

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

Subject Code: ITC303 Subject Name: Database management system

Date: 30/05/23

(B.Tech.) Program: Information Technology Examination: SY Semester: III Course Code: ITC303 and Course Name: Database Management System 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.				
	Question	Max. Marks	CO	BT Level
QU-1	Solve any SIX questions out of eight:	12		
i)	What are the two disadvantages of a Database System?	2	CO1	1
ii)	Consider the RA expression $\prod_{ID, Name, CourseID} (Student \bowtie Takes)$ and explain in words what the expression does.	2	CO3	2
iii)	List two reasons why null values might be introduced into the database.	2	CO4	1
iv)	Explain multivalued attributes with a suitable example.	2	CO2	2
v)	Define and explain the primary index.	2	CO4	2
vi)	List the Integrity Constraints in SQL and explain any one with example.	2	CO4	2
vii)	What is a functional dependency?	2	CO5	1
viii)	List the significant benefits of concurrent execution of multiple transactions.	2	CO6	2
QU-2	Solve any FOUR questions out of six.	16		
i)	List and explain four significant differences between a file-processing system and a DBMS.	4	CO1	2
ii)	Explain the difference between a weak and a strong entity set.	4	CO2	2
iii)	Define foreign key. What is this concept used for? Explain with a suitable example.	4	CO3	2
iv)	List and discuss different anomalies. Illustrate insertion anomalies with examples.	4	CO4	3
v)	What undesirable dependencies are avoided when a relation is in 2NF?	4	CO5	2
vi)	Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems.	4	CO6	2

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QU-3	Solve any TWO questions out of three.	16		
i)	List four responsibilities of a Database Administrator. For each responsibility, explain the problems that would arise if the responsibility were not discharged.	8	CO1	2
ii)	<p style="text-align: center;"> <i>employee</i> (<u><i>employee_name</i></u>, <i>street</i>, <i>city</i>) <i>works</i> (<u><i>employee_name</i></u>, <i>company_name</i>, <i>salary</i>) <i>company</i> (<u><i>company_name</i></u>, <i>city</i>) <i>manages</i> (<u><i>employee_name</i></u>, <i>manager_name</i>). </p> <p style="text-align: center;">Figure-1: Employee Database.</p> <p>Consider the Employee Database of Figure 1, where the primary keys are underlined. Give an expression in SQL for each of the following queries.</p> <p>a. Find the names and cities of residence of all employees who work for "Vaidehi Enterprises".</p> <p>b. Find the names, street addresses, and cities of residence of all employees who work for "Dena Bank" and earn more than Rs. 10,000.</p> <p>c. Find all employees in the database who do not work for "State Bank of India".</p> <p>d. Find all employees in the database who earn more than each employee of "Dena Bank".</p>	8	CO4	3
iii)	Define Boyce-Codd normal form. How does it differ from 3NF? Why is it considered a stronger form of 3NF?	8	CO5	2
QU-4	Solve any TWO questions out of three.	16		
i)	<p>Consider a database used to record the marks that students get in different exams of different course offerings (sections).</p> <p>a. Construct an E-R diagram that models exams as entities, and uses a ternary relationship, for the database.</p> <p>b. Construct an alternative E-R diagram that uses only a binary relationship between <i>student</i> and <i>section</i>. Make sure that only one relationship exists between a particular <i>student</i> and <i>section</i> pair, yet you can represent the marks that a student gets in different exams.</p>	8	CO2	5
ii)	List the ACID properties. Explain the usefulness of each.	8	CO6	2
iii)	List the mapping rules of the ER to the Relational Model. Apply all these rules for mapping the ER diagram of QU-4 (i) to the relational model.	8	CO3	3
