

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

April – May 2023

(B.Tech) Program: Artificial Intelligence & Data Science
Examination: SY
Course Code: AIC403
Date of Exam: 18/05/2023

Scheme: II
Semester: IV
Course Name: Database management System
Max. Marks: 60

Duration: 2.5 Hours

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

| | | Max. Mks | CO | BT level |
|------------|--|-----------|----|------------|
| Q 1 | Solve any six questions out of eight: | 12 | | |
| i) | SQL tables cannot have duplicate rows inserted in them. Give reason | 2 | 4 | Analyze |
| ii) | Refer to the query given, point out the error: SELECT ID, name, dept_name, salary * 1.1 WHERE instructor; | 2 | 4 | Apply |
| iii) | List some of the DCL commands | 2 | 4 | Remember |
| iv) | What is the purpose of SQL 'as' clause? | 2 | 4 | Understand |
| v) | What are virtual tables in SQL? | 2 | 4 | Remember |
| vi) | What is the process of defining subclasses of a superclass? | 2 | 2 | Understand |
| vii) | It is given for attributes X, Y of relational schema R as X --> Y ,This means: | 2 | 5 | Understand |
| viii) | What are the conditions for 2NF? | 2 | 5 | Remember |
| Q.2 | Solve any four questions out of six. | 16 | | |
| i) | Explain generalization and specialization with respect to EER model | 4 | 3 | Understand |
| ii) | Explain mapping cardinality with examples. | 4 | 2 | Understand |
| iii) | Explain with example, the DDL commands CREATE, ALTER and DROP. | 4 | 4 | Understand |

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| iv) | <p>Discuss the consistency of the database after execution of the following schedule:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">T1</th> <th style="width: 50%;">T2</th> </tr> </thead> <tbody> <tr><td>Read(A)</td><td></td></tr> <tr><td>A:= A-50</td><td></td></tr> <tr><td></td><td>Read (A)</td></tr> <tr><td></td><td>Temp = A *0.1</td></tr> <tr><td></td><td>A = A-Temp</td></tr> <tr><td></td><td>Write (A)</td></tr> <tr><td></td><td>Read (B)</td></tr> <tr><td>Write (A)</td><td></td></tr> <tr><td>Read (B)</td><td></td></tr> <tr><td>B = B+50</td><td></td></tr> <tr><td>Write (B)</td><td></td></tr> <tr><td>Commit</td><td></td></tr> <tr><td></td><td>B = B+Temp</td></tr> <tr><td></td><td>Write (B)</td></tr> <tr><td></td><td>Commit</td></tr> </tbody> </table> | T1 | T2 | Read(A) | | A:= A-50 | | | Read (A) | | Temp = A *0.1 | | A = A-Temp | | Write (A) | | Read (B) | Write (A) | | Read (B) | | B = B+50 | | Write (B) | | Commit | | | B = B+Temp | | Write (B) | | Commit | 4 | 6 | Understand |
|------------|--|-----------|----|------------|--|-----------|--|--|----------|--|---------------|----------|------------|-----------|-----------|--|----------|-----------|-----------|----------|---|----------|--|-----------|--|--------|--|--|------------|--|-----------|--|--------|---|---|------------|
| T1 | T2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read(A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A:= A-50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Read (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Temp = A *0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | A = A-Temp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Write (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Read (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Write (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B = B+50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Write (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Commit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | B = B+Temp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Write (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Commit | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| v) | Give an example to illustrate the need of normalization. | 4 | 5 | Understand | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| vi) | What is a recoverable schedule? Explain with an example. | 4 | 6 | Understand | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.3 | Answer any two of the three: | 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| i) | <p>a)What do you mean by “Conflict Serializable Schedule”? State whether the following table is conflict serializable with justification.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">T1</th> <th style="width: 50%;">T2</th> </tr> </thead> <tbody> <tr><td>Read (A)</td><td></td></tr> <tr><td>Write (A)</td><td></td></tr> <tr><td></td><td>Read (A)</td></tr> <tr><td></td><td>Write (A)</td></tr> <tr><td>Read (B)</td><td></td></tr> <tr><td>Write (B)</td><td></td></tr> <tr><td></td><td>Read (B)</td></tr> <tr><td></td><td>Write (B)</td></tr> </tbody> </table> | T1 | T2 | Read (A) | | Write (A) | | | Read (A) | | Write (A) | Read (B) | | Write (B) | | | Read (B) | | Write (B) | 8 | 6 | Apply | | | | | | | | | | | | | | |
| T1 | T2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Write (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Read (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Write (A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Read (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Write (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Read (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Write (B) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ii) | What is the meaning of the terms relation, tuple, degree, cardinality, attribute, domain, candidate key and primary key? | 8 | 3 | Understand | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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|------------|--|-----------|---|------------|
| iii) | Describe constraints related to the primary key, foreign key, domains and NULLs | 8 | 4 | Understand |
| Q.4 | Solve any two questions out of three. | 16 | | |
| i) | A table R has attributes A, B, C, D, E and satisfies the following functional dependencies: A → BC B → D CD → E E → A a. What are the candidate keys? Justify a. Is this table in 2NF, 3NF, 4NF or BCNF? Justify | 8 | 5 | Apply |
| ii) | For the following given database, write SQL queries:- Person (driver_id, name, address) Car (license, model, Year) Accident (report_no, date, location) Owns (driver-id, license) Participated (driver_id, car, report_number, damage_amount) (i) Find the total number of people who owned cars that were involved in accident in 2004 (ii) Find the number of accidents in which the cars belonging to "HT" were involved (iii) Update the damage amount for car with license number "Mum2011" in the accident with report number "4R120" to Rs. 4000 | 8 | 4 | Apply |
| iii) | Draw, list the major components of DBMS architecture and describe their functions. | 8 | 1 | Understand |