaction life cycle and describe its phases in detail	CO2	L1																					

SECTION-C (2x10=20 Marks)

Attempt any TWO Questions.

Attempt only TWO Questions.

1.	The following is the list of events in an inter-leaved execution of set $T_1, T_2, T_3, T_4, T_5, T_6$ and T_7 assuming 2PL. Is there a deadlock? If 'yes' which transactions are involved in deadlock? <table border="1"> <tr> <th>Time</th> <th>Transaction</th> <th>Code</th> </tr> <tr> <td>t_1</td> <td>T_2</td> <td>Lock(A,X)</td> </tr> <tr> <td>t_2</td> <td>T_1</td> <td>Lock(C,S)</td> </tr> <tr> <td>t_3</td> <td>T_3</td> <td>Lock(B,S)</td> </tr> <tr> <td>t_4</td> <td>T_5</td> <td>Lock(A,S)</td> </tr> <tr> <td>t_5</td> <td>T_4</td> <td>Lock(E,S)</td> </tr> <tr> <td>T_6</td> <td>T_6</td> <td>Lock(D,X)</td> </tr> </table>	Time	Transaction	Code	t_1	T_2	Lock(A,X)	t_2	T_1	Lock(C,S)	t_3	T_3	Lock(B,S)	t_4	T_5	Lock(A,S)	t_5	T_4	Lock(E,S)	T_6	T_6	Lock(D,X)	CO4	L4				
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2.	Explain the concept of View Serializability with tables	CO3	L3																									
3.	Consider the table and answer the following questions (Table - Student) <table border="1"> <tr> <th>Employee_ID</th> <th>Employee_Name</th> <th>Designation</th> <th>Department</th> <th>City</th> </tr> <tr> <td>101</td> <td>Alice Johnson</td> <td>Software Engineer</td> <td>IT</td> <td>Seattle</td> </tr> <tr> <td>102</td> <td>Bob Brown</td> <td>Data Analyst</td> <td>Analytics</td> <td>New York</td> </tr> <tr> <td>103</td> <td>Charlie Smith</td> <td>Project Manager</td> <td>Management</td> <td>Chicago</td> </tr> <tr> <td>104</td> <td>Diana Jones</td> <td>Software Engineer</td> <td>IT</td> <td>Los Angeles</td> </tr> </table> - Write an SQL query to display names of Employees ending with 'son' and 'th'. - Write an SQL query to fetch the Designation from the Employee table. - Write an SQL query to display names of Employees starting with 'Al' and 'Bo'. - Write an SQL query to display the City 'Seattle' and the Department 'IT' from the Employee table. - Display all records of employees whose Employee_ID is ODD	Employee_ID	Employee_Name	Designation	Department	City	101	Alice Johnson	Software Engineer	IT	Seattle	102	Bob Brown	Data Analyst	Analytics	New York	103	Charlie Smith	Project Manager	Management	Chicago	104	Diana Jones	Software Engineer	IT	Los Angeles	CO3	L5
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4.	What is Relational Algebra in RDBMS? Explain all functions of relational algebra	CO2	L1																									

BL- Bloom's Taxonomy Levels (1-Remembering, 2-Understanding, 3-Applying, 4-Analysing, 5- Evaluating, 6-Creating)