Hall Ticket No | | | | | | | | | | | Question Paper Code: ACSB08

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER - II

B.Tech IV Semester End Examinations, May - 2020

Regulations: R18

DATABASE MANAGEMENT SYSTEMS

(Common to CSE & IT)

Time: 3 hours **Max. Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1.	a)	Explain the Various Components of overall DBS architecture with neat diagram?.	**[7M]**
	b)	What are the different users accessing database with database?	**[7M]**
2.	a)	Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.	**[7M]**
	b)	Design E-R diagram that uses only a binary relationship between students and course-offerings. Make sure that only one relationship exists between a particular student and course-offering pair, yet you can represent the marks that a student gets in different exams of a course offering.	**[7M]**

MODULE – II

3.	a)	Explain the Relational algebra with examples of algebra queries which includes selection and projection, set operations?	**[7M]**
	b)	Consider Relations R and S where are R is having m tuples and S is having n tuples . m<=n . What would be the minimum and maximum number of tuples in each of the following cases (Assume that nothing is mentioned about key constraints).	**[7M]**
4.	a)	What is an unsafe query? Give an example and explain why it is important to disallow such queries.?	**[7M]**
	b)	Let R = (A, B) and S = (A, C), and let r(R) and s(S) be relations. The relational algebra expression ΠA(σB=10 (r)) is equivalent to the following domain relational calculus expression: { | ∃ b (∈ r ∧ b = 10)} Give an expression in the domain relational calculus that is equivalent to each of the following: a) r ⋈ s b) Πr.A ((r ⋈ s) ⋈c=r2.A ∧ r.B>r2.B (ρr2(r)))	**[7M]**

MODULE – III

5. a) What is a Join? What are the different types of joins available. Explain each one with an example? **[7M]**

   b) Consider the following schema: Suppliers(sid: integer, sname: string, address: string) Parts(pid: integer, pname: string, color: string) Catalog(sid: integer, pid: integer, cost: real) The Catalog relation lists the prices charged for parts by Suppliers. **[7M]**
   Write the following queries in SQL:
   1. Find the pnames of parts for which there is some supplier.
   2. Find the snames of suppliers who supply every part.
   3. Find the snames of suppliers who supply every red part.
   4. Find the pnames of parts supplied by Acme Widget Suppliers and no one else

6. a) Consider a relation R with the schema R(A, B, C, D, E, F) with a set of functional dependencies F as follows; **[7M]**
   {AB → C, BC → AD, D → E, CF → B}
   Find the super key for this relation.

   b) Let R=(A, B, C), S=(C, D, E) and let q and r be relations on schema R and s be a relation on schema S. Convert the following queries to SQL: **[7M]**
   a) $\{ \mid \exists\ b\ (\in r \wedge b = 10)\}$
   b) q - r.

MODULE – IV

7. a) What is the Transaction? What are the different Transaction State?.Explain Implementation of Atomicity and Durability? **[7M]**

   b) Two transactions T_1 and T_2 are given as: **[7M]**
   T_1: $r_1(X)w_1(X)r_1(Y)w_1(Y)$

   T_2 : $r_2(Y)w_2(Y)r_2(Z)w_2(Z)$
   where $r_i(V)$ denotes a read operation by transaction T_i on a variable V and $w_i(V)$ denotes a write operation by transaction T_i on a variable V. The total number of conflict serializable schedules that can be formed by T1 and T2 is

8. a) Describe how a Log-Based Recovery is implemented. Explain about Recovery With Concurrent Transactions Buffer Management?. **[7M]**

   b) Compare the Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols with respect to Concurrency Control? **[7M]**

MODULE – V

9. a) Discuss about File Organization and Organization of Records in Files? Explain your answer with suitable example. **[7M]**

   b) Consider the following relations: Emp(eid: integer, ename: varchar, sal: integer, age: integer, did: integer) Dept(did: integer, budget: integer, floor: integer, mgr eid: integer) Salaries range from $10,000 to $100,000, ages vary from 20 to 80, each department has about five employees on average, there are 10 floors, and budgets vary from $10,000 to $1 million. You can assume uniform distributions of values. For each of the following queries, which of the listed index choices would you choose to speed up the query? If **[7M]**

your database system does not consider index-only plans (i.e., data records are always retrieved even if enough information is available in the index entry), how would your answer change? Explain briefly

10. a) What is the difference between a Static Hashing and Dynamic Hashing? Discuss about Comparison of Ordered Indexing and Hashing? **[7M]**

    b) Expalin about Query Processing and write the various steps involved in Measures of Query Cost **[7M]**

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

COURSE OBJECTIVES:

The course should enable the students to:

I	Understand the role of database management system in an organization and learn the database concepts.
II	Understand the role of database management system in an organization and learn the database concepts.
III	Construct database queries using relational algebra and calculus.
IV	Understand the concept of a database transaction and related database facilities.
V	Learn how to evaluate set of queries in query processing.

COURSE OUTCOMES (COs):

CO 1	Describe Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Various Components of overall DBS architecture, Various Concepts of ER Model, Basics of Relational Model.
CO 2	Determine Relational algebra, selection and projection, set operations, renaming, joins, division, examples of algebra queries, relational calculus: Tuple relational calculus, Domain relational calculus, expressive power of algebra and calculus.
CO 3	Understand SQL – Data Definition commands, Queries with various options, Mata manipulation commands, Views, Joins, views, integrity and security; Relational database design: Pitfalls of RDBD, Lossless join decomposition, Functional dependencies , Armstrong Axioms, Normalization for relational databases 1st , 2nd and 3rd normal forms, Basic definitions of MVDs and JDs, 4th and 5th normal forms.
CO 4	Explore the concept of Transaction, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability. Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularities, Multiversion Schemes, Deadlock Handling. Recovery: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery with Concurrent Transactions Buffer Management
CO 5	Knowledge the Physical Storage Media, Magnetic Disks, Storage Access, File Organization, Organization of Records in Files. Indexing and Hashing: Basic Concepts: Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing. Query Processing: Overview, Measures of Query Cost.

COURSE LEARNING OUTCOMES (CLOs):

ACSB08.01	Describe the Purpose of Database Systems, Data Models, and View of Data.
ACSB08.02	Summarize the concept of Database Languages, Database Users.
ACSB08.03	Identify the Various Components of overall DBS architecture.
ACSB08.04	Use the concept of ER Model.
ACSB08.05	Describe Basics of Relational Model.
ACSB08.06	Determine Relational algebra, The Self variable.
ACSB08.07	Understand selection and projection, set operations.
ACSB08.08	Determine renaming, joins, division.
ACSB08.09	Use examples of algebra queries.
ACSB08.10	Illustrate Tuple relational calculus, Domain relational calculus, and also expressive power of algebra and calculus.
ACSB08.11	Understand SQL – Data Definition commands, Queries with various options.
ACSB08.12	Analyze the concept of Mata manipulation commands, Views, Joins, views.
ACSB08.13	Illustrate Calling a function, Returning multiple values from a function.
ACSB08.14	Contrast the Usage of Relational database design, Functional dependencies, Armstrong Axioms
ACSB08.15	Define Normalization, 2nd and 3rd Normalization, Basic definitions of MVDs and JDs, 4th and 5th normal forms.
ACSB08.16	Discuss the concept of Transaction, Transaction State.
ACSB08.17	Understand Atomicity and Durability, Concurrent Executions.
ACSB08.18	Summarize the concept of Serializability, Recoverability.
ACSB08.19	Discuss the Concurrency Control and various Protocols.
ACSB08.20	Understand the concept of Multiversion Schemes, Deadlock Handling. Recovery: Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery with Concurrent Transactions Buffer Management.
ACSB08.21	Knowledge about the Physical Storage Media, Magnetic Disks, Storage Access
ACSB08.22	Apply Working with File Organization, Organization of Records in Files.
ACSB08.23	Understand Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing.
ACSB08.24	Comparison of Ordered Indexing and Hashing.
ACSB08.25	Illustrate Query Processing: Overview, Measures of Query Cost.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No		Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	ACSB08.03	Describe the Purpose of Database Systems, Data Models, and View of Data	CO 1	Understand
	b	ACSB08.01	Summarize the concept of Database Languages, Database Users.	CO 1	Understand
2	a	ACSB08.02	Use the concept of ER Model.	CO 1	Remember
	b	ACSB08.02	Use the concept of ER Model.	CO 1	Understand
3	a	ACSB08.06	Describe Basics of Relational Model.	CO 2	Understand
	b	ACSB08.06	Determine Creating a class, The Self variable.	CO 2	Remember
4	a	ACSB08.08	Determine Creating a class, The Self variable..	CO 2	Understand
	b	ACSB08.07	Understand selection and projection, set operations.	CO 2	Understand
5	a	ACSB08.11	Analyze the concept of Mata manipulation commands, Views, Joins, views.	CO 3	Understand
	b	ACSB08.12	Understand SQL – Data Definition commands, Queries with various options.	CO 3	Understand
6	a	ACSB08.13	Define Normalization, 2nd and 3rd Normalization, Basic definitions of MVDs and JDs, 4th and 5th normal forms.	CO 3	Understand
	b	ACSB08.14	Contrast the Usage of Relational database design, Functional dependencies, Armstrong Axioms,	CO 3	Understand
7	a	ACSB08.17	Understand Atomicity and Durability, Concurrent Executions.	CO 4	Understand
	b	ACSB08.18	Discuss the concept of Transaction, Transaction State.	CO 4	Understand
8	a	ACSB08.18	Discuss the Concurrency Control and various Protocols.	CO 4	Understand
	b	ACSB08.19	Understand the concept of Multiversion Schemes, Deadlock Handling. Recovery: Paging.	CO 4	Understand
9	a	ACSB08.22	Understand Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing.	CO 5	Understand
	b	ACSB08.24	Understand Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing.	CO 5	Understand
10	a	ACSB08.25	Comparison of Ordered Indexing and Hashing.	CO 5	Understand
	b	ACSB08.24	Comparison of Ordered Indexing and Hashing.	CO 5	Understand

Signature of Course Coordinator **HOD, IT**