**University of Mumbai**

**Examinations Summer 2022**

Examination: Third Year Semester VI

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

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| 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 |
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| 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 |
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| 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 |
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| 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. |
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| 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 |
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| 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 |
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| Q8. | Relational Algebra is |
| Option A: | Data Definition Language |
| Option B: | Meta Language |
| Option C: | Procedural query Language |
| Option D: | High level Language |
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| 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 |
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| 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 |
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| Q11. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_produces the relation that has attributes of R1 and R2. |
| Option A: | Cartesian product |
| Option B: | Difference |
| Option C: | Intersection |
| Option D: | Product |
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| 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 |
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| Q13. | A transaction completes its execution is said to be |
| Option A: | Saved |
| Option B: | Loaded |
| Option C: | Rolled |
| Option D: | Committed |
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| 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 |
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| Q16. | What is ACID properties of Trasactions? |
| 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 |
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| Q18. | Count function in SQL returns the number of |
| Option A: | Values |
| Option B: | Columns |
| Option C: | Groups |
| Option D: | Distinct values |
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| 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 |
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| 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 |
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| 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=Departmet.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: |  |
| Option B: |  |
| Option C: |  |
| Option D: |  |
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| Q24. | The different events in Triggers are |
| Option A: | Define, Create |
| Option B: | Drop, Comment |
| Option C: | Insert, Update, Delete |
| Option D: | Select, Commit |
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| 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) |
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| 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 |
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| 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 |
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| 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 |
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| 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 |
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| 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 |
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| Q32. | Which of the following is not a transaction state? |
| Option A: | Partially committed |
| Option B: | Aborted |
| Option C: | End |
| Option D: | committed |
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| 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 |
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| 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

1. Find the name and ages of all the sailors
2. Find all sailors with rating above 7
3. Find the names of sailors who have reserved at least one boat
4. Find the name and age of the oldest sailor (nested query)
5. 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

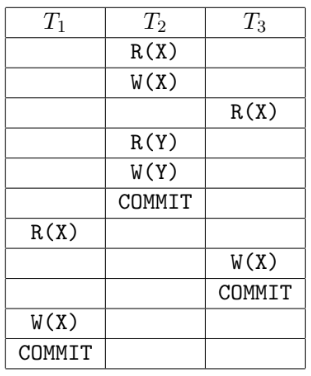
11 Define deadlock. Explain deadlock detection, prevention and recovery.

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



R(X) denotes read operation on data X and W(X) denotes write operation on data X. Determine wheather 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

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| --- | --- |
| **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 |