OR iii. Briefly discuss on the two-phase locking protocol used in concurrency control. How does it gurantees serializability. **6**

Q.6 Attempt any two:

i. Describe the steps of query processing. **5**

ii. How indexes are useful in database? What are primary and secondary indexes? **5**

iii. Write five advantages and five disadvantages of distributed databases. **5**

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

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

IT3CO05 Database Management Systems

Programme: B.Tech. Branch/Specialization: IT

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. Which of the following is not a function of the database? **1**

(a) Managing stored data (b) Manipulating data

(c) Security for stored data (d) Analysing code

ii. Which of the following set should be associated with weak entity set for weak entity to be meaningful? **1**

(a) Neighbour set (b) Far entity set

(c) Owner set (d) Identifying set

iii. Which command is used to remove data in a relation in SQL? **1**

(a) Drop table (b) Delete (c) Purge (d) Remove

iv. Which is a join condition contains an equality operator: **1**

(a) Equijoins (b) Cartesian (c) Natural (d) Left

v. Which of the following is not Armstrong's Axiom? **1**

(a) Reflexivity rule (b) Transitivity rule

(c) Pseudotransitivity rule (d) Augmentation rule

vi. In the _____ normal form, a composite attribute is converted to individual attributes. **1**

(a) First (b) Second (c) Third (d) Fourth

vii. Which of the following are introduced to reduce the overheads caused by the log-based recovery? **1**

(a) Checkpoints (b) Indices

(c) Deadlocks (d) Locks

viii. The recovery scheme must also provide **1**

(a) High availability (b) Low availability

(c) High reliability (d) High durability

P.T.O.

ix. The process of replacement of nested query with a query with join is knows as: **1**
(a) Corelation (b) Decorelation
(c) Materialization (d) Dematerialization.

x. Storing multiple copies of database at different locations is knows as: **1**
(a) Horizontal partitioning (b) Vertical partitioning
(c) Simple partitioning (d) None of these

Q.2 i. Enlist the advantages of DBMS over traditional file system. **2**

ii. Differentiate strong entity set and weak entity set. Demonstrate the concept of both using real-time example using E-R diagram. **3**

iii. Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars and has one or more premium payments associated with it. Each payment is for a particular period of time and has an associated due date and the date when the payment was received. **5**

OR iv. Explain specialization and generalization concepts in ER diagram with suitable example. **5**

Q.3 i. Write general structure to write query in Tuple relational calculus. **2**

ii. Consider the following relational database schema consisting of the four relation schemas: **8**
passenger (pid, pname, pgender, pcity)
agency (aid, aname, acity)
flight (fid, fdate, time, src, dest)
booking (pid, aid, fid, fdate)
Answer the following questions using relational algebra queries.
(a) Get the details about all flights from Chennai to New Delhi.
(b) Get the complete details of all flights to New Delhi.
(c) Find the passenger names for passengers who have bookings on at least one flight.
(d) Find agency cities in which there are no passengers.

OR iii. TABLE Worker(WORKER_ID INT NOT NULL PRIMARY KEY,FIRST_NAME CHAR(25), LAST_NAME CHAR(25),SALARY INT(15),JOINING_DATE DATETIME,DEPARTMENT CHAR(25)); **8**
TABLE Bonus(WORKER_REF_ID INT,BONUS_AMOUNT INT(10),BONUS_DATE DATETIME,FOREIGN KEY (WORKER_REF_ID),REFERENCES Worker(WORKER_ID));
TABLE Title(WORKER_REF_ID INT,WORKER_TITLE CHAR(25),AFFECTED_FROM DATETIME,FOREIGN KEY (WORKER_REF_ID)REFERENCES Worker(WORKER_ID));
Consider above 3 tables ,assume appropriate data and solve following SQL queries
(a) Find out unique values of DEPARTMENT from Worker table
(b) Show details of the Workers whose SALARY lies between 100000 and 500000.
(c) Show details of the Workers who have joined in Feb'2014.
(d) Fetch worker names with salaries >= 50000 and <= 100000.

Q.4 i. Explain insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with example. **3**

ii. Given below are two sets of FD's for a relation R(A,B,C,D,E).Are they equivalent? **7**
F={A->C, AC->D, E->AD, E->H} and G={A->CD, E->AH}

OR iii. Consider the relation schema R(A,B,C,D,E,F) and the functional dependencies A->B,C->DF,AC->E, D->F. What are the candidate keys of this relation R? What is its highest normal form? **7**

Q.5 i. Define Transaction. What are the desirable properties of transaction? **4**

ii. Write short notes on the following: **6**
(a) Transaction rollback and cascading rollback.
(b) Transaction support in SQL.
(c) Recovery Techniques Based on Immediate Update.

Marking Scheme

IT3CO05 Database Management Systems

Q.1	i.	Which of the following is not a function of the database? (d) Analysing code	**1**
	ii.	Which of the following set should be associated with weak entity set for weak entity to be meaningful? (d) Identifying set	**1**
	iii.	Which command is used to remove data in a relation in SQL? (a) Drop table	**1**
	iv.	Which is a join condition contains an equality operator: (a) Equijoins	**1**
	v.	Which of the following is not Armstrong's Axiom? (c) Pseudotransitivity rule	**1**
	vi.	In the _____ normal form, a composite attribute is converted to individual attributes. (a) First	**1**
	vii.	Which of the following are introduced to reduce the overheads caused by the log-based recovery? (a) Checkpoints	**1**
	viii.	The recovery scheme must also provide (a) High availability	**1**
	ix.	The process of replacement of nested query with a query with join is knows as: (b) Decorelation	**1**
	x.	Storing multiple copies of database at different locations is knows as: (d) None of these	**1**
Q.2	i.	Four advantages of DBMS over traditional file system 0.5 mark for each (0.5 mark * 4)	**2**
	ii.	Difference strong entity set and weak entity set 1 mark Concept of both using real-time example using E-R diagram 2 marks	**3**
	iii.	Complete E-R model full marks	**5**
OR	iv.	Specialization and generalization concepts in ER diagram Definition 2 marks Example 3 marks	**5**
Q.3	i.	General structure to write query in Tuple relational calculus.	**2**
	ii.	Consider the following relational database schema consisting of the four relation schemas: 2 marks for each query (2 marks * 4)	**8**
OR	iii.	Consider above 3 tables ,assume appropriate data and solve following SQL queries 2 marks for each corrected query (2 marks * 4)	**8**
Q.4	i.	Insertion, deletion and modification anomalies. 1 mark for each (1 mark * 3)	**3**
	ii.	Given below are two sets of FD's for a relation R(A,B,C,D,E).Are they equivalent? As per the solution	**7**
OR	iii.	Candidate keys of this relation R 3.5 marks Its highest normal form 3.5 marks	**7**
Q.5	i.	Definition of Transaction. 2 marks Desirable properties of transaction 2 marks	**4**
	ii.	(a) Transaction rollback and cascading rollback 2 marks (b) Transaction support in SQL. 2 marks (c) Recovery Techniques Based 2 marks	**6**
OR	iii.	Two-phase locking protocol 4 marks It gurantees serializability 2 marks	**6**
Q.6		Attempt any two:	
	i.	Steps of query processing 1 mark for each step (1 mark * 5)	**5**
	ii.	Indexes are useful in database 2 marks Primary and secondary indexes 1.5 marks for each (1.5 marks * 2) 3 marks	**5**
	iii.	Five advantages of distributed databases 0.5 mark for each (0.5 mark * 5) 2.5 marks Five disadvantages of distributed databases. 0.5 mark for each (0.5 mark * 5) 2.5 marks	**5**

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