Course Code	**:**	**MCS-023**
Course Title	**:**	**Introduction to Database Management Systems**
Assignment Number	**:**	**BCA(III)/023/Assignment/2024-25**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Date of Submission	**:**	**31st October,2024(For July Session)** **30th April,2025(For January Session)**

This assignment has eight questions. Answer all questions of total 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words.

Q1. **(2 Marks)**

a) What is SQL? Explain its important features.

b) Consider the following schemas:

BOOK (Book_ID, Title, Publisher_ID, Year_of Pub, Price)

AUTHOR (Author_ID, Book_ID, Author Name)

PUBLISHER (Publisher_ID, Book_ID, Address, Name_of Pub, No._of Copies)

Write a query in SQL for the following:

(i) Find the name of authors whose books are published by "ABC Press".

(ii) Find the name of the author and price of the book, whose Book_ID is '100'.

(iii) Find the title of the books which are published by Publisher_ID '20' and are published in year 2011.

(iv) Find the address of the publisher who has published Book_ID "500".

Make suitable assumptions, if any. **(8 Marks)**

Q2.

a) With the help of a suitable example, discuss the insertion, deletion and updation anomalies that can occur in a database. Briefly discuss the mechanism to remove such anomalies. **(6 Marks)**

b) Write SQL commands for each of the following. Also illustrate the usage of each command through suitable example. **(4 Marks)**

(i) Creation of views

(ii) Creation of sequences

(iii) Outer join

(iv) To give access permission to any user

Q3.

a) What are integrity constraints? Discuss the various types of integrity constraints that can be imposed on database. **(3 Marks)**

b) How are database security and database integrity related? Briefly discuss the different levels of security measures which may be considered to protect the database. **(3 Marks)**

c) Consider the relation R (A, B, C, D, E) and the set of functional dependencies :-

F(A $\rightarrow$ D, {A,B} $\rightarrow$ C, D $\rightarrow$ E)

Assume that the decomposition of R into {R1 (A, B, C) and R2 (A, D, E)}.

Is this decomposition lossless? Justify? **(4 Marks)**

Q4.

a) Explain the Log-based recovery scheme with the help of an example. **(5 Marks)**

b) Compute the closure of the following set F of functional dependencies for relation schema R = (A, B, C, D, E).

$A \rightarrow BC$
$CD \rightarrow E$
$B \rightarrow D$
$E \rightarrow A$

List the candidate keys for R. **(5 Marks)**

Q5.

a) Give the limitations of file based system. How can they be overcome using DBMS? **(5 Marks)**

b) Discuss the importance of file organisation in databases. Mention the different types of file organisations available. Discuss any one of the mentioned file organisations in detail. **(5 Marks)**

Q6.

a) For what reasons is 2-phase locking protocol required? Explain. Discuss the disadvantages of basic 2-phase locking protocol. List the ways and means that can be used to overcome the disadvantages. **(5 Marks)**

b) List and explain the 4 basic properties of a Transaction with the help of appropriate examples. **(5 Marks)**

Q7.

a) What do you mean by fragmentation of a database? What is the need of fragmentation in DDBMS environment? Explain different types of fragmentation with an example of each. **(5 Marks)**

b) Explain the need of Distributed DBMS over Centralized DBMS. Also give the structure of Distributed DBMS. **(5 Marks)**

Q8. An organization needs to provide Medical facilities to its employees and their dependents. Organization is having a list of Doctors, Hospitals and Test centres for the employees facility. An employee may get Medical facility from the list of Doctors, Hospitals and Test centres provided by the organization to them. Employee does not need to pay anything for the facilities availed. The Doctors, Hospitals and Test centres directly raise their bill to the organization.

Identify the entities, relationships, constraints and cardinality and construct an ER diagram for the above mentioned specifications. List your assumptions and clearly indicate the cardinality mappings as well as any role indicators in your ER diagram. **(10 Marks)**