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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
 [AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
 Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 50018**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Third Semester

Computer Science and Engineering

U19CS305 – DATABASE MANAGEMENT SYSTEMS

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define database management system and its applications.	2	K1	CO1
2.	What are the different types of data models?	2	K2	CO1
3.	List the DML commands in SQL.	2	K2	CO2
4.	Write the syntax for deleting a table in SQL.	2	K2	CO2
5.	'Boyce-Codd normal form is found to be stricter than third normal form'. Justify.	2	K3	CO3
6.	What is a file organization in DBMS and why heap file organization is important?	2	K2	CO3
7.	How does dynamic hashing handle bucket overflow?	2	K2	CO4
8.	List the properties of transaction.	2	K1	CO4
9.	Define the phases of two phase locking protocol.	2	K1	CO5
10.	How does buffer management affect database?	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Draw an E-R diagram for a Life Insurance Company and explain in detail.	13	K4	CO1
	(OR)			
b)	With a neat diagram explain the database system architecture and also explain interactions with architecture.	13	K3	CO1
12. a)	Consider the employee database, where the primary keys underlined. employee( <u>empname</u> , street, city) works( <u>empname</u> , <u>companyname</u> , salary) company( <u>companyname</u> , city) manages( <u>empname</u> , <u>management</u> ) Write an SQL query for the following statements	13	K3	CO2
	i. Find the names of all employees who work for First Bank Corporation.			
	ii. Find the names, street addresses and cities of residence of all employees who work for First Bank Corporation and earn more than 200000 per annum.			
	iii. Find the names of all employees in this database who live in the same city as the company for which they work.			
	(OR)			
b)	Elaborate the select, project, Cartesian product and join operation in relational algebra with an example.	13	K2	CO2
13. a)	Given a Relation R (A, B, C, D) and Functional Dependency set $FD = \{AB \rightarrow CD, B \rightarrow C\}$ , determine whether the given R is in 2NF? If not convert it into 2 NF.	13	K3	CO3
	(OR)			
b)	Discuss about RAID system. How does it improve performance and reliability? Explain the Level 3 and Level 4 of RAID.	13	K2	CO3
14. a)	Discuss about the B+ Tree file organization in detail and also construct. A B+ tree using the following key elements (order of the tree is 3) 5, 3, 4, 9, 7, 15, 14, 21, 22, 23.	13	K4	CO4
	(OR)			
b)	Write short notes on:		K2	CO4
	i. Transaction concept.	7		
	ii. Serializablility.	6		
15. a)	Explain why timestamp-based concurrency control allows schedules that are not recoverable. Describe how it can be modified through buffering to disallow such schedules.	13	K4	CO5
	(OR)			

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|----|-----|--|---|----|-----|
| b) | i.  | How Log based recovery works in DBMS? When the concurrent transactions crashes occurs how the system behaves & recovers? | 7 | K2 | CO5 |
|    | ii. | Describe Early lock release and logical undo operations.   | 6 | K4 |     |

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	<p>Consider the following relations for a Employee Database Application:</p> <p>Employee(<u>Eno</u>, Name, Sex, Dob, Doj, Designation, Basic_Pay, Deptno)            Department(<u>Dept_no</u>, Name)            Project(<u>Proj_no</u>, Name, Dept_no)            Worksfor(<u>Eno</u>, <u>Proj_no</u>, <u>Date</u>, Hours)</p> <p>The attributes specified for each relation is self-explanatory. However the business rules are stated as follows. A department can control any number of projects. But only one department can control a project. An employee can work on any number of projects on a day. However an employee cannot work more than once on a project he she worked on that day. The primary keys are underlined.</p> <p>i. Identify the foreign keys. Implement DDL commands &amp; develop to implement the above schema.</p> <p>ii. Construct an SQL query to list the department number and the number of employees in each department.</p> <p>iii. Develop a view that will keep track of the department number, the number of employees in the department, and the total basis pay expenditure for each department.</p> <p style="text-align: center;">(OR)</p>	15	K3	CO2
b)	<p>Construct an E-R 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. Each payment is for a particular period of time set of customers, and the date when the payment was received.</p>	15	K3	CO1