

**M.Sc. II Semester Degree Examination, Sept./Oct. - 2024****COMPUTER SCIENCE****Database Management Systems****(NEP)**

Time : 3 Hours

Maximum Marks : 70

Note : Answer **any five** of the following questions with Question **No.1 is Compulsory**, each question carries **equal** marks.

1. (a) Describe the three-level architecture of a database system. What are the main components at each level, and how do they interact to manage data effectively ? **7**
- (b) Identify and explain the key components of a Database Management System (DBMS). **7**
2. (a) Describe different file organization techniques used in databases. Discuss the pros and cons of each method. **7**
- (b) Explain the concept of hash functions, and discuss how they contribute to efficient data retrieval and collision handling. **7**
3. (a) Explain the relational model in the context of databases. Discuss the key characteristics and components of a relational database. **7**
- (b) What are Relational Operators in context of DBMS, and why are they important ? **7**
4. (a) Define the concept of schedules in the context of database transactions. Explain the different types of schedules. **7**
- (b) Explain the concept of transaction processing in database systems. Discuss the desirable properties of transactions, commonly referred to as ACID properties. **7**
5. (a) Compare and contrast the deferred update and immediate update techniques for database recovery. **7**
- (b) Discuss the challenges involved in protecting sensitive information in statistical databases and the techniques used to prevent inference attacks. **7**



6. (a) Explain the concept of multi-level indexes and indexes on multiple keys. **7**
(b) Describe how a table in the 2NF differs from a table in 1NF. **7**
7. (a) Define Multi-Version Concurrency Control (MVCC) and explain its advantages in managing concurrent transactions. **7**
(b) Discuss the importance of database security and authorization mechanisms. **7**
8. Write short notes on the following : **5+5+4**
- (a) Secondary Storage Devices
 - (b) Higher order Normal forms
 - (c) Granularity of Data items

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