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

Enrollment No.....

Faculty of Engineering

End Sem Examination May-2023

IT3CO05 Database Management Systems

Programme: B.Tech. Branch/Specialisation: 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. Database _____ which is the logical design of the database, and the database _____ which is a snapshot of the data in the database at a given instant in time. **1**

(a) Instance, Schema (b) Relation, Schema

(c) Relation, Domain (d) Schema, Instance

ii. Which of the following is a top-down approach in which the entity's higher level can be divided into two lower sub-entities? **1**

(a) Aggregation (b) Generalization

(c) Specialization (d) All of these

iii. Expression of generalized projection can be written as- **1**

(a) θ F1, F2, Fn (R) (b) π F1, F2, Fn (R)

(c) F1, F2, Fn (R) (d) None of these

iv. Which of the following clause is to be used, if you want to get sorted output from the relation? **1**

(a) HAVING (b) GROUP BY

(c) ORDER BY (d) IN

v. According to which rule if {A → B} and {BC → D}, then {AC → D}- **1**

(a) Reflexivity rule (b) Pseudo Transitivity

(c) Augmentation rule (d) None of these

vi. The relation employee(ID,name,street,Credit,street,city,salary) is decomposed into- **1**

employee1 (ID, name)

employee2 (name, street, city, salary)

(a) Lossless decomposition (b) Lossless-join decomposition

(c) Lossy-join decomposition (d) All of these

P.T.O.

vii. Which one is true statement for deadlock? **1**
(a) A deadlock is a condition where two or more transactions are executing properly.
(b) A deadlock is an unwanted situation in which two or more transactions are waiting indefinitely for one another.
(c) Deadlock is very important for transaction.
(d) Deadlock is similar to starvation.

viii. A transaction for which all committed changes are permanent is called- **1**
(a) Atomic (b) Consistent (c) Isolated (d) Durable

ix. Hashing is a technique to directly search the location of desired data on the disk without using _____. **1**
(a) Linear structure (b) Index structure
(c) Cell structure (d) File structure

x. B+ tree index takes the form of a- **1**
(a) Complex tree (b) Simple tree
(c) Balanced tree (d) Unbalanced tree

Q.2 i. Compare DBMS and Early file systems bringing out the major advantages of the database approach. **4**

ii. Develop an ER diagram for Department Management System with a set of Course, Instructor and Students. **6**

OR iii. Define the following with an example: **6**
(a) Weak entity type
(b) Specialization
(c) Derived & Composite Attribute

Q.3 i. Explain following with an example: **4**
(a) Select Operation
(b) Project Operation
(c) Set Difference Operation
(d) Division Operation

ii. Discuss various types of join operation with an example. Why Natural join is required? **6**

OR iii. Write SQL statements for following: **6**
Student (Enrno, name, courseId, emailId, Mobno)
Course(courseId, course_name, duration)
(a) Add a column city in student table.
(b) Alter the column Mobno data types.

(c) Display unique course from Course table?
(d) List name of all students start with 'a'.

Q.4 i. What is functional dependency? Explain its use in database design. **3**

ii. Define the following terms with a Suitable example- **7**
(a) Key (b) Super key (c) Candidate key
(d) Primary key (e) Foreign key

OR iii. Explain insertion, deletion and modification anomalies. Why are they considered bad? Illustrate in 2NF with an example. **7**

Q.5 i. Explain the Properties of transaction. **4**

ii. What is need of lock in DBMS? Explain shared lock and exclusive lock with the help of example. **6**

OR iii. Explain with an example- **6**
(a) Dirty reads
(b) Lost updates
(c) Inconsistent reads

Q.6 Attempt any two:

i. Write a difference between Distributed Database and Parallel Database. **5**

ii. What are the benefits of using dynamic indexing? Explain in detail B+ tree file organization. **5**

iii. Explain about the measures that are to be considered for comparing the performance of various file organization techniques. **5**

******

Marking Scheme

IT3CO05(T)

Database Management Systems (T)

Q.1	i)	d)Schema, Instance	**1**
	ii)	c)Specialization	**1**
	iii)	b)π F1, F2, Fn (R)	**1**
	iv)	a) ORDER BY	**1**
	v)	b)Pseudo Transitivity	**1**
	vi)	c)Lossy-join decomposition	**1**
	vii)	b)A deadlock is an unwanted situation in which two or more transactions are waiting indefinitely for one another.	**1**
	viii)	d) Durable	**1**
	ix)	b)Index structure	**1**
	x)	c)Balanced tree	**1**
Q.2	i.	Compare DBMS and early file systems bringing out the major advantages of the database approach.	**4**
	ii.	Develop an ER diagram for Department Management System with a set of Course, Instructor and Students.	**6**
OR	iii.	Define the following with an example: **2 Marks each**	**6**

(i) Weak entity type
(ii) Specialization
(iii) Derived & Composite Attribute

Q.3	i.	Explain Following with an example: **1 Marks for each** i. Select Operation ii. Project Operation iii. Set Difference Operation iv. Division Operation	
	ii.	Discuss various types of join operation with an Q natural inner outer example. **4 marks** Why Natural join is required. **2 marks**	**6**
OR	iii.	Write SQL statements for following: **1.5 Marks each**	**6**

Student (Enrno, name, courseId, emailId, Mobno)
Course(courseId, course_name, duration)

i) Add a column city in student table. Atter table add
ii) Alter the column Mobno data types. Alter table MODIFY
iii) Display unique course from Course table? Dioteinel
iv) List name of all students start with 'a'. a%

Q.4	i.	What is functional dependency? **1.5 Marks** Explain its use in database design. **1.5 Marks**	**3**
	ii.	Define the following terms with a Suitable example i) Key **1 Marks** ii) Super key **1.5 Marks** iii) Candidate key **1.5 Marks** iv) Primary key **1.5 Marks** v) Foreign key **1.5 Marks**	**7**
OR	iii.	Explain insertion, deletion and modification anomalies. **3 marks** Why are they considered bad? **1 marks** Illustrate in 2NF with an example. **3 marks**	7
Q.5	i.	What is functional dependency? ACID **1.5 Marks** Explain its use in database design. **1.5 Marks**	**4**
	ii.	Define the following terms with a Suitable example i) Need 2 **Marks** ii) Shared lock 2 **Marks** **iii)** Executive lock 2 Marks	**6**
OR	iii.	Explain insertion, Deity Reads 2 **Marks** Lout update 2 **Marks** **Incondite reads** 2 **Marks**	**7**

Q.6

Attempt any two:

i. Write a difference between Distributed Database and Parallel Database. **5**

$10c^n$ - 1 Marks Speed - 1 Marks Defn -1 Marks
Common up - 1 Marks Complicated - 1 Marks

ii. What are the benefits of using dynamic indexing? **2 marks** **5**
Explain in detail B+ tree file organization. **3 mark**s

iii. Cout Storage efficiency **5**

******