Model Question Paper- I with effect from 2022

CBCS SCHEME

Fourth Semester B.E Degree Examination 2024-25

Database Management Systems (BCS403)

TIME: 03 Hours   *Max.Marks:100*

1. Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**
2. M: Marks, L: Bloom's level, C: Course outcomes.

		Module - 1	**M**	**L**	**C**
Q.1	**a**	Explain the types of end users with examples.	8	L2	CO1
	b	What are the advantages of using DBMS? Explain.	8	L2	CO1
	c	Describe the characteristics of database.	4	L2	CO1
		OR			
Q.2	**a**	Explain three schema architecture. Why mappings b/w schema levels are required?	8	L2	CO1
	b	Explain the different types of attributes in ER model.	8	L2	CO1
	c	Explain the following. 1. Cardinality Ratio 2. Weal Entity	4	L2	CO1
		Module - 2			
Q.3	**a**	Explain the different Relational Model constraints.	6	L2	CO2
	b	Demonstrate the concepts of Generalization & Specialization with examples.	6	L2	CO2
	c	Explain Entity Integrity Constraint & Referential Integrity Constraints? Why each of these is important in a database.	8	L2	CO2
		OR			

Q.4	a	Consider the Sailors-Boats-Reserves DB described **s (sid, sname, rating, age)** **b (bid, bname, color)** **r (sid, bid, date)** Write each of the following queries in SQL. 1. Find the colors of boats reserved by Alber. 2. Find all sailor ids of sailors who have a rating of at least 8 or reserved boat 103. 3. Find the names of sailors who have not reserved a boat whose name contains the string "storm". Order the names in ascending order. 4. Find the sailor ids of sailors with age over 20 who have not reserved a boat whose name includes the string "thunder".	10	L3	CO2
	b	Discuss the Equijoin & Natural Join with suitable example.	6	L3	CO2
	c	Explain the relational algebra operation for set theory with examples.	4	L2	CO2
		Module - 3			
Q.5	a	Explain the Cursor & its properties in embedded SQL with an example.	6	L2	CO3
	b	What is a Normalization? Explain the 1NF, 2NF & 3NF with examples.	10	L2	CO4
	c	Explain informal design guidelines for relational schema design.	4	L2	CO3
		OR			
Q.6	a	What is Functional Dependency? Write algorithm to find minimal cover for set of Functional Dependency. Construct the minimal cover m for set of functional dependency. E={ B→A, D→A, AB→D}	10	L2	CO4
	b	Explain the types of update anomalies in SQL with an example.	10	L4	CO3
		Module - 4			
Q.7	a	Demonstrate the Database Transaction with transaction diagram.	10	L2	CO4
	b	Demonstrate working of Assertion & Triggers in SQL? Explain with an example.	10	L3	CO3
		OR			
Q.8	a	Demonstrate the System Log in database transaction.	6	L2	CO4
	b	Demonstrate the ACID properties of database transaction.	4	L2	CO4
	c	Explain stored procedure language in SQL with an example.	10	L2	CO3

Model Question Paper- I with effect from 2022

		Module - 5			
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Q.9	a	Demonstrate the Two phase locking protocol used for concurrency control.	8	L3	CO5
	b	Demonstrate the Concurrency control based on Timestamp ordering.	4	L2	CO5
	c.	Why Concurrency control is needed? Demonstrate with an example.	8	L3	CO5
		OR			
Q.10	a	What is NOSQL? Explain the CAP theorem.	6	L2	CO5
	b	What are document based NOSQL systems? Explain basic operations CRUD in MongoDB.	8	L2	CO5
	c	What is NOSQL Graph database? Explain Neo4j.	6	L2	CO5

Model Question Paper- II with effect from 2022

CBCS SCHEME

Fourth Semester B.E Degree Examination 2024-25

Database Management System (BCS403)

TIME: 03 Hours   *Max.Marks:100*

*1. Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE***
2. M: Marks, L: Bloom's level, C: Course outcomes.

		Module - 1	M	L	C
Q.1	a	What is a Database? Explain the three schema architecture with neat diagram.	8	L2	CO1
	b	What are the advantages of using DBMS approach? Explain	8	L2	CO1
	c	Explain the following terms. 1. Data Dictionary 2. Weak Entity	4	L2	CO1
		OR			
Q.2	a	Explain the categories of Data Models.	8	L2	CO1
	b	Explain the component modules of DBMS & their interactions with diagram.	8	L2	CO1
	c	What are the responsibilities of DBA & database designers?	4	L2	CO1
		Module - 2			
Q.3	a	Explain the different types of update operations on relational database. How basic operation deals with constraint violation.	6	L2	CO2
	b	Explain Unary relational operations with examples.	6	L2	CO2
	c	What is an Integrity Constraint? Explain the importance of Referential Integrity Constraint.	8	L2	CO2
		OR			
Q.4	a	Explain the following relational algebra operation. JOIN, DIFFERENCE, SELECT, UNION	10	L3	CO2
	b	Discuss the E.R to Relational mapping algorithm with example for each step.	6	L3	CO2
	c	Explain the relational algebra operation for set theory with examples.	4	L2	CO2
		Module - 3			
Q.5	a	Illustrate insert, delete, update, alter & drop commands in SQL.	6	L4	CO3

	b	Explain informal design guidelines for relational schema design.	**4**	**L2**	**CO3**
	c	What is Functional dependency? Explain the inference rules for functional dependency with proof.	**10**	**L3**	**CO4**
		OR			
Q.6	**a**	Consider two sets of functional dependency. F={A→C, AC→D, E→AD, E→H} E= {A→CD, E→AH}. Are they Equivalent?	**10**	**L3**	**CO4**
	b	Explain the types of update anomalies in SQL with an example.	**10**	**L2**	**CO3**
		Module - 4			
Q.7	**a**	Demonstrate transaction states & additional operations.	**10**	**L3**	**CO4**
	b	Demonstrate working of Assertion & Triggers in database? Explain with an example.	**10**	**L2**	**CO3**
		OR			
Q.8	**a**	Demonstrate the System Log in database transaction.	**6**	**L2**	**CO4**
	b	Discuss the ACID properties of database transaction.	**4**	**L2**	**CO4**
	c	Explain stored procedure language in SQL with an example.	**10**	**L2**	**CO3**
		Module - 5			
Q.9	**a**	Explain the Two phase locking protocol used for concurrency control.	**8**	**L3**	**CO5**
	b	Define Schedule? Illustrate with an example.	**4**	**L2**	**CO5**
	c.	Why Concurrency control is needed? Demonstrate with an example.	**8**	**L3**	**CO5**
		OR			
Q.10	**a**	What is NOSQL? Explain the CAP theorem.	**6**	**L2**	**CO5**
	b	What are document based NOSQL systems? basic operations CRUD in MongoDB.	**8**	**L2**	**CO5**
	c	What is NOSQL Graph database? Explain Neo4j.	**6**	**L2**	**CO5**

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024
Database Management Systems

Time: 3 hrs.   Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define database. Elaborate component modules of DBMS and their interactions.	10	L2	CO1
	b.	Describe the three-schema architecture. Why do we need mappings among schema levels?	06	L2	CO1
	c.	Explain the difference between logical and physical data independence.	04	L2	CO1
		OR			
Q.2	a.	Draw an ER diagram for an COMPANY database with employee, department, project as strong entities and dependent as weak entity. Specify the constraints, relationships and ratios in the ER diagram.	10	L3	CO3
	b.	Define the following terms with example for each using ER notations: Entity, attribute, composite attribute, multivalued attribute, participation role.	10	L3	CO3
		Module – 2			
Q.3	a.	Discuss the update operations and dealing with constraint violations with suitable examples.	08	L2	CO2
	b.	Illustrate the relational algebra operators with examples for select and project operation.	06	L2	CO2
	c.	Discuss the characteristics of relations that make them different from ordinary table and files.	06	L2	CO2
		OR			
Q.4	a.	Perform (i) Student U instructor (ii) Student ∩ Instructor (iii) Student – Instructor (iv) Instructor – Student on the following tables:	04	L3	CO2

Student

Fname	Lname
Susan	Yao
Ramesh	Shah
Johnny	Kohler
Barbara	Jones
Amy	Ford
Jimmy	Wang
Ernest	Gilbert

Instructor

Fname	Lname
John	Smith
Ricardo	Browne
Susan	Mao
Francis	Johnson
Ramesh	Shah

			M	L	C
	b.	Consider the following relational database schema and write the queries in relational algebra expressions: EMP(Eno, Ename, Salary, Address, Phone, DNo) DEPT(DNo, Dname, DLoc, MgrEno) DEPENDENT(Eno, Dep_Name, Drelation, Dage) (i) List all the employees who reside in 'Belagavi'. (ii) List all the employees who earn salary between 30000 and 40000 (iii) List all the employees who work for the 'Sales' department (iv) List all the employees who have at least one daughter (v) List the department names along with the names of the managers	10	L3	CO2

	c.	Consider the two tables T_1 and T_2 shown below:	06	L3	CO2

T_1

P	Q	R
10	a	5
15	b	8
25	a	6

T_2

A	B	C
10	b	6
25	c	3
10	b	5

Show the results of the following operations:

(i) $T_1 \bowtie_{T_1.P=T_2.A} T_2$

(ii) $T_1 \bowtie_{T_1.Q=T_2.B} T_2$

(iii) $T_1 \bowtie_{(T_1.P=T_2.A \text{ AND } T_1.R=T_2.C)} T_2$

Module – 3

Q.5	a.	Discuss the informal design guidelines for relation schema design.	08	L2	CO4
	b.	Define 1NF, 2NF, and 3NF with examples.	06	L2	CO4
	c.	Write the syntax for INSERT, UPDATE and DELETE statements in SQL and explain with suitable examples.	06	L2	CO3

OR

Q.6	a.	Discuss insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with examples.	10	L2	CO3
	b.	Illustrate the following with suitable examples: (i) Datatypes in SQL (ii) Substring Pattern Matching in SQL.	10	L2	CO3

Module – 4

Q.7	a.	Consider the following relations: Student(Snum, Sname, Branch, level, age) Class(Cname, meet_at, room, fid) Enrolled(Snum, Cname) Faculty(fid, fname, deptid) Write the following queries in SQL. No duplicates should be printed in any of the answers. (i) Find the names of all Juniors (level = JR) who are enrolled in a class taught by I. Teach. (ii) Find the names of all classes that either meet in room R128 or have five or more students enrolled. (iii) For all levels except JR, print the level and rthe average age of students for that level. (iv) For each faculty member that has taught classes only in room R128, print the faculty member's name and the total number of classes she or he has taught. (v) Find the names of students not enrolled in any class.	10	L3	CO3
	b.	What do understand by correlated Nested Queries in SQL? Explain with suitable example.	04	L2	CO3
	c.	Discuss the ACID properties of a database transaction.	06	L2	CO4

OR

Q.8	a.	What are the views in SQL? Explain with examples.	04	L3	CO5
	b.	In SQL, write the usage of GROUP BY and HAVING clauses with suitable examples.	06	L2	CO3
	c.	Discuss the types of problems that may encounter with transactions that run concurrently.	10	L2	CO5

		Module – 5			
Q.9	a.	What is the two phase locking protocol? How does it Guarantee serializability.	06	L2	CO5
	b.	Describe the wait-die and wound-wait protocols for deadlock prevention.	08	L2	CO5
	c.	List and explain the four major categories of NOSQL system.	06	L2	CO3
		OR			
Q.10	a.	What is Multiple Granularity locking? How is it implemented using intension locks? Explain.	10	L2	CO5
	b.	Discuss the following MongoDB CRUD operations with their formats: (i) Insert (ii) Delete (iii) Read	06	L2	CO4
	c.	Briefly discuss about Neo4j data model.	04	L2	CO4

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