

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

April – May 2023

(B.Tech.) Program: Computer Engineering Scheme II

Examination: SY Semester: IV

Course Code: CEC403 and Course Name: Database Management System

Date of Exam: **18/05/2023**

Duration: 2.5 Hours

Max. Marks: 60

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
<b>Q 1</b>	<b>Solve any six questions out of eight:</b>	12		
i)	Define condition to check the relation is in 2NF with suitable example	2	CO5	U
ii)	Draw labeled diagram of transaction states.	2	CO6	U
iii)	What are the responsibilities of a Database Administrator?	2	CO1	U
iv)	Draw an ER diagram with a student as an entity, one composite attribute and one derived attribute.	2	CO2	U
v)	Observe the instructions given below and state whether they will conflict or not conflict. 1. li = read(Q), lj = read(Q). _____ 2. li = read(Q), lj = write(Q). _____ 3. li = write(Q), lj = read(Q). _____ 4. li = write(Q), lj = write(Q). _____	2	CO6	Ap
vi)	Explain the following relational algebra operators with proper syntax and using suitable examples. 1. Project 2. Cartesian Product	2	CO3	U
vii)	Write all DML commands by giving proper example of each command.	2	CO4	U
viii)	Explain the foreign key(referential integrity) concept with an example	22	CO3	U
<b>Q.2</b>	<b>Solve any four questions out of six.</b>	16		
i)	Consider the following relation for the database that keeps track of Student enrolment in courses and books issued for each course . Student(ssn,sname,subject,DOB) Course(course_id,cname,dept) Enroll(ssn,course_id,semester,grade)	4	CO3	Ap

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	Book_issued(course_id, ISBN, semester) Text(ISBN, Title, Publisher, Author)															
	Solve the following <b>relational algebra queries</b> : a. Find all student details(sname, subject) registered for course id 10. b. Find various book titles and authors for semester higher than 3															
ii)	Define Normalization and explain the condition to check the relation is in 1NF. Observe the table given below and convert it into 1NF <table style="margin-left: 20px; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">ID</th> <th style="text-align: left;">Name</th> <th style="text-align: left;">Courses</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>A</td> <td>C1, C2</td> </tr> <tr> <td>2</td> <td>E</td> <td>C3</td> </tr> <tr> <td>3</td> <td>M</td> <td>C2, C3</td> </tr> </tbody> </table>	ID	Name	Courses	1	A	C1, C2	2	E	C3	3	M	C2, C3	4	CO5	Ap
ID	Name	Courses														
1	A	C1, C2														
2	E	C3														
3	M	C2, C3														
iii)	Explain the following terms with examples a) Data Independence b) Total and Partial Participation	4	CO1	U												
iv)	Explain specialization and aggregation with suitable example	4	CO2	U												
v)	Explain ACID properties of transactions with examples.	4	CO6	U												
vi)	Consider a suitable example and apply inner join and right outer join to it.	4	CO4	U												
<b>Q.3</b>	<b>Solve any two questions out of three.</b>	16														
i)	Explain 3NF and 4NF with suitable examples	8	CO5	U												
ii)	For the following relation schema: employee(eid, ename, street, city) works(eid, cname, salary) company(cname, city) Write SQL queries for the following: a) Find the names, street address and cities of residence for all employees who work for 'Axis Bank' and earn between 30000 and 50000. (2M) b) Find the names of all employees in the database who live in the same cities as the companies for which they work. (2M) c) Find the name of the highest paid employee. (1M) d) Update salary of all employees 5% raise in their existing salary. (1M)	8	CO4	Ap												

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	e) Find the name of the company that has the smallest payroll.(1M) f) Create view on employee table with ename and city. (1M)																														
iii)	What is schedule? Explain Conflict serializability with example. Prove that following schedule is conflict serializable or not  <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>T1</th> <th>T2</th> <th>T3</th> </tr> </thead> <tbody> <tr> <td>R(X)</td> <td></td> <td></td> </tr> <tr> <td></td> <td>R(Y)</td> <td></td> </tr> <tr> <td></td> <td></td> <td>R(Y)</td> </tr> <tr> <td></td> <td>W(Y)</td> <td></td> </tr> <tr> <td>W(x)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>W(x)</td> </tr> <tr> <td></td> <td>R(X)</td> <td></td> </tr> <tr> <td></td> <td>W(X)</td> <td></td> </tr> </tbody> </table>	T1	T2	T3	R(X)				R(Y)				R(Y)		W(Y)		W(x)					W(x)		R(X)			W(X)		8	CO6	Ap
T1	T2	T3																													
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<b>Q.4</b>	<b>Solve any two questions out of three.</b>	16																													
i)	Describe the mapping rules for conversion of ER to relational schema with examples	8	CO3	U																											
ii)	Construct an EER diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars and has one or more premium payments associated with it. Premium payments can be of two types online or offline. Each payment is for a particular period of time and has an associated due date, and the date when the payment was received. (Add specialization wherever required)	8	CO2	Ap																											
iii)	Define Deadlock. Explain Deadlock Detection and Prevention with suitable example.	8	CO6	U																											

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