

**University of Mumbai**  
**Examinations Summer 2022**  
Examination: Third Year Semester VI

Course Code: **ECCDLO6014** and Course Name: **DBMS**

Q1.	_____ is a set of one or more attributes taken collectively to uniquely identify a record.
Option A:	Primary key
Option B:	Super key
Option C:	Foreign key
Option D:	Candidate key
Q2.	Data independence means
Option A:	Data is defined separately and not included in programs
Option B:	Data and programs are maintained in separate files
Option C:	Is the capacity to change the schema at one level of a database system without having to change the schema at the next higher level
Option D:	Data is defined separately and included in programs
Q3.	A relational database developer refers to a record as
Option A:	A criteria
Option B:	A relation
Option C:	A tuple
Option D:	An attribute
Q4.	Key to represent relations between tables is called
Option A:	Super key
Option B:	Foreign key
Option C:	Primary key
Option D:	Secondary key
Q5.	A logical schema
Option A:	is the entire database
Option B:	is the standard way of organizing information into accessible parts
Option C:	Describes how data is actually stored on disk.
Option D:	Is the Entire Data base as well as the standard way of organizing information into accessible parts.
Q6.	E-R model uses this symbol to represent weak entity set?
Option A:	Dotted rectangle
Option B:	Diamond
Option C:	Doubly outlined rectangle
Option D:	Dotted square
Q7.	What is an Instance of a Database?
Option A:	The logical design of the database system
Option B:	The entire set of attributes of the Database put together in a single relation
Option C:	The state of the database system at any given point of time
Option D:	The initial values inserted into the Database immediately after its creation

Q8.	Relational Algebra is
Option A:	Data Definition Language
Option B:	Meta Language
Option C:	Procedural query Language
Option D:	High level Language
Q9.	_____ refers to the correctness and completeness of the data in a database
Option A:	Data security
Option B:	Data integrity
Option C:	Data constraint
Option D:	Data independence
Q10.	Every attribute has some predefined value scope that is called
Option A:	Tuple
Option B:	Tables
Option C:	Attribute domain
Option D:	Relation schema
Q11.	_____ produces the relation that has attributes of R1 and R2.
Option A:	Cartesian product
Option B:	Difference
Option C:	Intersection
Option D:	Product
Q12.	Which is not advantage of concurrent execution
Option A:	Improved throughput
Option B:	Reduced waiting time
Option C:	Less storage space required
Option D:	Resource utilization
Q13.	A transaction completes its execution is said to be
Option A:	Saved
Option B:	Loaded
Option C:	Rolled
Option D:	Committed
Q14.	Which of the following is not an Aggregate function?
Option A:	Min
Option B:	Max
Option C:	Select
Option D:	Avg
Q15.	A type of query that is placed within a WHERE or HAVING clause of another query called
Option A:	Super query
Option B:	Sub query
Option C:	Master query
Option D:	Multi-query
Q16.	What is ACID properties of Transactions?

Option A:	Atomicity, Consistency, Isolation, Database
Option B:	Atomicity, Consistency, Isolation, Durability
Option C:	Atomicity, Consistency, Inconsistent, Durability
Option D:	Automatically, Consistency, Isolation, Durability
Q17.	The attribute that can be divided into other attributes is called
Option A:	Simple Attribute
Option B:	Composite Attribute
Option C:	Multi-valued Attribute
Option D:	Derived Attribute
Q18.	Count function in SQL returns the number of
Option A:	Values
Option B:	Columns
Option C:	Groups
Option D:	Distinct values
Q19.	A relation that has zero partial dependencies is in which normal form
Option A:	First
Option B:	Second
Option C:	Third
Option D:	BCNF
Q20.	In SQL, which of the following is not a data manipulation Language commands?
Option A:	DELETE
Option B:	SELECT
Option C:	UPDATE
Option D:	CREATE
Q21.	A data manipulation command that combines the records from one or more tables is called
Option A:	SELECT
Option B:	PROJECT
Option C:	JOIN
Option D:	PRODUCT
Q22.	Consider the following schema Employee(Eno, Ename, deptNo) Department(deptNo, deptName) Find the correct query to find the name of the employees working in the research department
Option A:	Select Ename from Employee, Department where Employee.deptNo=Department.deptNo and deptName='Research'
Option B:	Select Ename from Employee where Department.deptName='Research'
Option C:	Select Ename from Employee where deptName='Research'
Option D:	Select Ename from Employee where deptName='Acedemic'
Q23.	Employee(person_name,street, city) Works(person_name, company_name, salary) Company(company_name, city) Manages(person_name, manager_name)  Consider the relational database given above where primary key is in bold letters.

	Give an expression in the relational algebra to express each of the following queries: 1. Find the names of the employees who work for First Bank Corporation.
Option A:	$\Pi_{person\_name}(\sigma_{comapny\_name="FirstBankCorporation"}(works))$
Option B:	$\sigma_{person\_name}(\Pi_{comapny\_name="FirstBankCorporation"}(works))$
Option C:	$(\sigma_{comapny\_name="FirstBankCorporation"}(works))$
Option D:	$\Pi_{comapny\_name="FirstBankCorporation"}(works)$
Q24.	The different events in Triggers are
Option A:	Define, Create
Option B:	Drop, Comment
Option C:	Insert, Update, Delete
Option D:	Select, Commit
Q25.	An attribute of a table cannot hold multiple values is the property of
Option A:	First Normal form (1NF)
Option B:	Second normal form (2NF)
Option C:	Third normal form(3NF)
Option D:	Fourth normal form (4NF)
Q26.	DDL and DML statements are compiled and executed by
Option A:	query processor
Option B:	storage manager
Option C:	transaction manager
Option D:	data model
Q27.	SELECT * FROM employees WHERE department_id IN(1, 2, 5) AND salary > 20000; Which values would cause the logical condition to return TRUE?
Option A:	Department_ID=1 and salary=20000
Option B:	Department_ID=5 and salary=20000
Option C:	Department_ID=null and salary=20001
Option D:	Department_ID=2 and salary=20001
Q28.	Consider the following query Select AVG(mark) From student Where subject_id='EC703' Which one of the following values will returned by the above query if marks values in EC703 are 90, 60 and NULL?
Option A:	75
Option B:	50
Option C:	Null
Option D:	Not defined
Q29.	Consider the following relation with given functional dependencies as, R(ABCDEFGH)

	AB→C , BD→EF, AD→G, A→H Find the candidate keys of the relation.
Option A:	ABD
Option B:	AB and BD
Option C:	ACD
Option D:	AD and CD
Q30.	Which of the following normal form removes the transitive dependency between the non key attributes and candidate key?
Option A:	1NF
Option B:	2NF
Option C:	3NF
Option D:	BCNF
Q31.	The attribute AGE is calculated from DATE_OF_BIRTH. The attribute AGE is Called as
Option A:	key valued
Option B:	Multi valued
Option C:	Composite
Option D:	Derived
Q32.	Which of the following is not a transaction state?
Option A:	Partially committed
Option B:	Aborted
Option C:	End
Option D:	committed
Q33.	Which of the following lock will be obtained by transaction then it can read but cannot write on the data item
Option A:	Shared mode
Option B:	Exclusive mode
Option C:	Read only mode
Option D:	Write only mode
Q34.	To hold transactions consistent, the database includes
Option A:	Commit
Option B:	Atomic
Option C:	Flashback
Option D:	Retain
Q35.	To remove a relation from an SQL database, we use the _____ command.
Option A:	Delete
Option B:	Purge
Option C:	Remove
Option D:	Drop table
Q36.	This Set operator combine the results of two or more SELECT statements without removing duplication
Option A:	Union
Option B:	Union all
Option C:	Intersect

Option D:	Minus
Q37.	SQL Views are also known as
Option A:	Complex tables
Option B:	Simple tables
Option C:	Virtual tables
Option D:	Actual Tables
Q38.	A functional dependency is a relationship between or among
Option A:	Entities
Option B:	Rows
Option C:	Attributes
Option D:	Tables
Q39.	The ____ graph describes deadlocks precisely
Option A:	Wound wait graph
Option B:	Wait die graph
Option C:	Wait for graph
Option D:	Wait wait graph
Q40.	A _____ of the transactions can be obtained by finding a linear order consistent with the partial order of the precedence graph.
Option A:	Serializability order
Option B:	Direction graph
Option C:	Precedence graph
Option D:	Scheduling scheme

## 5 marks questions

1. Discuss advantages of DBMS over traditional file management system.
- 2 Explain the importance of UML diagram.
- 3 Explain different types of data base users.
- 4 Define Data Base Administrator. Discuss role of DBA.
- 5 What do you understand by the concurrent execution of the transactions? Mention any two advantages of concurrency.
- 6 Explain building blocks of DATA Model.
- 7 Explain data abstraction in brief.
- 8 Explain evaluation of data model.
- 9 Explain different types of attributes with example
- 10 Explain components of ER model.
- 11 Define following terms i) super key ii) candidate key iii) primary key iv) foreign key
- 12 Explain specialization and generalization in detail with suitable example

- 13 Explain weak entity with example.
- 14 Explain Domain relational calculus.
- 15 Describe trigger with example.
- 16 Explain ACID properties of transaction
- 17 Explain database recovery management in brief.
- 18 Explain Tuple relational calculus database recovery management in brief.
- 19 Explain constraints in SQL
- 20 What do you understand by schedule? Give an example of serializable schedule.

## **10 marks questions**

1 Explain following types of attributes with an example.

i) Single Valued ii) Multi Valued iii) Composite iv) Derived

2 Construct ER diagram and convert it into relational model for company which has several Employees working on different types of projects. Several Employees are working on one department. Department associated with many projects. Every Employee has a manager. Several employees are supervised by one employee.

Consider the necessary attributes of each entity.

3 We require to develop an information management system that supports some of the services involved in an Online Bookstore (e.g., Amazon.com). The Book store has registered customers in order to sell books. It also contains publishers' information and a customer can place the book he desires to buy on a shopping basket.

- A customer has an email, name, phone and address.
- A book has and ISBN, year, title and price.
- Publisher has a name, address, phone and url and publishes several books, but one book can be published by one publisher.
- An author has a name and address and can write several books.
- Books can be written by only one author and they are stored on many warehouses and one warehouse has many books.
- A customer can have several shopping baskets

Each shopping basket belongs to one customer, where each shopping basket can contain several books.

4 Explain following relational algebra operations with suitable example

i) Project ii) Select iii) Union iv) Cartesian Product

5 What do you understand by joins? Explain following terms with example.

i) Natural join ii) left outer join iii) right outer join iv) full outer join

6 Define Normalization. Explain 1NF, 2NF, 3NF and BCNF with example.

7 Consider the following relations

Sailors (sid, sname, rating, age)

Boats (bid, bname, color)

Reserves (sid, bid, day)

Write the following queries in SQL

- i) Find the name and ages of all the sailors
- ii) Find all sailors with rating above 7
- iii) Find the names of sailors who have reserved at least one boat
- iv) Find the name and age of the oldest sailor (nested query)
- v) Find the sid of sailors who have reserved a red boat

8 Explain data definition language and data manipulation language.

9 Draw the state diagram of transaction. Discuss every step in brief with an example.

10 Explain conflict serializability and view serializability with example

11 Define deadlock. Explain deadlock detection, prevention and recovery.

12 Explain the following with suitable example.

- 1) Time stamp-based concurrency protocol and
- 2) 2 PL based concurrency protocol.

13 Consider the following schedule S

$T_1$	$T_2$	$T_3$
	R(X)	
	W(X)	
		R(X)
	R(Y)	
	W(Y)	
	COMMIT	
R(X)		
		W(X)
		COMMIT
W(X)		
COMMIT		

R(X) denotes read operation on data X and W(X) denotes write operation on data X. Determine whether the schedule is recoverable or cascadeless.

14 What do you mean by conflict serializable schedule? Use the given schedule and determine whether it is conflict serializable?

T1	T2
Read(A)	
Write(A)	
	Read(A)
	Write(A)
Read(B)	
Write(B)	



	Read(B)
	Write(B)

15 Consider the following database:

Product (maker, model, type)

PC (model, speed, ram, hd, price)

Laptop (model, speed, ram, hd, screen, price)

Printer (model, color, type, price)

The Product relation gives the manufacturer, model number and type (PC, laptop, or printer) of various products. We assume for convenience that model numbers are unique over all manufacturers. The PC relation gives for each model number that is a PC the speed (of the processor, in gigahertz), the amount of RAM (in megabytes), the size of the hard disk (in gigabytes), and the price.

Write SQL queries for the following (any FIVE)

1. Find the model number, speed and hard drive capacity for all the PCs with prices below \$500
2. Find the makers of PCs with a processor speed of 450 MHz or more
3. Find out the average speed of the PCs produced by maker A
4. Find the makers producing at least three distinct models of PCs. Result set: maker, number of PC models
5. Get the laptop models that have a speed smaller than the speed of any PC. Result set: type, model, speed.
6. Find the model number and maker of the lowest priced PC that has 64MB or more memory

16 Write short note on Log based recovery.

17 Explain three level schema architecture of DBMS. State different level of dependencies in this architecture

18 What do you mean by data modelling? Discuss different types of models

19 Draw ER diagram for Hospital management system. Convert ER diagrams into tables.

20 Construct an ER diagram for school with the sets of students and a set of teachers associated with each student with a log of various examinations conducted write a relational schema for the ER design

Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	C
Q3.	C
Q4	B

Q5	B
Q6	C
Q7	C
Q8.	C
Q9.	B
Q10.	C
Q11.	A
Q12.	C
Q13.	D
Q14.	C
Q15.	B
Q16.	B
Q17.	B
Q18.	D
Q19.	B
Q20.	D
Q21.	C
Q22.	A
Q23.	A
Q24.	C
Q25.	A
Q26.	A
Q27.	D
Q28.	A
Q29.	A
Q30.	C
Q31.	D

Q32.	C
Q33.	A
Q34.	B
Q35.	D
Q36.	B
Q37.	C
Q38.	C
Q39.	C
Q40.	A