

MCA (Revised)
Term-End Examination
December, 2022

**MCS-043 : ADVANCED DATABASE MANAGEMENT
SYSTEMS**

Time : 3 hours

Maximum Marks : 100

Note : *Question number 1 is **compulsory**. Attempt any **three** questions from the rest.*

1. (a) Explain data mining/knowledge discovery process in detail. 5
- (b) Elaborate the reference architecture of Distributed Database Management System. 5
- (c) What is deadlock detection and deadlock recovery ? Explain with an example. 5
- (d) Define multidimensional data model. Differentiate between star and snowflake schema. 5
- (e) How does time-stamp ordering protocol work ? Explain with an example. 5
- (f) Explain the use of checkpoints in log-based recovery technique. 5

- (g) Explain how hashing technique and B-tree are used in index structure in the context of PostgreSQL. 5
- (h) Draw a query tree for the following query : 5
 Select A.x, B.y from A, B where
 A.p = B.q AND A.s > 300;
2. (a) Explain the concept of multi-valued dependency, with the help of an example. How is this different from functional dependency ? 6
- (b) With the help of an example, explain the process of creating an Assertion (Constraint). 4
- (c) Explain the following, with the help of an example of each : 10
- (i) K-means Clustering
- (ii) Join Dependency
3. (a) List the ACID properties. Explain the usefulness of each, with an example. 5
- (b) Consider the universal relation R(A, B, C, D, E, F, G, H, I, J) and a set of functional dependencies $FD = \{AB \rightarrow C, A \rightarrow DE, B \rightarrow F, F \rightarrow GH, D \rightarrow IJ\}$. What is the key of R ? Decompose R into 2NF, then 3NF relations. 10
- (c) Discuss the following : 5
- (i) ETL
- (ii) Materialized Views

4. (a) List and explain four salient differences between OLAP and OLTP systems. 5
- (b) Describe how concurrency control is achieved with two-phase locking. 5
- (c) Let D be a database that contains the following four transactions :

TID	Items
T1	{K, A, B, D}
T2	{D, A, C, E, B}
T3	{C, A, B, E}
T4	{B, A, D}

Minimum support count = 60%

- (i) Find frequent item sets using Apriori algorithm. 5
- (d) List the advantages and disadvantages of using Data Dictionary. 5
5. Explain any **four** of the following, with the help of an example/a diagram, if needed : $4 \times 5 = 20$
- (a) Deductive Databases
- (b) Open Database Connectivity (ODBC)
- (c) Backup and Recovery in Oracle DBMS
- (d) Multimedia Databases
- (e) Digital Libraries