Total No. of printed pages = 3

MCA 202104

Roll No. of candidate | | | | | | | | | | |

2373722 **2022**

M.C.A 1st Semester End-Term Examination

ADVANCED DATABASE SYSTEMS

(New Regulation (w.e.f. 2020-21)) &

(New Syllabus w.e.f. 2020-21))

Full Marks – 70 Time – Three hours

The figures in the margin indicate full marks for the questions.

All questions are compulsory unless otherwise specified.

1. Choose the correct answers. (10 × 1 = 10)

(i) Which of the following is known as a set of entities of the same type that share same properties, or attributes?

(a) Relation set (b) Tuples

(c) Entity set (d) Entity Relation model

(ii) ———— is a set of one or more attributes taken collectively to uniquely identify a record.

(a) Super key (b) Primary Key

(c) Foreign key (d) Candidate key

(iii) Which of the following represents a query in the tuple relational calculus?

(a) {}{P(t) |t} (b) {t |P(t)}

(c) t | P( ) |t (d) All of the mentioned

(iv) The term stating either all operations of the transaction to be displayed at the database, or none at all is known to be

(a) Atomicity (b) Inconsistency

(c) Isolation (d) Durability

(v) Isolation of the transactions is ensured by

(a) Transaction management (b) Application programmer

(c) Recovery management (d) Concurrency control

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(vi) ———— combines the data manipulating power of SQL with the data processing power of Procedural languages.

(a) PL/SQL (b) SQL

(c) Advanced SQL (d) PQ

(vii) Query processing refers to technique of maintaining managing and manipulating data stored within the computer system by using ———— queries.

(a) DBMS (b) RDBMS

(c) SQL (d) None of these

(viii) Which are types of recovery control techniques:

(a) Deferred update (b) Immediate update

(c) Both A and B (d) None

(ix) Choosing for large and non-indexed tablets, specifically for intermediate results can be termed as ————

(a) Parallelism (b) Disk

(c) Deadlock (d) Hashing

(x) In a distributed Database reduction of redundancy is obtained by ————

(a) Data fragmentation (b) Data Sharing

(c) Data Replication (d) None of the above

2. Answer the following. (5 ×2=10)

(a) What is a key? Explain Candidate Key, Alternate Key and Foreign Key. (2)

(b) What are ACID properties of a transaction? (2)

(c) What is Strong entity set and weak entity set? Give examples. (2)

(d) What are the different types of failures in DBMS? (2)

(e) Define BCNF and give example. (2)

3. Answer any *four* from the following. (4×5=20)

(a) Describe cardinality ratios and participation constraints for relationship types with examples. (5)

(b) Describe entity integrity and referential integrity. Give an example of each. (5)

(c) What do you mean by deferred and immediate database modification? (5)

(d) Why is database architecture layered? Explain data independence. (1+4=5)

(e) How do you create a trigger? Explain types of trigger. (5)

(f) Explain the concept of QBE. (5)

(g) Discuss the various components of distributed DBMS. (5)

4. Answer any *three* (3×10=30)

(a) Describe data fragmentation, replication and allocation in distributed databases. (10)

(b) What are the various concurrency control techniques? Compare Lock based Concurrency Control strategies in detail. (10)

(c) In an organization several projects are undertaken. Each project can employ one or more employees. Each employee can work on one or more projects. Each project is undertaken on the required of client. A client can request for several projects. Each project has only one client. A project can use a number of items and a item may be used by several projects. Draw an E-R diagram and convert it to a relational schema. (10)

(d) What are the Commit Protocols in Distributed DBMS? Explain distributed two-phase commit protocol. (3+7=10)

(e) What is I/O Parallelism? Discuss briefly the various partitioning techniques. (2+8=10)

(f) What is a serializable schedule? Discuss the methods of testing for serializability. (2+8=10)

(g) Consider the following relations for a database that keeps track of business trips of salespersons in a sales office: (4+6=10)

SALESPERSON (SSN, Name, start_year Dept_no)

TRIP (SSN, From_city, To_city, Departure_Date, Return_Date, Trip_ID)

EXPENSE(TripID, Account#, Amount)

(i) Draw the E-R diagram.

(ii) Specify the following queries in relational algebra.

(1) Give the details (all attributes of TRIP) for trips that exceeded Rs.20000 in expenses.

(2) Print the SSN of salesman who took trips to 'Delhi'.

(3) Print the trip expenses incurred by the salesman with SSN= '234-56-7890'. Note that the salesman may have gone on more than one trip. List them individually.