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Code No. : 16147 (B) N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. VI-Semester Main & Backlog Examinations, May/June-2023

Introduction to Databases (OE-IV)

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What are different levels of abstraction?	2	1	1	1,2
2.	What is the difference between Weak and a Strong entity set. Give an example of each.	2	1	1	1,2
3.	What is the difference between cartesian product and natural join. Give an example of each.	2	1	2	1,2
4.	List different aggregate functions in SQL.	2	2	2	1,2
5.	What is lossless Decomposition? Give an example.	2	1	3	1,2
6.	What are Armstrong's axioms and why are they sound and complete.	2	1	3	1,2
7.	What are the factors used to evaluate which technique (indexing and hashing) is best for given application?	2	1	4	1,2
8.	What are the causes of bucket overflow in a hash file organization? How to handle overflows.	2	2	4	1,2
9.	Explain the distinction between the terms serial schedule and serializable schedule.	2	2	5	1,2
10.	Explain ACID Properties.	2	2	5	1,2
Part-B (5 × 8 = 40 Marks)					
11. a)	Draw Overall System Structure of DBMS and explain each component in the system.	4	2	1	1,2
b)	Design an ER diagram for airline. The database must keep track of customers and their reservations, flights and their status, seat assignments on the individual flights, and schedule and routing of future flights. Include appropriate constraints.	4	3	1	1,2,3
12. a)	What are different integrity constraints. Explain with an example.	4	1	2	1,2

Contd... 2

<p>b) Consider the following relational database</p> <p style="padding-left: 40px;">Employee(<u>employee_name</u>, street, city)</p> <p style="padding-left: 40px;">Works(<u>employee_name</u>, <u>company_name</u>, salary)</p> <p style="padding-left: 40px;">Company(<u>company_name</u>, city)</p> <p>Write SQL Queries for</p> <p>(i) Find the names of all employees who live in city "Hyderabad".</p> <p>(ii) Find the names and cities of residence of all employees who work for "XYZ Bank".</p> <p>(iii) Find all employees in the database who earn more than each employee of "XYZ Bank".</p>		4	3	2	1,2,3																		
<p>13. a)</p>	<p>Given a schema R(A, B, C, D, E), and the following set of FDs: {A → E, E → CD, BC → A, D → B} Find all the candidate keys of the given relation R.</p>	4	3	3	1,2,3																		
<p>b)</p>	<p>What are trivial and non trivial functional dependencies. List all functional dependencies of the following relation.</p> <table border="1" data-bbox="399 884 853 1086" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>a1</td> <td>b1</td> <td>c1</td> </tr> <tr> <td>a1</td> <td>b1</td> <td>c2</td> </tr> <tr> <td>a2</td> <td>b1</td> <td>c1</td> </tr> <tr> <td>a2</td> <td>b1</td> <td>c3</td> </tr> </tbody> </table>	A	B	C	a1	b1	c1	a1	b1	c2	a2	b1	c1	a2	b1	c3	4	2	3	1,2			
A	B	C																					
a1	b1	c1																					
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<p>14. a)</p>	<p>Define Dense index and Sparse index. When is it preferable to use dense index rather than a sparse index?</p>	4	2	4	1,2																		
<p>b)</p>	<p>Give the properties of B+ - Tree . Construct a B+-Tree for the following set of key values 1, 3, 5, 7, 9, 2, 4, 6, 8, 10 with 4 pointers(order 4)</p>	4	3	4	1,2																		
<p>15. a)</p>	<p>What is recoverable schedule? Why is recoverability of schedules desirable? Give an example.</p>	4	2	5	1,2																		
<p>b)</p>	<p>What is serial schedule? Consider the following two transactions and schedule (time goes from top to bottom). Is this schedule conflict-serializable? Explain why or why not.</p> <table border="1" data-bbox="470 1579 885 1915" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Transaction T₀</th> <th>Transaction T₁</th> </tr> </thead> <tbody> <tr> <td>r₀[A]</td> <td></td> </tr> <tr> <td>w₀[A]</td> <td></td> </tr> <tr> <td></td> <td>r₀[B]</td> </tr> <tr> <td></td> <td>w₀[B]</td> </tr> <tr> <td></td> <td>c₀</td> </tr> <tr> <td>r₁[A]</td> <td></td> </tr> <tr> <td>r₁[B]</td> <td></td> </tr> <tr> <td>c₁</td> <td></td> </tr> </tbody> </table>	Transaction T ₀	Transaction T ₁	r ₀ [A]		w ₀ [A]			r ₀ [B]		w ₀ [B]		c ₀	r ₁ [A]		r ₁ [B]		c ₁		4	3	5	1,2,3
Transaction T ₀	Transaction T ₁																						
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16. a)	(i) What are mapping cardinalities give an example of each. (ii) Discuss the functionalities of DBA.	4	2	1	1,2
b)	Consider the given schema Customer(<u>Customer_name</u> , Customer_city) Borrower(<u>Customer_name</u> , Loan_number) Depositor(<u>Customer_name</u> , account_rumber) And Write the following Relational algebra queries	4	3	2	1,2,3
	i) To find all customers of the bank who have an account but not a loan				
	ii) To find all customers of the bank who have both an account and a loan				
	iii) To find all customers of the bank who have either an account or a loan				
17.	Answer any <i>two</i> of the following:				
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.	4	3	3	1,2,3
b)	The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using overflow chaining with hash function $h(k) = k \text{ mod } 10$. What is the resultant hash table?	4	3	4	1,2,3
c)	What is a cascadeless schedule? Why is cascadelessness of schedules desirable? Explain your answer with an example.	4	2	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	40%
iii)	Blooms Taxonomy Level - 3 & 4	40%
