Total No. of printed pages = 3

MCA 182303

Roll No. of candidate

7/2/ **2021**

M.C.A. 3rd Semester End-Term Examination

DATABASE MANAGEMENT SYSTEMS

(New Regulation (w.e.f. 2017 –2018) & New Syllabus (w.e.f 2018-2019)

Full Marks – 70 Time – Three hours

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

Answer question No. 1 and any *four* from the rest.

1. Choose the correct answer : (10 × 1 = 10)

   (i) ER model is an example of
      (a) Conceptual data model
      (b) Physical data model
      (c) Representational data model
      (d) All the above

   (ii) Find the incorrect statement
      (a) BCNF must not have transitivity
      (b) BCNF contains determinants which are not candidate key
      (c) There may be more than one prime attribute in BCNF
      (d) BCNF must be in 3NF

   (iii) Result of a Cartesian product
      (a) Is a condition less join of two relations
      (b) Contains only the matched rows
      (c) Contains only few columns of both the relations
      (d) None of the above

   (iv) Metadata contains the description of the
      (a) Tables (b) Indexes
      (c) Constraints (d) All the above

[Turn over

(v) If in a relation $R(A,B,C)$ having functional dependency $A \rightarrow B$, $B \rightarrow C$

(a) Has partial dependency (b) Has transitivity

(c) Values are not atomic (d) All the above

(vi) If $C \rightarrow AB$, $D \rightarrow C$ then

(a) D is a candidate key (b) AB is a candidate key

(c) C is candidate key (d) None of the above

(vii) Match Column A and B

Column A		Column A
(I) SQL	(1)	Procedural Language
(II) Relational Algebra	(2)	Object oriented methods
(III) ODMG C++	(3)	Non procedural language

(a) (I)–1, (II)-2, (III)-3 (b) (I)-2, (II)-1, (III)-3

(c) (I)-3, (II)-1,(III)-2 (d) None of (I) (II) (III)

(viii) Which one is the most efficient searching technique

(a) Binary search (b) Sequential search

(c) Hashing (d) None of the above

(ix) A relation is in 3NF if

(a) There is no partial dependency

(b) There is multi-valued dependency

(c) There is no transitivity

(d) All the above

(x) Primary indexes are done on

(a) Primary key attribute

(b) Foreign key attribute

(c) Both the above

(d) None of the above

2. (a) What is derived attribute? Give an example. (3)

(b) Write the difference between primary and secondary index? (3)

(c) What do you mean by spanned and unspanned organization of records on disk blocks? (3)

(d) What is a schedule? Give an example. (3)

(e) What do you mean by physical data Independence? (3)

3. A GARAGE repairs and maintains different types of cars of the customers. The record the customers of the cars are maintained. A customer may have several cars. The maintenance record together with the cost are kept in a file together with date of entry and date of delivery. The Technicians names are also included who are repairing the car.

(a) Finding the entity and attributes draw an ER diagram for the system (8)

(b) Convert the diagram in relational schema. (7)

4. Given the relations

EMP (empno, ename, job, hiredate, mgr,sal,comm.,hiredate,deptno)

DEPT(deptno,dname.loc).

Write SQL statements for

(a) Finding the employee who sal is more than 10000 and works as "SALESMAN". (3)

(b) Find sum salary paid to each department. (3)

(c) Find employee who are working is 'SALES' Department. (3)

Write relational algebra expression for :

(d) Find employee no. and name whose hiredate is greater than 10-DEC-2001. (3)

(e) Find ename, deptno, dname. (3)

5. (a) State and prove Armstrong's inference rule (6)

(b) Given below are two sets of FD'S for a relation R(ABCDE), are they equivalent? Explain

(i) $\{A \rightarrow B,\ AB \rightarrow C,\ D \rightarrow AC,\ D \rightarrow E\}$

(ii) $\{A \rightarrow BC,\ D \rightarrow AE\}$. (5)

(c) Define partial dependency with an example. (4)

6. (a) Explain serializable schedule ? How the serializability of a schedule can be checked using precedence graph? Discuss. (8)

(b) What do you mean by binary lock and read/write locks? Explain with examples. (7)

7. Write short notes on (any three) $(3 \times 5 = 15)$

(a) Deadlock In transaction processing

(b) Specialisation and generalisation

(c) Aggregate functions in SQL

(d) Tmestamp based protocols.
