Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering / Science

End Sem (Odd) Examination Dec-2022

CA3CO09 Database Management Systems

Programme: BCA /BCA-MCA (Integrated) Branch/Specialisation: Computer Science

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Farmer goes to ATM Center to withdraw an amount of Rs.300/-. Which type of user is farmer? **1**

(a) Application programmer (b) Naïve user

(c) Sophisticated user (d) DBA

ii. The distinguishable part of a record is called- **1**

(a) Files (b) Data (c) Database (d) Field

iii. In an E-R diagram double lines indicate? **1**

(a) Total participation (b) Multiple participation

(c) Cardinality N (d) None of these

iv. The entity set that participates in a relationship. **1**

(a) May or may not be distinct

(b) Is distinct

(c) Need not be distinct

(d) None of these

v. Choose the false statements about relational databases. **1**

(a) Tables in a relational database are always independent from each other

(b) Tables are major components of a relational database, and they hold the data.

(c) Tables can be visualized as having columns and rows.

(d) Rows in tables can be visualized as "records"

vi. Assignment operator can be denoted by _____ when we write a relational algebra expression- **1**

(a) ← (b) → (c) ≈ (d) None of these

P.T.O.

vii. The essential requirement of_____ normal form is that every determinant in the relation must be candidate key. **1**
(a) Boyce Codd (b) Fourth
(c) Fifth (d) Third

viii. In second normal form- **1**
(a) No Functional Dependencies (FDs) exist.
(b) No Multi Valued Dependencies (MVDs) exist.
(c) No Partial FDs exist.
(d) No Partial MVDs exist.

ix. The default level of consistency in SQL is- **1**
(a) Repeatable read (b) Read committed
(c) Read uncommitted (d) Serializable

x. The phantom problem is- **1**
(a) Same query produces same set of rows at the same times
(b) Same query produces same set of rows at the different times
(c) Same query produces different set of rows at the different times
(d) Same query produces different set of rows at the same times

Q.2 i. Define: **2**
(a) Schema (b) Sub-schema

ii. What are the different types of users in DBMS? Explain the role of database administrator. **3**

iii. What do you mean by data model? Explain any two data models in detail. **5**

OR iv. What do you mean by DBMS architecture? Explain the three-level architecture of DBMS with the help of an example and its advantages. **5**

Q.3 i. How to do reduction of ER schema to tables? **2**

ii. Differentiate: specialization and generalization with the help of an example. Is it possible to represent their difference with the help of an E-R diagram? If yes, how? **8**

OR iii. Construct an ER diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. **8**

Q.4 i. What do you mean by keys in DBMS? Explain any two keys that are used in DBMS. **3**

ii. Consider the relations EMP (ENO, ENAME, AGE, BASIC) **7**
WORK_ON (ENO, DNO)
DEPT (DNO, DNAME, CITY)
Express the following queries in SQL:
(a) Find names of employees whose basic pay is greater than average basic pay
(b) Find the sum of the basic pay of all the employees, the maximum basic pay, the minimum basic pay and the average basic pay.

OR iii. What do you mean by relational algebra in DBMS? Explain any five operators in relational algebra along with examples. **7**

Q.5 i. Write short note on: **4**
(a) Functional dependencies (b) BCNF

ii. Find out all the candidate keys of Relation R. **6**
R(ABCDEFGH)
A → BC
B →CFH
CH →G
E →A
A →EG

OR iii. Explain various update anomalies that can arise in a relational database with example. **6**

Q.6 Attempt any two:

i. Write short note on: **5**
(a) Serializability (b) Deadlock
(c) Concurrency control (d) Timestamp
(e) ACID Properties

ii. Consider the schedule of three transactions T1, T2 and T3. R1(X), R2(Y), R3(Y), W2(Y), W1(X), W3(X), R2(X), W2(X) Where R stands for READ, W for WRITE and determines if the schedule is serializable. If so, give the schedule. **5**

iii. Differentiate: Shadow Paging and Log Based Recovery Methods. **5**

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Marking Scheme
CA3CO09 Database Management Systems

Q.1	i)	Farmer goes to ATM Center to withdraw an amount of Rs.300/-. Which type of user is farmer? (b) Naïve User	**1**
	ii)	The distinguishable part of a record is called? (d) Field	**1**
	iii)	In an E-R diagram double lines indicate? (a) Total participation	**1**
	iv)	The entity set that participates in a relationship. (c) Need not be distinct	**1**
	v)	Choose the FALSE statements about Relational Databases? (a) Tables in a Relational Database are always independent from each other.	**1**
	vi)	Assignment Operator can be denoted by _____ when we write a Relational Algebra expression (a) ←	**1**
	vii)	The essential requirement of_____ normal form is that every determinant in the relation must be candidate key. (a) Boyce Codd	**1**
	viii)	In Second Normal Form: (c) No Partial FDs exist.	**1**
	ix)	The default level of consistency in SQL is (d) Serializable	**1**
	x)	The Phantom Problem is: (c) Same Query produces different set of rows at the different times.	**1**
Q.2	i.	Define: (i) Schema 1 mark (ii) Sub-schema 1 mark	**2**
	ii.	What are the different types of Users in DBMS? 2 marks Explain the role of Database Administrator. 1 mark	**3**
	iii.	What do you mean by Data Model? 1 mark Explain any two data models in detail. 2 marks each	**5**
OR	iv.	What do you mean by DBMS Architecture? 1 mark Explain the three-level architecture of DBMS with the help of an example and its advantages. 2 marks each	**5**
Q.3	i.	How to do reduction of ER Schema to Tables? 2 marks	**2**
	ii.	Differentiate: Specialization and Generalization with the help of an example. 4 marks Is it possible to represent their difference with the help of an E-R diagram? If yes, how? 4 marks	**8**
OR	iii.	Construct an ER diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.	**8**
Q.4	i.	What do you mean by Keys in DBMS? 1 mark Explain any two Keys that are used in DBMS. 1 mark each	**3**
	ii.	Consider the relations EMP (ENO, ENAME, AGE, BASIC) WORK_ON (ENO, DNO) DEPT (DNO, DNAME, CITY) Express the following queries in SQL: (a) Find names of employees whose basic pay is greater than average basic pay 3 marks (b) Find the sum of the basic pay of all the employees, the maximum basic pay, the minimum basic pay and the average basic pay. 4 marks	**7**
OR	iii.	What do you mean by Relational Algebra in DBMS? 2 marks Explain any 5 Operators in Relational Algebra along with examples. 1 mark each	**7**
Q.5	i.	Write Short Note on: (i) Functional Dependencies 2 marks (ii) BCNF 2 marks	**4**
	ii.	Find out all the Candidate Keys of Relation R. 6 marks R(ABCDEFGH) A → BC B →CFH CH →G E →A A →EG	**6**
OR	iii.	Explain various update anomalies that can arise in a relational database with example. 6 marks	**6**
Q.6		Attempt any two:	
	i.	Write Short Note on: 1 mark each (i) Serializability (ii) Deadlock (iii) Concurrency Control	**5**

		(iv) Timestamp (v) ACID Properties	
	ii.	Consider the schedule of three transactions T1, T2 and T3. R1(X), R2(Y), R3(Y), W2(Y), W1(X), W3(X), R2(X), W2(X) Where R stands for READ, W for WRITE and determines if the schedule is serializable. If so, give the schedule. 5 marks	**5**
	iii.	Differentiate: Shadow Paging and Log Based Recovery Methods. 5 marks	**5**

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