

N.B. : (1) Question No. 1 is compulsory. (2) Attempt any four questions out of remaining six. (3) Make suitable assumptions if needed.

- 1. (a) How many Codd's Rules Must a DBMS satisfy to qualify for RDBMS ? 5 (b) What is shadow Paging ? 5 (c) What are the desirable properties of decomposition. 5 (d) List four significant differences between file processing system and Database Management System. 5
2. (a) Discuss different security and authorization mechanism in Database Management System. 10 (b) What is deadlock ? What are the conditions necessary for deadlock ? Discuss various strategies used for handling dead locks. 10
3. (a) What are triggers ? Give an example. Illustrate the cases when triggers must not be used. 10 (b) Explain the following Relational Algebraic operations with examples :- 10 (i) Generalized Projection (ii) Set Intersection (iii) Aggregate (iv) Natural Join (v) Assignment.
4. (a) When it is preferable to use dense index rather than sparse index ? Explain your answer. Also explain hash indices. 12 (b) Explain validation based protocol. 8
5. (a) What do you mean by Authorization and Authentications in DBMS ? Explain how it is implemented in SQL with suitable example. 10 (b) What do you understand by concurrence control ? Explain view serializability and conflict serializability ? 10
6. (a) What is the importance of normalization in database design ? Explain 1NF, 2NF, 3NF, BCNF and 4NF giving examples. 10 (b) Answer the following questions :- (i) Explain the term super key, primary key, candidate key giving suitable example. 3 (ii) What are the different database users ? 3 (iii) What is attribute ? What are the different types of attribute ? How they are represented in E-R diagram ? 4
7. Write short notes on (any four) :- 20 (a) Data dictionary storages (b) Time stamp ordering protocol (c) Assertion (d) B+ Tree (e) Database Administrator.