Name:

Enrolment No:

UPES

End Semester Examination, May 2024

Course: Advanced Database Management System **Semester: IV**

Program: B.Tech. (CSE) with spl. All branches **Time: 03 hrs.**

Course Code: CSEG2005 **Max. Marks: 100**

Instructions: Do as directed.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q. 1	Describe two-tier and three tier architecture of DBMS.	**4M**	**CO1**
Q. 2	Discuss the concept of generalization and specialization, using a suitable example. Draw neat illustration of EER diagram to support your answer.	**4M**	**CO1**
Q. 3	Explain the role of DBA in any software company.	**4M**	**CO1**
Q. 4	Consider the two relations Student (rollno, name, address) and Enroll (rollno, Courseno, Course_name) with cardinalities 120 and 8 respectively. Then, determine the possible i. Minimum no. of tuples in the relation of R1⋈R2. ii. Maximum no. of tuples in the relation of R1⋈R2.	**4M**	**CO2**
Q. 5	Explain the requirement of 2NF in DBMS with help of an example.	**4M**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q. 6	i. Consider the following table and identify the type of dependency that exists in this table. Decompose and normalize this table to remove this dependency. Roll_No | Course | Club 1 | Physics, Chemistry, Maths | Astronomy, Drama 2 | Physics, Chemistry | Astronomy, Photography 3 | Chemistry, Maths | Drama, Astronomy, Photography ii. Consider a relation R = (ABCD) and FD= (AB→CD, D→A). Check Relation is in 3NF or Not.	**5 M** **5M**	**CO4**
Q.7	Justify, can insertion operation violate domain constraint, key constraint, entity integrity constraint, and referential integrity constraint. Also, support your explanation with examples.	**10 M**	**CO3**

<table>
<tr><td>Q. 8</td><td>i. Illustrate different kinds of hashing.

ii. A hash table of length 10 uses open addressing with hash function h (k) = k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below.
<table><tr><td>0</td><td></td></tr><tr><td>1</td><td></td></tr><tr><td>2</td><td>42</td></tr><tr><td>3</td><td>23</td></tr><tr><td>4</td><td>34</td></tr><tr><td>5</td><td>52</td></tr><tr><td>6</td><td>46</td></tr><tr><td>7</td><td>33</td></tr><tr><td>8</td><td></td></tr><tr><td>9</td><td></td></tr></table>Explain, which one of the following choices gives a possible order in which the key values could have been inserted in the table.
(A) 46, 42, 34, 52, 23, 33
(B) 34, 42, 23, 52, 33, 46
(C) 46, 34, 42, 23, 52, 33
(D) 42, 46, 33, 23, 34, 52</td><td>5M

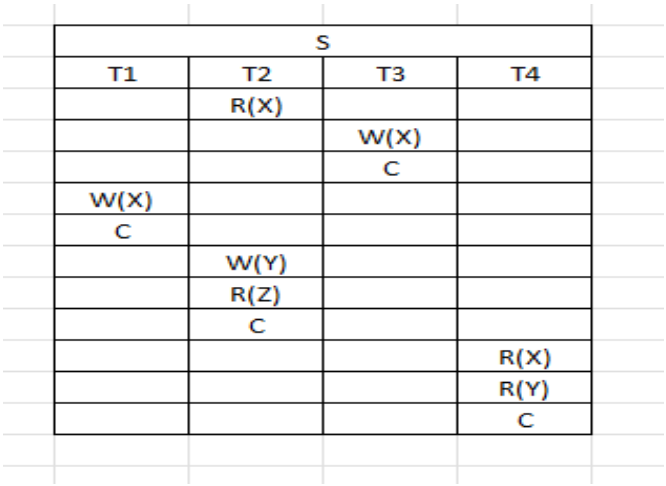
5M</td><td rowspan="4">CO2</td></tr>
<tr><td></td><td>(OR)</td><td></td></tr>
<tr><td></td><td>i.Differentiate between the B-tree and B+-tree used for dynamic multilevel indexes.
ii. Draw and explain the structure of internal nodes and leaf nodes in B+ tree with suitable example.</td><td>5 M

5 M</td></tr>
<tr><td>Q.9</td><td>Discuss the various type constructors used in Object Oriented database. Explain what primary characteristics an OID should possess.</td><td>10 M</td><td>CO6</td></tr>
<tr><td colspan="4">SECTION-C
(2Qx20M=40 Marks)</td></tr>
<tr><td>Q.10</td><td>employee (<u>person-name</u>, street, city)
works (<u>person-name</u>, <u>company-name</u>, salary)
company (<u>company-name</u>, city)
manages (<u>person-name</u>, manager-name)

Consider the above relational database and populate it as required. Show the output accordingly after executing the below queries. Give an expression in the relational algebra and SQL to express each of the following queries:

i. Find the names of all employees who work for First Bank Corporation.
ii. Find the names of all employees in this database who live in the same city as the company for which they work.
(OR)
Consider the above relational database and populate it as required. Show the output accordingly after executing the below queries. Give an expression in the relational algebra and SQL to express each of the following queries:

i. Find the names and cities of residence of all employees who work for First Bank Corporation.
ii. Find the employees name whose salaries greater than Rs.500000.</td><td>20 M</td><td>CO3</td></tr>
</table>

Q.11	i. Illustrate the use of time stamp protocol with a suitable example. ii. Compare strict two phase locking and rigorous 2PL with suitable examples. iii. Explain conflict serializability with suitable example. Check, below schedule S is serializable schedule or not. If yes, determine the equivalent serial schedule/s. 	6 M 7 M 7 M	CO5

S			
T1	T2	T3	T4
	R(X)		
		W(X)	
		C	
W(X)			
C			
	W(Y)		
	R(Z)		
	C		
			R(X)
			R(Y)
			C