

(Pages : 4)

K – 4289

Reg. No. :

Name :

Fourth Semester B.Tech. Degree Examination, September 2020

**13.405 : DATABASE DESIGN (FR)
(2013 Scheme)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. Each carries **4** marks.

1. Discuss the Data Independence in layered architecture of DBMS.
2. What are basic set operations available in SQL. Write examples.
3. Define Functional dependency. How equivalence of two Functional dependency set can be determined?
4. Differentiate between Primary Index, Secondary Index and Clustered Index.
5. What is the need for Query optimization and how relational algebra can help on Query optimization?

PART – B

Answer **any one full** questions from **each** Module. Each question carries **20** marks.

Module – I

6. (a) Amal has a large Book collection. His friends like to borrow his Books, and he needs a way to keep track of who has what. He maintains a list of friends, identified by unique FID's (Friend Identifiers) and a list of Book's, identified by BID's (Book identifiers). With each friend, he has the name, address and the all-important telephone numbers which he can call to get the Book back. With each Book, he has author name and title. Whenever a friend borrows a Book, Amal will enter that fact into his database along with the date borrowed. Whenever the Book gets returned, that fact, too, gets noted along with the date returned. Draw an ER Diagram for this database requirement and mark all constraints. 10

P.T.O.



- (b) Design and explain a sample scenario of Database requirements to have
- (i) Unary relationship
 - (ii) Attributes to relationship. 10

OR

7. (a) List different types of attributes and their representation in ER Diagram. 5
- (b) Explain any two specific features of Extended ER Diagram. 8
- (c) Distinguish between the following, with suitable example. 7
- (i) Super Key, Candidate Key and Primary Key.
 - (ii) Weak Entity and Strong Entity.
 - (iii) Entity Type and Entity Set.

Module – II

8. (a) Consider the following relations to the registration of students and their examination result.

Student (Student ID: String, SName: String, Address: String)

Subject (Sid: String, Name : String, Department: String)

Result (Student ID:String, Cid:String, Marks: Integer)

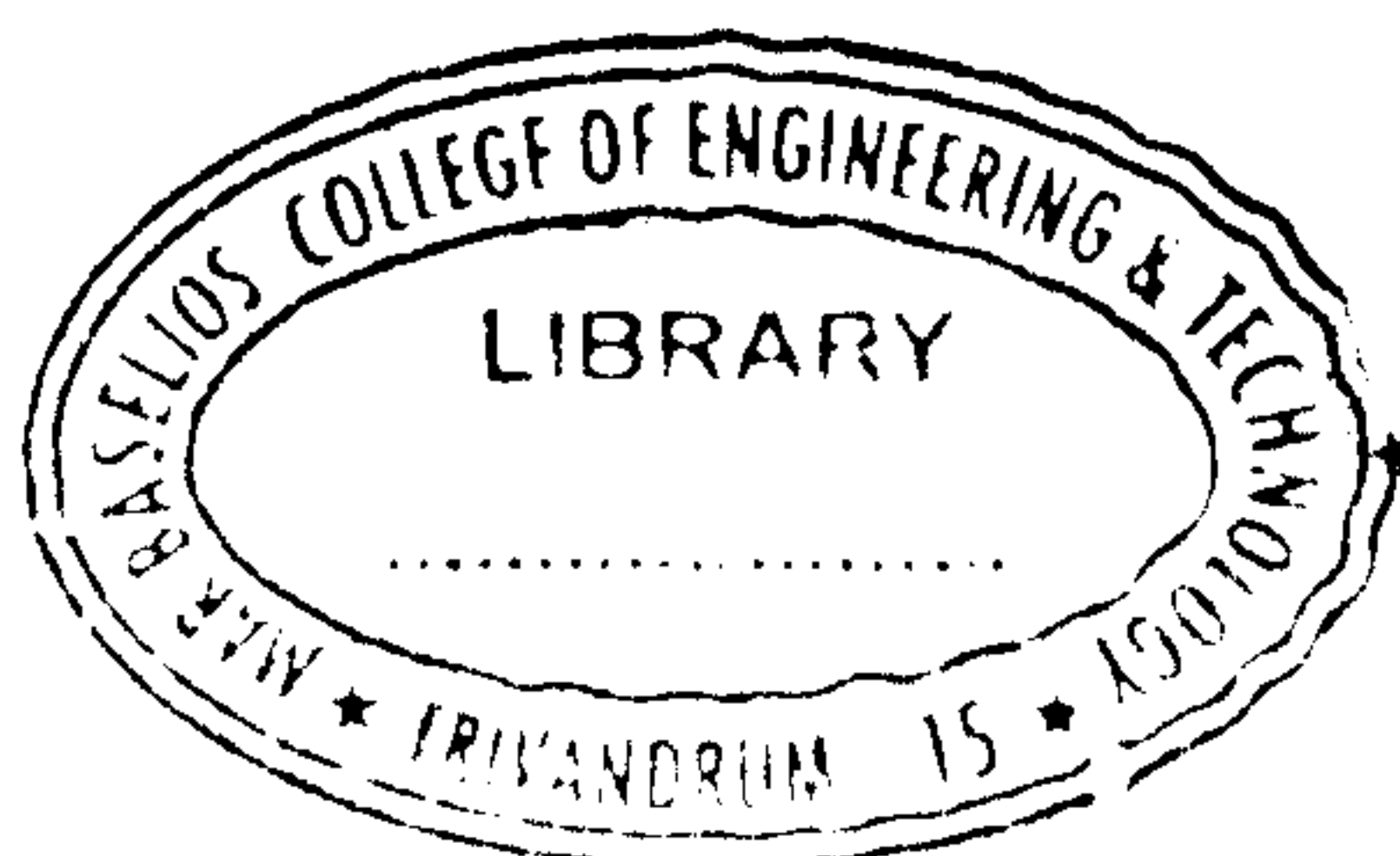
If Result relation has an entry for each subject registration and references Student and Subject relations, write the SQL for the following queries.

- (i) Find the names of students, who had taken subject from 'CSE' department.
 - (ii) Find the names of students who had taken subject from both 'CSE and 'ECE' departments.
 - (iii) Find the names of students who had taken subject named 'DBMS'.
 - (iv) Find the number of distinct students, who had taken atleast one subject.
 - (v) Find the total marks received by the student 'ABCS, from all subjects taken.
 - (vi) List each subject and average marks scored, sorted in the alphabetical order of subject names. 12
- (b) Explain any six relational algebra operators with example. 8

OR

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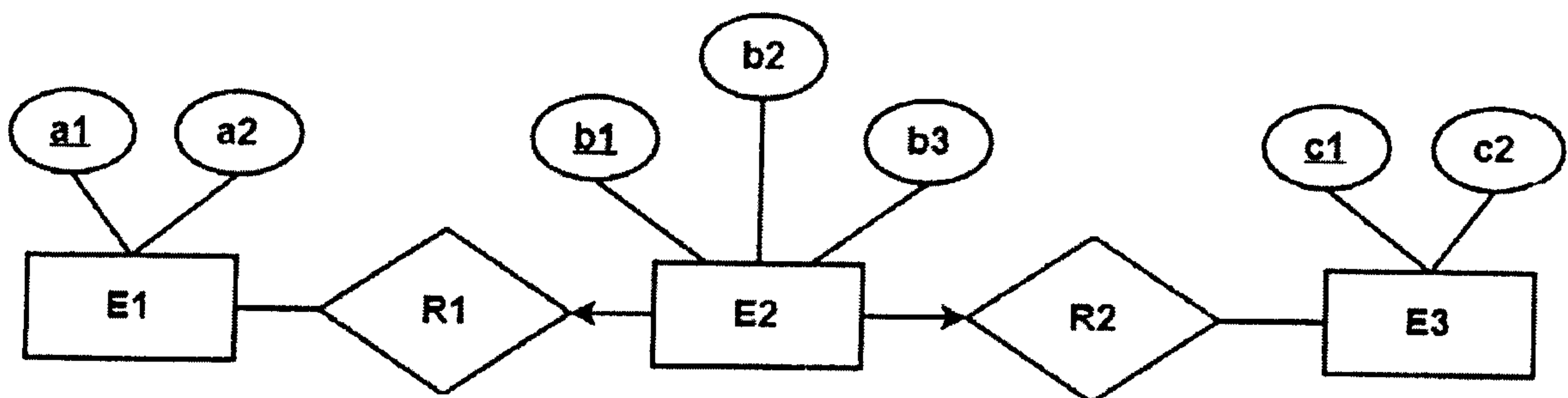
9. (a) What are different DDL statements ? Explain SQL statement with example. 10
- (b) What are Views in SQL? Compare Views with Tables. 6
- (c) What are Triggers in SQL? 4

Module – III

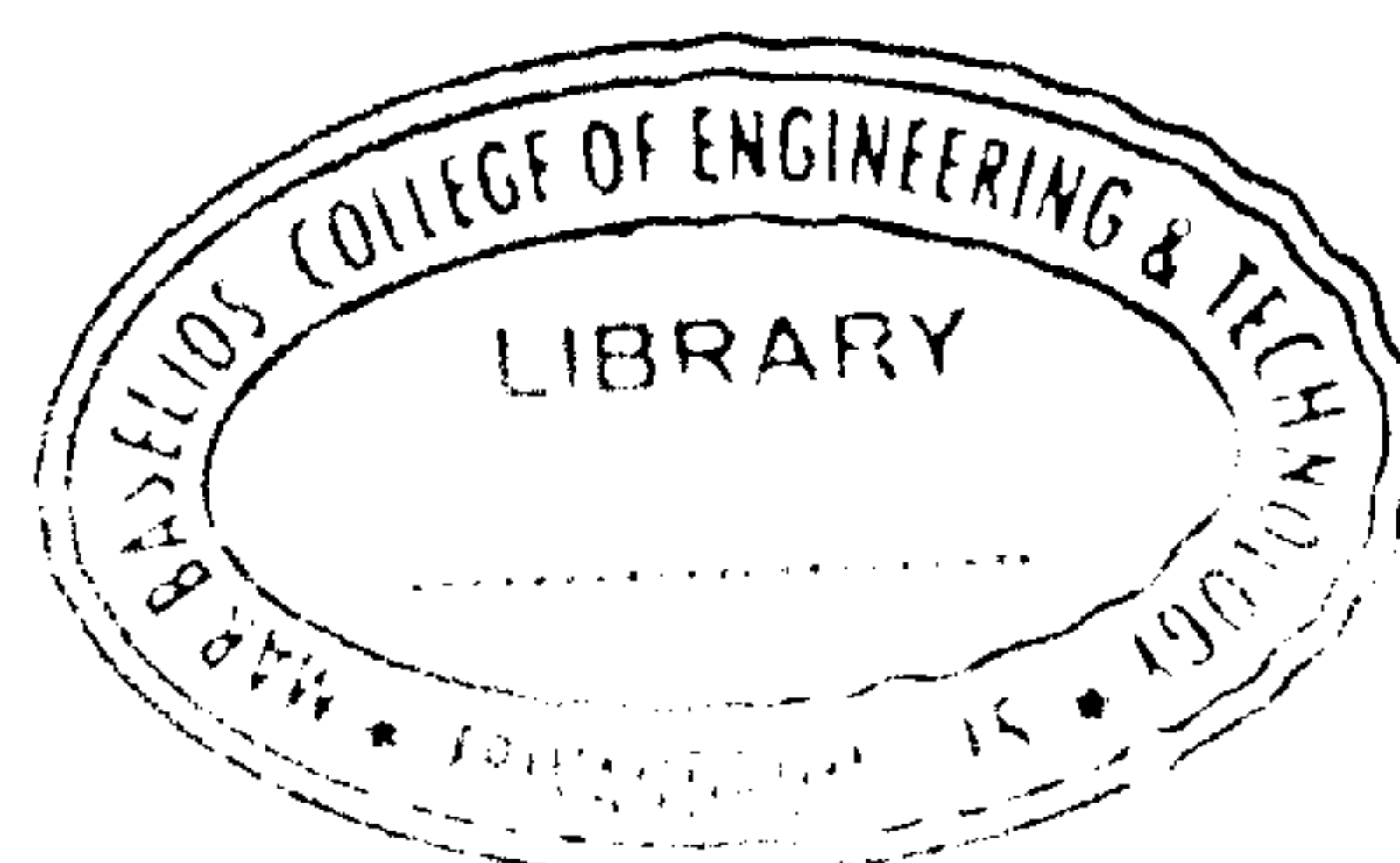
10. (a) For the relations schemas given below, identify keys and highest normal forms
- (i) $R(A,B,C,D,E)$ with set of functional dependencies.
 $G = \{A \rightarrow D, B \rightarrow A, BC \rightarrow D, AC \rightarrow BE\}$
- (ii) $R(A,B,C,D,E,F)$ with set of functional dependencies,
 $F = \{A \rightarrow B, BC \rightarrow D, C \rightarrow E, B \rightarrow A\}$ 10
- (b) Explain how equivalency of two given Functional Dependency sets are to be checked and Find the equivalency of Functional Dependency sets $F = \{X \rightarrow Y, Y \rightarrow Z, X \rightarrow Z\}$ and $G = \{X \rightarrow Y, Y \rightarrow Z, X \rightarrow W\}$. 10

OR

11. (a) Consider the ER diagram.



- (i) Identify the set of relations required to map this ER model to a relational model. 5
- (ii) Identify all Primary keys and Foreign Keys. Draw a schema diagram showing all relations. 5



- (b) Define lossless and dependency preserving decomposition of relations. Check whether the relation $R(A,B,C,D)$ with set of Functional Dependency, $F = \{AB \rightarrow CD\}$ decomposing into $R_1(A,B,C)$ and $R_2(A,D)$ is lossless and dependency preserving or not? 10

Module-IV

12. (a) What are the basic properties required for a Database Transaction? Explain with the help of simple transaction. 8
- (b) Explain conflict serializable schedules. 4
- (c) Describe the structure of B Tree nodes. How does B+ tree differ from B Tree? 8

OR

13. (a) Explain 2PC locking protocol. Whether it guarantee serializability and deadlock free? 10
- (b) Explain recoverability in Database Transactions. Differentiate between recovery with immediate update and recovery with deferred update. 10
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