## University of Mumbai
### Examinations Summer 2022
S.E. (Computer Engineering) (SEM-IV)
(Choice Base Credit Grading System) (R- 19) (C Scheme)
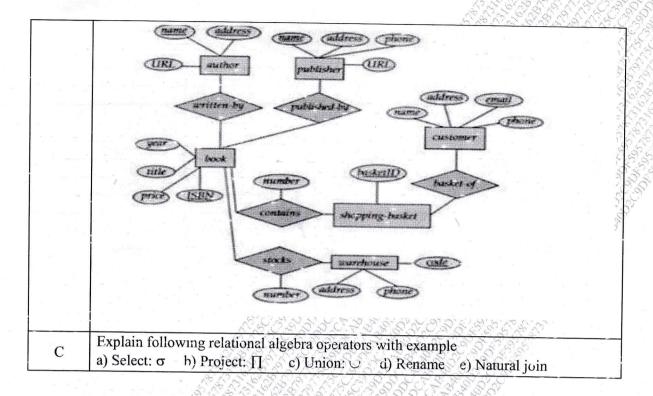Subject: Database Management System

Time: 2 hour 30 minutes        Max. Marks: 80

| Q1. | Choose the correct option for following questions. All the Questions are compulsory and carry equal marks |
|---|---|
| 1. | The capacity to alter the database schema at one level without affecting any other levels is termed as |
| Option A: | Data Independence |
| Option B: | Data Mapping |
| Option C: | Data Isolation |
| Option D: | Data Transformation |
| | |
| 2. | An attribute (say A) of entity set is calculated from other attribute value (say B). The attribute A is called |
| Option A: | Single valued |
| Option B: | Multi valued |
| Option C: | Composite |
| Option D: | Derived |
| | |
| 3. | Consider the following relations: Parts (pid,pname,color) PartCost (pid,cost) What does the following relational algebra expression represent? $\Pi_{pid}((\sigma_{color='red'}(Parts)) \bowtie (\sigma_{cost\geq1000}(PartCost)))$ |
| Option A: | Find the pid of all parts whose color is red. |
| Option B: | Find the pid of all parts whose color is red or cost ≥ 1000. |
| Option C: | Find the pid of all parts whose color is red but not cost ≥ 1000. |
| Option D: | Find the pid of all parts whose color is red and cost ≥ 1000 . |
| | |
| 4. | Let E1 and E2 be two entities in an E-R diagram with one multi-valued attribute in E1, R1 and R2 are two relationships between E1 and E2, where R1 is one-to-many and R2 is many-to-many, R1 and R2 do not have any attributes of their own, What is the minimum number of tables required to represent this situation in the relational model. |
| Option A: | 2 |
| Option B: | 4 |
| Option C: | 3 |
| Option D: | 5 |
| | |
| 5. | Consider the instructor table: INSTRUCTOR (instr_id, name, dept name, salary). insert a new instructor `I-101', named `PMJ', with 50,000 salary for department `COMP'. Identify the appropriate SQL statement. |
| Option A: | INSERT INTO TABLE INSTRUCTOR VALUES (`I-101','PMJ','COMP', 10,00,000) |
| Option B: | INSERT INTO INSTRUCTOR (`I-101','PMJ','COMP', 50,000) |
| Option C: | INSERT INTO INSTRUCTOR VALUES (`I-101', `PMJ', `COMP'. 50,000) |

| | |
|---|---|
| Option D: | INSERT INTO TABLE INSTRUCTOR table instr_id, name, dept name, salary) VALUES ('I-101', 'PMJ', 'COMP', 50,000) |
| | |
| 6. | Let R= (A, B, C, D, E, F) be a relation with the following dependencies. B->CE ,C->F, EC->D, A->B. Which of the following is a candidate key for R |
| Option A: | C |
| Option B: | E |
| Option C: | A |
| Option D: | B |
| | |
| 7. | Identify the incorrect statement. |
| Option A: | 3NF doesn't have transitive dependencies |
| Option B: | Composite attributes are not allowed in 1NF |
| Option C: | In 2NF, there should not be any Full functional dependencies |
| Option D: | In BCNF, trivial FD are allowed |
| | |
| 8. | If T1,T2 are two transactions and I1 , I2 are two instructions of T1 and T2 respectively then I1 and I2 are conflicting instructions if |
| Option A: | They operate on the different data item |
| Option B: | They belong to different transactions |
| Option C: | At Least one of them is a write operation |
| Option D: | At Least one of them is a read operation |
| | |
| 9. | Choose the correct option |
| Option A: | Every Conflict serializable schedule is also View serializable |
| Option B: | Every View serializable schedule is also conflict serializable |
| Option C: | Both a and b |
| Option D: | Every serial schedule has same conflict and view equivalent schedule |
| | |
| 10. | When a transaction is aborted due to ant kind of failure,which instruction should be executed to keep database in consistent state |
| Option A: | Commit |
| Option B: | Rollback |
| Option C: | Savepoint |
| Option D: | Checkpoint |
| | |

| Q2 | Solve any Two Questions out of Three 10 marks each |
|---|---|
| A | Short note on Data Independence. Define DBA Discuss roll and responsibilities of DBA. |
| B | Convert following E-R diagram to relational schema and equivalent schema diagram |

| | |
|---|---|
| C | Explain following relational algebra operators with example<br>a) Select: σ    b) Project: ∏    c) Union: ∪    d) Rename    e) Natural join |

| | |
|---|---|
| **Q3** | **Solve any Two Questions out of Three 10 marks each** |
| A | Book (book_id, title, author, cost)<br>Store (store_no, city, state, inventory_val)<br>Stock (store_no, book_id, quantity)<br><br>Consider above relational schema and formulate SQL queries for the following:<br><br>(i) Modify the cost of DBMS books by 10%<br>(ii) Find the author of the books which are available in Mumbai store<br>(iii) Find the title of the most expensive book<br>(iv) Find the total quantity of books in each store<br>(v) Add a new record in Book<br>(Assume values as per requirement) |
| B | Why there is need of normalization? Explain 1NF, 2NF, 3NF and BCNF with examples. |
| C | Design an EER schema for a **BANK** database.<br><br>Each bank can have multiple branches, and each branch can have multiple accounts and loans. Bank keeps the track of different types of Accounts (Saving_aacount, Checking_account), Loans (Car_loans, Home_loans,…) , each account's Transaction (deposit, withdrawal, check,..) and each loan's Payments; both of these include the amount, date and time.<br><br>State any assumptions you make about the additional requirement clearly. |

| | |
|---|---|
| **Q4** | **Solve any Two Questions out of Three 10 marks each** |
| A | What is Deadlock and explain deadlock handling in DBMS with Example. |

| | | A schedule has transactions T1, T2, T3 has given below: | | |
|---|---|---|---|---|
| | | T1 | T2 | T3 |
| | | READ(X) | | |
| | | | READ(Z) | |
| | | READ(Z) | | |
| | | | | READ(X) |
| | | | | READ(Y) |
| B | | WRITE(X) | | |
| | | | | WRITE(Y) |
| | | | READ(Y) | |
| | | | WRITE(Z) | |
| | | | WRITE(Y) | |

a) What is conflict and view serializability?

b) Draw a Precedence graph?

c) Is schedule conflict serializable or not?

d) Find equivalent serial schedule?

| C | Describe ACID properties with examples and draw state transition diagram of transaction. |
|---|---|