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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

V Semester B. E. Additional Examinations December-2020

Computer Science and Engineering

DATABASE DESIGN

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

PART-A

1	1.1	Define database schema.	01
	1.2	_____ is the characteristic that allows program data independence & program operational independence.	01
	1.3	_____ entity types do not have key attributes of their own.	01
	1.4	_____ is the relationship type with two degree classification.	01
	1.5	_____ indicates the maximum number of entities that can be involved in a relationship.	01
	1.6	_____ symbol is used to represent entity relationship set in an *E-R*-Diagram.	01
	1.7	In an *E-R* Diagram double ovals are used to denote _____ attributes.	01
	1.8	How are derived attributes denoted in *E-R* diagram.	01
	1.9	What is Normalization?	02
	1.10	_____ is a query used to retrieve the data from the database.	01
	1.11	Consider the following table of loan_record & predict the output for the following query *Select Count*(∗) *from* ((*Select Borrower, Bank_manager from Loan_record*) *ASS Natural Join* (*Select Bank_Manager, loan_account from loan_records*)*aST*);	01
	1.12	_____ storage engine of MongoDB uses memory mapped files to store data.	01
	1.13	_____ is used to inspect & check the amount of mapped memory in MongoDB.	01
	1.14	MongoDB reports its triggered page faults as total number of page faults in _____ no. of seconds.	01
	1.15	What is the need of concurrency control mechanism?	01
	1.16	What is deadlock & list the conditions that arises dead lock.	02
	1.17	Suppose we log only "after images" of an updated page. Describe what should happen at commit time & what should happen during transaction execution time?	02

Borrower	*Bank_Manager*	*Loan_account*
Ramesh	*Sundarraj*	1000
Suresh	*Ramgopal*	5000
Mahesh	*Sundarraj*	7000

PART-B

2	a	Discuss the major characteristics of a database approach versus the file processing approach.	04
	b	With a help of neat block diagram classify the levels of three schema architecture.	06
	c	With a diagrammatical representation illustrate the phases involved in designing an database.	06
3	a	Design an *ER* diagram for a company database that consists of employee, department projects as relations, use cordinality ratios & participation constraints where applicable.	10
	b	With an example explain the different types of join operation.	06
		OR	
4	a	By considering an library management system as an example scenario, discuss the usage of: i) Select operation ii) Project operation in relational algebra with example queries.	06
	b	A library consists of a section, mumber, book, granter, a publisher. Crete an *ER* diagram depicting the use cases where • section has *SID*, name & phone no. • Member has M_ID, addr, telephone, occupation, M_name • Book has call no., Title, author, price • Publisher has P_id, name, addr, Ph no., • Granter has Natiopnal ID Card no., name, addr & ph no.	10
5	a	Consider the following schema for library database: $Book\ (Book\_id, Title, Publisher\_name, year)$ $Book\_Authors\ (Book\_id, Author\_name)$ $Publisher\ (name, addr, phone)$ $Book\_copies\ (Book\_id, Branch\_id, copies)$ $Book\_Lending\ (Book\_id, branch\_id, card\ no, date\ out, due-date)$ $Library\_Branch\ (Branch\_id, branch\ name, addr)$ Write the *SQL* queries for the following i) Retrieve the details of all books in the library_id, title, name of publisher, authors, no of copies in each branch. ii) Get the particulars of borrowers who have borrowed more than three books, but from Jan 19 to Jun 19. iii) Delete a book in book table, update the contents of other tables to reflect this data manipulation operation. iv) Partition the book table based on year of publication, demonstrate working with simple query.	12
	b	Discuss the steps involved in inverting any relation into 2nd normal form with an example.	04
		OR	

6	a	Consider the schema for college database: $Student\ (USN, Sname, addr, Ph.no, gender)$ $SemSec\ (SSid, Sem, Sec)$ $Class\ (USN, SSid)$ $Subject\ (subcode, title, Sem, credits)$ $Ia\ marks\ (USN, sub\ code, SSid, t1, t2, t3\ final\ Ia)$ Write SQL Queries for: i) To create the tables ii) List of all student details studying in 4th sem 'C' section.	08
	b	Considering any scenario of your own illustrate the working of Boyce – Codd Normal form	08
7	a	List and explain the key features of MongoDB's.	08
	b	Discuss the steps in detail that's involved in designing an e-commerce data model.	08
8	a	Derive the desirable properties of a transaction.	04
	b	Illustrate with an example scenario the mechanism of shadow paging.	08
	c	Discuss the mechanisms involved in detecting a dead lock.	04