Name: **Enrolment No:**	UPES UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2024

Course: Database System & Database Management — **Semester : III**
Program: MBA BA KPMG — **Time : 03 hrs.**
Course Code: DIGM7002 — **Max. Marks: 100**

Instructions: Attempt all sections

SECTION A
10Qx2M=20Marks

S. No.		Marks	CO
Q 1	**Attempt all multiple choice questions**		**CO1**
A.	What does an RDBMS consist of? a) Collection of Records b) Collection of Keys c) Collection of Tables d) Collection of Fields	**2**	**CO1**
B.	Which of the following is known as a set of entities of the same type that share same properties, or attributes? a) Relation set b) Tuples c) Entity set d) Entity Relation model	**2**	**CO1**
C.	What is the function of the following command? `Delete from r where P;` a) Clears entries from relation b) Deletes relation c) Deletes particular tuple from relation d) All of the mentioned	**2**	**CO1**
D.	The relations in second normal form (2NF): a) Eliminate all hidden dependencies b) Have a composite key c) Do not have any partial dependencies d) Have multivalued attributes	**2**	**CO1**
E.	The following three rules can be used to find logically implied functional dependencies. This collection of rules is called a) Axioms b) Armstrong's axioms c) Armstrong d) Closure	**2**	**CO1**

	e) data point that falls outside the overall pattern. f) data point above or below 3 standard deviations of the mean.		
F.	The relation employee(ID, name, dept_ID, dept_name, city, salary) is decomposed into employee1 (ID, name, city, salary) employee2 (dept_ID, dept_name) Now this decomposition: a) Satisfies 2NF b) Satisfies 3NF c) Satisfies BCNF d) None of the above	**2**	**CO1**
G.	The property of a transaction that persists all the crashes is a) Atomicity b) Durability c) Isolation d) All of the mentioned	**2**	**CO1**
H.	If a schedule S can be transformed into a schedule S' by a series of swaps of non-conflicting instructions, then S and S' are a) Non conflict equivalent b) Recoverable c) Conflict equivalent d) View equivalent	**2**	**CO1**
I.	In order to maintain transactional integrity and database consistency, what technology does a DBMS deploy? a) Triggers b) Pointers c) Locks d) Cursors	**2**	**CO1**
J.	State true or false: If I = read(Q) and J = write(Q) then the order of I and J does not matter. a) True b) False	**2**	**CO1**
SECTION B **4Qx5M= 20 Marks**			
Q2.	What are the different types of database end users? What are the responsibilities of the DBA?	**5**	**CO2**
Q3.	When is the concept of a weak entity used in data modeling? How are they represented in an ER diagram? Explain with examples.	**5**	**CO2**

Q4.	What is a functional dependency? Why are Armstrong's inference rules—the three inference rules IR1 through IR3—important?	**5**	**CO2**
Q5.	What is a serial schedule? What is a serializable schedule? Why is a serial schedule considered correct? Why is a serializable schedule considered correct?	**5**	**CO2**
SECTION-C **3Qx10M=30 Marks**			
Q6.	Define first, second, third normal forms. Define Boyce-Codd normal form. How does it differ from 3NF?	**10**	**CO3**
Q7.	Draw a state diagram, and discuss the typical states that a transaction goes through during execution.	**10**	**CO3**
Q8.	Attempt **<u>any one</u>** of the following: A. What is a timestamp? How does the system generate timestamps? Discuss the timestamp ordering protocol for concurrency control and its variations. B. What do you understand by concurrency control with reference to the transaction processing systems? Why is it important? Explain	**10**	**CO3**
SECTION-D **2Qx15M= 30 Marks**			
Q9.	A. Specify the following views in SQL on the following COMPANY database schemas: EMPLOYEE(Fname, Lname, SSN, BDate, Address, Se, Salary, Supervisor_SSN, Dept_no) DEPARTMENT(Dname, Dnumber, MGR_SSN) PROJECT(Pname, Pnumber, Plocation, Dnum) WORKS_ON(EmpSSN, Proj_No, Hours) i. A view that has project name, controlling department name, number of employees, and total hours worked per week on the project for each project. ii. A view that has project name, controlling department name, number of employees, and total hours worked per week on the project for each project with more than one employee working on it B. Specify the following queries in SQL on the given database schemas: STUDENT(Name, Stu_num, Class, Major) COURSE(Course_name, Course_num, Credit_hours, Department) i. Change the class of student 'Smith' to 2. ii. Insert a new course <'Knowledge Engineering','CS4390', 3,'Data Science'>.	**15**	**CO4**

	iii. Delete the record for the student whose name is 'Smith' and whose student number is 17.		
Q10.	Consider the following relation: BOOK (Book_title, Author name, Book_type, Listprice, Author_affil, Publisher) Author_affil refers to the affiliation of author. Some of the functional dependencies are: Book_title → Publisher, Book_type Book_type → Listprice Author name → Author_affil Answer the following questions: a. What normal form is the relation in? Explain your answer. b. Apply normalization until you cannot decompose the relations further. State the reasons behind each decomposition.	**15**	**CO4**