SP - 133

Total No. of Pages : 4

Seat No.	

T.Y. B.Tech. (Computer Science and Engineering)
(Semester - VI) (CBCS) Examination, November - 2023
DATA BASE ENGINEERING
Sub. Code : 81548

8763

Day and Date : Wednesday, 22 - 11 - 2023 **Total Marks : 70**

Time : 2.30 p.m. to 5.00 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Assume suitable data wherever necessary.**
3) **Figures to the right indicates full marks.**

Q1) Solve MCQs. (2 Marks Each)

a) The result which operation contains all pairs of tuples from the two relations, regardless of whether their attribute values match.

i) Join ii) Cartesian product

iii) Intersection iv) Set difference

b) _____ property of decomposition is mostly preserved while a relation is decomposed to BCNF, while the _____ property may not always be preserved.

i) Dependency Preservation, Lossy decomposition

ii) Lossy decomposition, Dependency Preservation

iii) Dependency Preservation, Lossless decomposition

iv) Lossless decomposition, Dependency Preservation,

c) Which one of the following statements about normal forms is FALSE?

i) BCNF is stricter than 3 NF

ii) Lossless, dependency -preserving decomposition into 3 NF is always possible

iii) Loss less, dependency— preserving decomposition into BCNF is always possible

iv) Any relation with two attributes is BCNF

d) Select emp_name from department where dept_name like' _____ Science'; Which one of the following has to be added into the blank to select the dept_name which has Science as its ending string?

i) % ii) -

iii) & iv) !

e) In ordered indices the file containing the records is sequentially ordered, a _____ is an index whose search key also defines the sequential order of the file

i) Clustered index ii) Structured index

iii) Unstructured index iv) Nonclustered index

f) In multiple granularity of locks SIX lock is compatible with

i) IX ii) IS

iii) S iv) SIX

g) Consider a scenario in log where we have <start t2>, <start t1> and <commit t2> log records. What would be recovery procedure if immediate database modification scheme is used for updating the database.

i) redo tl,undo t2 ii) redo t1, redo t2

iii) undo t1, redo t2 iv) undo tl, undo t2

Q2) Solve any 2 of the following (7 Marks Each)

a) List different types of users in Database environment. Explain the role played by each of the listed users.

b) Consider the relation R with attributes:

R(A, B, C, D, E, F, G, H)

The set of FD's for given relation is:

F => {

A -> D

F -> H

A, B -> C, E, F, G, H

B, F -> H

B, C, H -> A, D, F, G, E

}

Given the relation is in 1NF, normalize the schema till BCNF.

c) How are the following integrity constraints implemented in SQL:

i) Domain constraint

ii) Referential integrity.

Explain the above with appropriate syntax and example.

Q3) Solve any 2 of the following (7 Marks Each)

a) List the basic operators of Relational Algebra. Explain any 3 operators with respective syntax and example.

b) List and explain the Extended Features of ER model

c) The following relations keep track of Library Management system.

Book_info(bookid, bname, bauthor, price, edition, publication, pur_date,)

Student(lib_car_num, stud_name, class, branch, roll_no)

lssue_table(issue_date, sub_date, bookid, lib_car_num, due)

Write the following SQL queries:

i) Find the details of the books issued to the library card number 1. **[2]**

ii) Give all the information about student and the book issued with ascending order of library card number. **[2]**

iii) Find the author, edition, price of book. **[1]**

iv) Find the names of the students with dues on the book issue. **[2]**

Q4) Solve any 2 of the following (7 Marks Each)

a) Construct a B+ tree with n=3 for given set of key values

52, 40, 55, 12, 34, 56, 55, 90, 87, 50, 70

b) List and explain the variants of Two Phase Lock Protocol

c) Compare Deferred Database Modification and Immediate Database Modification

Q5) Solve any 2 of the following (7 Marks Each)

a) List and explain the Index Evaluation Metrics

b) Consider the Partial Schedule as given below with transaction having timestamps 1,2,3,4 respectively.

T1	T2	T3	T4
		Read (A)	
	Read (B)		
		Write (A)	
Write (A)			
	Write (B)		
			Read (A)
		Read(B)	
		Write (B)	
			Read (B)

Predict the state of transactions after every operation, by applying the timestamp-based protocol.

c) Explain the purpose of Checkpoint mechanism. Explain the steps for performing a checkpoint

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