Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

Course: Database Management Systems **Semester: III**

Program: B. Tech CSE **Time : 03 hrs.**

Course Code: CSEG2046 **Max. Marks: 100**

Instructions: Answer only what is asked. Irrelevant content will not earn extra marks.

SECTION A
(5Qx4M=20Marks)

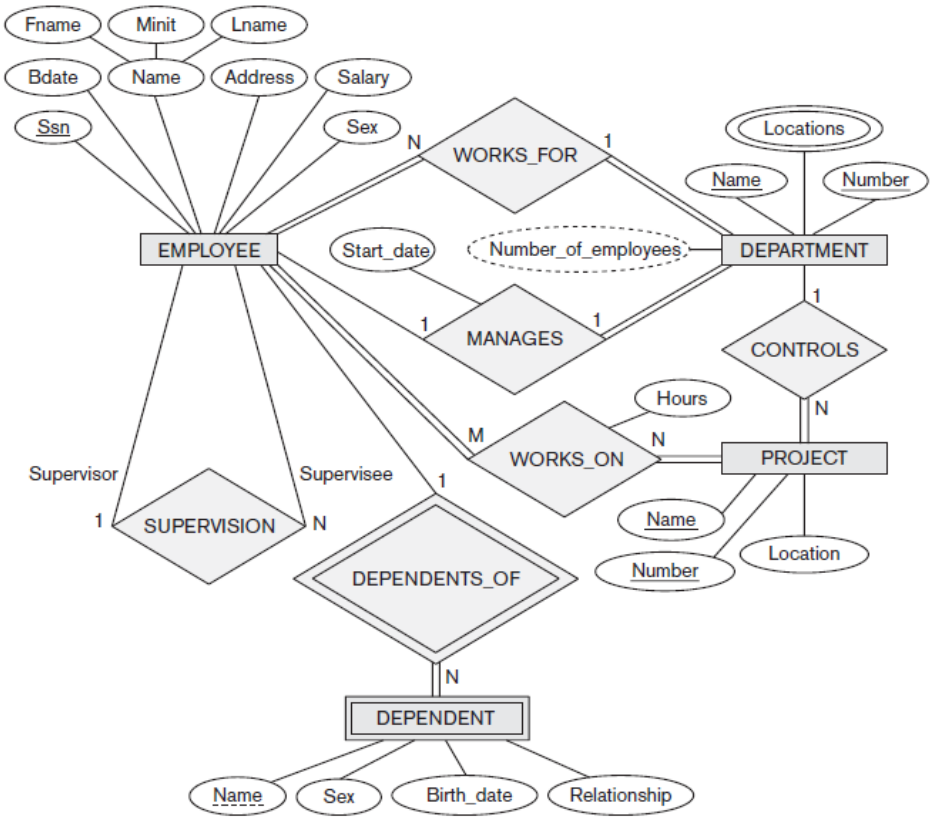
S. No.	Questions	Marks	CO
Q. 1	Give Justification for the Statement: "The selection operation is commutative while the Projection operation is not commutative."	**4**	**CO 1**
Q. 2	Explain briefly about aggregate functions with example query.	**4**	**CO 1**
Q. 3	Explain total and partial participation of entities in a relationship with suitable examples.	**4**	**CO 2**
Q. 4	Differentiate between primary, secondary and clustered indexes.	**4**	**CO 3**
Q. 5	Discuss the ACID properties of transaction.	**4**	**CO 4**

SECTION B
(4Qx10M= 40 Marks)

Q. 6	Discuss the different types of keys in relational database management system. **OR** Consider a relation R with attributes ABCDEFGH and functional dependencies S as follows: S = {A → CD, ACF → G, AD → BEF, BCG → D, CF → AH, CH → G, D → B, H → DEG}. Find all the candidate keys for R.	**10**	**CO 2**
Q. 7	Discuss the stages involved in query processing. How does query optimizer improve the efficiency of query execution. Taking an example, explain how a query is processed, and best query execution plan is selected? Use suitable illustrations.	**10**	**CO 2**
Q. 8	Discuss the different types of problems that can arise with concurrent transactions with suitable examples.	**10**	**CO 3**

Q. 9	Given the structure of restaurants collection
	{
	"address": {
	"building": "1007",		

	"coord": [-73.856077, 40.848447], "street": "Morris Park Ave", "zipcode": "10462" }, "borough": "Bronx", "cuisine": "Bakery", "grades": [{"date": {"$date": 1393804800000}, "grade": "A", "score": 2}, {"date": {"$date": 1378857600000}, "grade": "A", "score": 6}, {"date": {"$date": 1358985600000}, "grade": "A", "score": 10}, {"date": {"$date": 1322006400000}, "grade": "A", "score": 9}, {"date": {"$date": 1299715200000}, "grade": "B", "score": 14}], "name": "Morris Park Bake Shop", "restaurant_id": "30075445" } Write MongoDB queries for the following:	**(2+2+2 +2+2)**	**CO 4**
A)	Display the next 5 restaurants after skipping the first 5 which are in the borough Bronx.		
B)	Find the restaurant Id, name, borough and cuisine for those restaurants which contain 'Reg' as three letters somewhere in its name.		
C)	Find the restaurant Id, name, borough and cuisine for those restaurants which do not belong to the borough Staten Island or Queens or Bronx or Brooklyn.		
D)	Find the restaurant Id, name, borough and cuisine for those restaurants which prepared dish except 'American' and 'Chinees' or restaurant's name begins with letter 'Wil'		
E)	Find the restaurants that have a grade with a score of 2 and a grade with a score of 6 and are in the borough of Manhattan or Brooklyn, and their cuisine is not American.		
SECTION-C (2Qx20M=40 Marks)			
Q. 10		**(10+10)**	**CO 2**
A)	List the differences between NoSQL and relational databases.		
B)	Consider the relation R = {A, B, C, D, E, F, G, H, I, J} and the set of functional dependencies F = {AB → C, A→ DE, B→F, F→ GH, D→ IJ}. What are the candidate keys for R? Decompose R into 2NF and then 3NF relations.		
	OR		
A)	Explain the various steps to convert an ER diagram to Relational Schema.		
B)	Identify the various relationships and its cardinality ratio and participation constraint of each relationship type in the given ER diagram.		

			
Q. 11 A) B)	Explain **Two phase locking** protocol. Check whether the given schedule S is conflict serializable or not. If yes, then determine all the possible serialized schedules S: $R_4(A)$, $R_2(A)$, $R_3(A)$, $W_1(B)$, $W_2(A)$, $R_3(B)$, $W_2(B)$.	**(5+15)**	**CO 4**