Q.6 Attempt any two:

i. Explain state transition diagram. Explain, when a transaction is said to be failed. **5**

ii. Define serial schedule. Why is it always considered to be correct? Explain serializable schedule by giving an example. **5**

iii. What is timestamp? How does a system generate timestamps? **5**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering / Science

End Sem (Odd) Examination Dec-2019

CA3CO09 Database Management Systems

Programme: BCA – MCA (Integrated) / BCA Branch/Specialisation: Computer Application

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. The ability to change the conceptual schema without affecting the external schema or application programs is known as_____. **1**

(a) Program-data independence
(b) Logical data independence
(c) Physical data independence
(d) Data abstraction

ii. The _____ is a special type of table that contains data descriptions and defines the name, data type and length of each field in the database. **1**

(a) Data dictionary (b) Data table
(c) Data record (d) None of these

iii. 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

iv. When common attributes of entity types are combined to form higher-level entity type, it is called_____. **1**

(a) Inheritance (b) Specialization
(c) Aggregation (d) Generalization

v. Which of the operation requires two tables as input and two tables must have one common column? **1**

(a) Join (b) Division
(c) Cartesian product (d) Projection

vi. Which of these operators selects values that match any value in a given list of values? **1**

(a) BETWEEN (b) LIKE
(c) IN (d) DISTINCT

vii. A functional dependency is a relationship between/among_____. **1**

(a) Tuples (b) Relations (c) Attributes (d) None of these

viii. 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

ix. Once the transaction executes its final operation, it enters into ____ state. **1**

(a) Committed (b) Terminated
(c) Partially committed (d) Failed

x. The techniques used to handle the phantom problem are_____. **1**

(a) Predicate locking (b) Index locking
(c) Time stamping (d) Both(a) and (b)

Q.2 i. Explain DBMS catalog and metadata. **2**

ii. Who is a database administrator? What are the various responsibilities of a DBA? **3**

iii. Explain the various functional components of a DBMS with the help of a suitable diagram. **5**

OR iv. Explain the three-level architecture of DBMS with the help of an example. Mention its advantages also. **5**

Q.3 i. Can a relationship type have attributes? Explain with the help of an example. **2**

ii. Discuss the difference between specialization and generalization with the help of an example. Is it possible to represent their difference with the help of an E-R diagram? Explain. **8**

OR iii. Explain total participation constraint and partial participation constraint with the help of an example. Also discuss why it is necessary for a weak entity type to always have a total participation constraint. **8**

Q.4 i. What are the various unary operations in relational algebra? Explain with examples. **3**

ii. What do you understand by unary and binary operations in relational algebra? **7**

Consider the following relation schema: SAILORS (*sid:* integer, *sname:* string, *rating:* integer, *age:* real) BOATS(*bid:* integer, *bname:* string, *color:* string) RESERVES (*sid:* integer, *bid:* integer, *day:* date)

(a) Find the names of sailors who have reserved boat 201.
(b) Find the names of sailors who have reserved a red and a green boat.
(c) Find the colors of boats reserved by Ravi.
(d) Find the names of sailors who have reserved at least one boat.
(e) Find names of sailors who have reserved a red boat.

On the basis of a relational schema, write the following queries in relational algebra.

OR iii. Explain the following commands with examples: **7**

(a) ALTER TABLE (b) DROP TABLE
(c) SELECT (d) UPDATE
(e) DELETE

Q.5 i. Explain first normal form and second normal form with the help of example. **4**

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

OR iii. Consider the following set F of functional dependencies for relation schema R (A, B, C, D, E) and the set of functional dependencies {A→ BC, CD→E, B→D, E→A}. **6**

(a) Write inference rules for functional dependencies.
(b) List the candidate keys for R.
(c) Compute the canonical cover for the above set of functional dependencies.

P.T.O.

Marking Scheme
CA3CO09 Database Management Systems

Q.1	i.	The ability to change the conceptual schema without affecting the external schema or application programs is known as_____. (b) Logical data independence		**1**
	ii.	The _____ is a special type of table that contains data descriptions and defines the name, data type and length of each field in the database. (a) Data dictionary		**1**
	iii.	The entity set that participates in a relationship. (c) Need not be distinct		**1**
	iv.	When common attributes of entity types are combined to form higher-level entity type, it is called_____. (d) Generalization		**1**
	v.	Which of the operation requires two tables as input and two tables must have one common column? (a) Join		**1**
	vi.	Which of these operators selects values that match any value in a given list of values? (c) IN		**1**
	vii.	A functional dependency is a relationship between/among_____. (c) Attributes		**1**
	viii.	The essential requirement of_____ normal form is that every determinant in the relation must be candidate key. (a) Boyce Codd		**1**
	ix.	Once the transaction executes its final operation, it enters into ____ state. (c) Partially committed		**1**
	x.	The techniques used to handle the phantom problem are_____. (d) Both (a) and (b)		**1**
Q.2	i.	DBMS catalog	1 mark	**2**
		Metadata	1 mark	
	ii.	Database administrator	1 mark	**3**
		Various responsibilities of a DBA	2 marks	
	iii.	Various functional components of a DBMS	3 marks	**5**
		Diagram	2 marks	
OR	iv.	Three-level architecture of DBMS with example	3 marks	**5**
		Its advantages	2 marks	
Q.3	i.	Can a relationship type have attributes? Explanation with example		**2**
	ii.	Difference between specialization and generalization 4 marks Is it possible to represent their difference with an E-R diagram 4 marks		**8**
OR	iii.	Total participation constraint and partial participation constraint 4 marks Why it is necessary for a weak entity type to always have a total participation constraint 4 marks		**8**
Q.4	i.	Various unary operations in relational algebra with examples.		**3**
	ii.	Unary and binary operations in relational algebra 2 marks Consider the following relation schema 1 mark for each (1 mark * 5) 5 marks		**7**
OR	iii.	Explain the following commands with examples: (a) ALTER TABLE (b) DROP TABLE (c) SELECT (d) UPDATE (e) DELETE		**7**
Q.5	i.	First normal form with example	2 marks	**4**
		Second normal form with example	2 marks	
	ii.	Various update anomalies that can arise in a relational database with example Stepwise marking		**6**
OR	iii.	Consider the following set F of functional dependencies for relation schema 2 marks for each (2 marks * 3)		**6**
Q.6		Attempt any two:		
	i.	State transition diagram	3 marks	**5**
		Explain, when a transaction is said to be failed	2 marks	
	ii.	Defining serial schedule	2 marks	**5**
		Why is it always considered to be correct	1 mark	
		Serializable schedule with example	2 marks	
	iii.	Timestamp	3 marks	**5**
		How does a system generate timestamps	2 marks	

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