

School of Computer Science and Engineering

Winter Semester 2023-24

Continuous Assessment Test - II

SLOT: B2 + TB2

Programme Name & Branch: B.Tech

Course Name & Code: BCSE3021 & Database Systems

Class Number (s): VI2023240304212

Faculty Name (s): Prof. Ramanathan L.

Exam Duration: 90 Min.

Maximum Marks: 50

Q. No.	Question	Max Marks
1.	Consider the following relational schema representing a library database: <ol style="list-style-type: none"> Book (ISBN, Title, Author, Genre) Borrower (Card_ID, Name, Email) Borrowing (Card_ID, ISBN, Borrow_Date, Return_Date) Using relational algebra, perform the following tasks: <ol style="list-style-type: none"> Retrieve the titles of all books authored by "J.K. Rowling". [3 Marks] Find the names and email addresses of all borrowers who have borrowed a book on or after January 1, 2023. [4 marks] List the titles of books that have been borrowed but not yet returned. [3 Marks] 	3 4 3
2.	Check whether the given schedule S is conflict serializable or not. If yes, then determine all the possible serialized schedules.	10

	T1	T2	T3	T4	
	WRITE B	READ A WRITE A WRITE B	READ A READ B	READ A	
3.	Suppose that we are using extendable hashing on a file that contains records with the following search key values 2,3,5,7,11,17,19,23,29,31. Show the extendable hash structure for this file, if the hash function is $h(x) = x \text{ mod } B$ and buckets can hold 3 records.				10
4.	Construct a B+-tree for the following set of key values: (2, 3, 5, 7, 11, 17, 19, 23, 29, 31) Assume that the tree is initially empty and values are added in ascending order. Assuming B value to be 4. (max leaf nodes = 4, max keys = 3)				10
5.	Employee (EName, EID, DOB, EAddr, Sex, ESalary, EDeptNo) Department (DeptNo, DeptName, DeptMgrID, Mgr_S_date) DeptLoc (DeptNo, Dept_Loc) Project (ProjName, ProjNo, ProjLoc, ProjDeptNo) WorksOn (E-ID, P-No, Hours) Dependent (E-ID, DependName, Sex, DDOB, Relation)				10
	Now let us consider the query in the above database to find the name of employees born after 1970 who work on a project named "Growth".				
	Show the query execution plan for the above query by using heuristic optimization techniques.				