



MCA DEGREE EXAMINATIONS: DEC 2022

(Regulation 2020)

First Semester

MASTER OF COMPUTER APPLICATIONS

P20CAT1002: Database Technologies

COURSE OUTCOMES

- CO1:** Use the techniques, components and tools of atypical database management system.
- CO2:** Understand basic database concepts, including the structure and operation of the relational data model.
- CO3:** Demonstrate the different types of database implementation concepts.
- CO4:** Understand the emerging database technologies.
- CO5:** Familiarize with NoSQL concepts.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. Find the atomic fields in the following relation CO2 [K₃]
R (Name, age, Date Of Birth, Gender, Address)
2. Which of the following statement is not correct and why? CO2 [K₂]
 - a) Super key may contain extraneous attributes
 - b) Minimal super key is a candidate key
 - c) A key is a property of the individual tuples rather than the entire relation
 - d) One of the candidate key may be a primary key
3. What are the various information defined by DDL? CO2 [K₂]
4. Give an example for multivalued attribute. How these attributes are handled when converted into relations. CO3 [K₃]
5. What are the problems that will arise if the tables are not normalized? CO3 [K₂]
6. Define the ACID properties of a transaction. CO2 [K₂]

7. Find whether the following schedule is Conflict Serializable? CO2 [K₃]

T1	T2
R(A)	
	R(A)
	R(B)
	W(B)
R(B)	
W(A)	

8. What is local and global transaction in a distributed database (or systems)? CO2 [K₂]
9. What are the challenges of Multimedia databases? CO4 [K₂]
10. What are the advantages of NoSQL over relational databases? CO5 [K₂]

PART B (6 x 5 = 30 Marks)

11. Consider the following relational database schema consisting of the four relation schemas: CO2 [K₃]

passenger (pid, pname, pgender, pcity)

agency (aid, aname, acity)

flight (fid, fdate, time, src, dest)

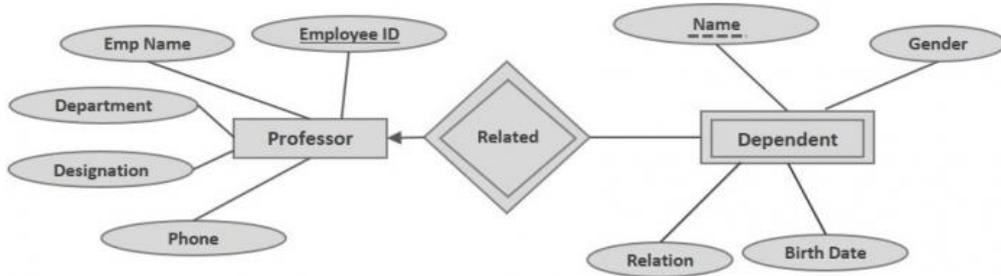
booking (pid, aid, fid, fdate)

Write the relational algebra query statement for the following questions.

- a) Get the details about all flights from Chennai to New Delhi.
- b) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.

12. What is the requirement of integrity constraints? List the various integrity constraints of a database and explain its purpose with an example. CO2 [K₃]
13. Explain the various conditions to be satisfied for a view to become 'updatable view'. Also give an example sql query to create a view (assume your own relation and fields). CO2 [K₃]

14. Identify the strong and weak entities in the following ER diagram and state the reason why they are strong and weak entities. How the relationship (in this example 'Related') is called which connects a strong entity to a weak entity? CO2 [K4]



15. State the differences between Shared nothing parallel databases and Distributed databases. CO4 [K2]

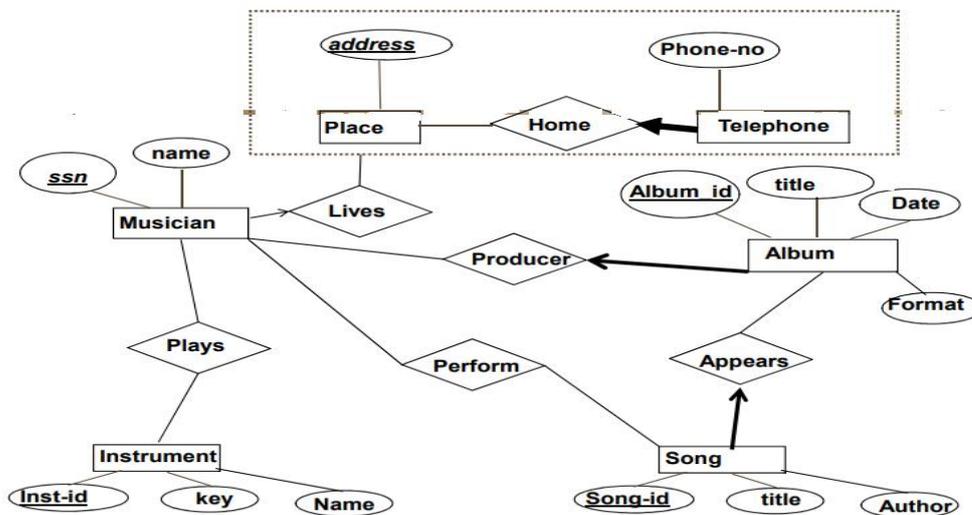
16. Consider following schedule S1:
 $S1 = r3(A), r2(B), w2(B), r1(B), w3(C), c3, r2(D), c2, r1(D), c1$
 The numbers represent transactions, and r, w, c stands for read, write and commit respectively. Schedule S1 specifies the order the transaction operations. CO2 [K4]

Is S1 cascadeless? Explain briefly.

Answer any FIVE Questions

PART C (5 x 10 = 50 Marks)

17. Convert the following ER Diagram into Relational tables and identify the primary key and foreign keys of each table. CO2 [K4]



18. Identify the various functional dependencies and apply the BCNF in the following relation. CO2 [K4]

EMPLOYEE table:

EMP_ID	EMP_COUNTRY	EMP_DEPT	DEPT_TYPE	EMP_DEPT_NO
264	India	Designing	D394	283
264	India	Testing	D394	300
364	UK	Stores	D283	232
364	UK	Developing	D283	549

19. Explain the Two-Phase Locking Protocol with an example. CO2 [K2]

20. Consider the following schedule S of the transactions T1, T2, T3 and T4. CO2 [K4]

T1	T2	T3	T4
			R(A)
	R(A)		
		R(A)	
W(B)			
	W(A)		
		R(B)	
	W(B)		

- a) Check whether schedule S is conflict serializable or not. 6
- b) Find all possible serializable schedules if it is conflict serializable. 4
21. Explain the types of aggregate data models in NoSQL databases. CO5 [K2]
22. Explain the following: CO2 [K2]
- a) Various types of system failures 4
 - b) Log Records 4
 - c) Deferred and Immediate modifications of the databases 2
