

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2024	
B.Tech Program: AI-DS	Scheme IIB
Regular Examination: SY	Semester: IV
Course Code: AIC403 and Course Name: Database Management Systems	
Date of Exam: 18/05/2024	Duration: 2.5 Hours
	Max. Marks: 60

Instructions:		Max. Marks	CO*	BT level
(1) All questions are compulsory. (2) Draw neat diagrams wherever applicable. (3) Assume suitable data, if necessary.				
Q 1	Solve any six questions out of eight:	12		
i)	Why is Data Independence important?	2	1	U
ii)	Define Primary Key and Foreign Key	2	2	U
iii)	Justify "Each foreign key is a candidate key"	2	3	U
iv)	Under what conditions, is it possible to update Views?	2	4	U
v)	Give an example illustrating the use of DISTINCT to remove duplicates from the result of an SQL query	2	4	Ap
vi)	Give an example to illustrate the need of normalization	2	5	Ap
vii)	Explain with an example "If two transactions are accessing the same object and writing them at the same time without any concurrency control then one of the updates can be lost"	2	6	Ap
viii)	Determine if the given schedule is Conflict Serializable: $r_1(A) w_1(A) r_2(B) w_2(B) r_3(D) w_3(D) r_1(C) w_1(C) r_2(C) w_2(C)$	2	6	Ap
Q.2	Solve any four questions out of six	16		
i)	Could a modern university be supported if a file processing system was used to manage enterprise information? List four major difficulties that are likely to arise if no database system was available to the university.	4	1	U
ii)	Give examples of 1-1 relationship, 1-m relationship, m-1 relationship and m-m relationship	4	2	U
iii)	Consider the following student database using Relational Algebra queries: Student(ID, Name, Address, City, Tutor)	4	3	Ap

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2024		
B.Tech Program: AI-DS Scheme IIB		
Regular Examination: SY Semester: IV		
Course Code: AIC403 and Course Name: Database Management Systems		
Date of Exam: 18/05/2024	Duration: 2.5 Hours	Max. Marks: 60

	Enrolment(ID, Code, Marks) Course(Code, Title, Department) a. Find student names that have no tutor b. Find student names that have "Sejal Shah" as tutor																					
iv)	Frame SQL queries for the relations given: Player(PID, PName, YearofBirth, Country) Stats(PID, MID, NRuns, NWickets) a. Find the Player's name that was the youngest amongst the players. b. Find the country of the player which has the highest maximum score in an ODI	4	4	Ap																		
v)	Explain the reasons and give examples for Insertion, Updation and Deletion anomalies	4	5	U																		
vi)	State whether following table is conflict serializable with justification. <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th>T1</th> <th>T2</th> </tr> </thead> <tbody> <tr> <td>Read (A)</td> <td></td> </tr> <tr> <td>Write (A)</td> <td></td> </tr> <tr> <td></td> <td>Read (A)</td> </tr> <tr> <td></td> <td>Write (A)</td> </tr> <tr> <td>Read (B)</td> <td></td> </tr> <tr> <td>Write (B)</td> <td></td> </tr> <tr> <td></td> <td>Read (B)</td> </tr> <tr> <td></td> <td>Write (B)</td> </tr> </tbody> </table>	T1	T2	Read (A)		Write (A)			Read (A)		Write (A)	Read (B)		Write (B)			Read (B)		Write (B)	4	6	Ap
T1	T2																					
Read (A)																						
Write (A)																						
	Read (A)																					
	Write (A)																					
Read (B)																						
Write (B)																						
	Read (B)																					
	Write (B)																					
Q.3	Solve any two questions out of three.	16																				
i)	Discuss the responsibilities of a DBA. Why does the DBA need to understand query optimization? Explain the role of a DBA in a simple database if it being used by many people	8	1	U																		
ii)	Northern India University (NIU) is a large Institution with several campuses scattered across north India. Academically, the university is divided into a number of faculties, such a Faculty of Arts, Faculty of Science. Some faculties operate on a number of campuses. Faculties, in turn, are divided into schools. For example, the School of Physics, the	8	2	Ap																		

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2024		
B.Tech Program: AI-DS Scheme IIB		
Regular Examination: SY Semester: IV		
Course Code: AIC403 and Course Name: Database Management Systems		
Date of Exam: 18/05/2024	Duration: 2.5 Hours	Max. Marks: 60

	School of Information Technology etc. The schools are not further divided into departments. Each student in the University is enrolled in a single course of study which involves a fixed core of subjects specific to that course. Each course is offered by one particular school. Each school has a number of lecturing staff. Students are awarded a grade for each subject they chose. Draw a suitable ER diagram			
iii)	Consider the following schema: Sailors (sid, sname, rating, age) Reserves (sid, bid, day) Boats (bid, bname, color) Write the following queries in relational algebra, tuple relational Calculus and domain relational calculus: a) Find the name of sailors who have reserved boat 103. b) Find the names and ages of sailors with a rating above 7. c) Find the names of sailors who have reserved a red boat. d) Find the sname, bid, and day for each reservation.	8	3	Ap
Q.4	Solve any two questions out of three.	16		
i)	Write an SQL query for the following: a. Create a table for Hospital database with minimum 5 fields b. To insert two new records c. To add new column d. To display all records	8	4	Ap
ii)	A table R has attributes A, B, C, D, E and satisfies the following functional dependencies: $A \twoheadrightarrow BC$, $B \twoheadrightarrow D$, $CD \twoheadrightarrow E$ a. What are the candidate keys? b. Is this table in 2NF? 3NF? c. Show that (A, B, C) and (A, D, E) are a lossless decomposition of R	8	5	Ap
iii)	Draw the state diagram for a transaction. Discuss every state in brief with the help of an example	8	6	U
