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PES University, Bangalore

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UE16CS252

May 2018: END SEMESTER ASSESSMENT (ESA) B.TECH.

UE16CS252- DBMS DATABASE MANAGEMENT SYSTEMS.

Time: 3 Hrs — Answer all questions. State any assumptions made. — Max Marks: 100

1	a)	List 4 advantages of using a DBMS approach to store and retrieve data.	4
	b)	With a suitable diagram, explain what is the three-schema architecture?. What is logical and physical data independence?.	6
	c)	Write an ER Diagram for the following Library database. Identify all the Entities, Relationships and Attributes. Underline the primary keys and mark the different constraints. You can add an "Id" attribute as a primary key for an entity to make it unique if necessary. Library has a number of branches in the city, each branch having a name, address and librarian. Books have title, authors and publisher. A book can have multiple authors but a single publisher. Note that same author can write multiple books and same publisher can publish multiple books. Publisher has a name, address and phone number as publisher details. Each library branch can have various number of copies of each book. A borrower, identified by a unique library card number has name, address and phone number. Borrower is a member of one library branch. When a borrower loans a book, the date of issue and the due date is recorded.	10
2.	a)	How are different constraints specified in SQL. Give at least 4 examples.	4
	b)	Consider the given schema below to write SQL statements for the following queries. employee (employee-name, street, city) works (employee-name, company-name, salary) company (company-name, city) manages (employee-name, manager-name) a. Add a new employee called Jones who lives on Lake Road in Oldtown. b. Modify the database so that Jones now lives on Park Lane in Newtown c. Give all managers of First Bank Corporation a 10 percent raise.	6
	c)	Consider the given schema below to write SQL statements for the following queries. Customers(cid,name,age,salary) Books(bid, title, author, publisher,price) Purchases(cid, bid, ondate) (i).List the customer names who have purchased a book published by Pearson costing more than Rs.1000. (ii).Find out the author and title of those books that were sold on 1/4/2017 (iii).List out those customers who have purchased at least two books and are aged more than 40. (iv).List out those customers, whose average purchase price is greater than or equal to average price of all books.	10
3.	a)	In ERD to Relational Schema mapping, summarize how Relationships (in ERD) are mapped.to Relational Schema.	4
	b)	For the **GradStudent** database schema given below, create sample tables populating with few students who have taken courses and earned grades:	8

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		Student(student_no, name, major) Course(course_no, name, credithours,dept) Grade(student_no,course_no,grade) Give an example of an operation (eg. Insert or Delete) that violates the (i) domain constraint (ii) Key Constraint (iii) Entity Integrity Constraint (iv) Referential Integrity Constraint in GradStudent. Illustrate your answer by specifying a database operation on this database state (eg. Insert or Delete) with actual values.	
	c)	Consider the following schema where Part gives the part description, Supplier gives the supplier details and the Catalog indicates cost at which a Part is supplied by a Supplier. Part (PID, PNAME, COLOUR) Catalog (PID, SID, COST) Supplier (SID, SNAME , SADDRESS) Express the following as **Relational Algebra** queries: i. Find the IDs of suppliers who supply some red or green part. ii. Find the IDs of suppliers who supply some red part and some green part. iii. Find the IDs of suppliers who supply only red parts. iv. Find the IDs of suppliers who supply every part.	8
4.	a)	What is a database design? List four database design guidelines?	6
	b)`	For each of the following sets of functional dependencies on a schema R(A, B, C, D, E) F1. AB --> C, D --> E, B --> E F2. A --> CD, B --> DE i. Find the attribute closure of AB ii. Find a candidate key for this schema. Show the method of arriving at candidate key.	6
	c)	Consider the following database. The year and semester refers to when the course is offered and the student gets a grade in that course. Each faculty belongs to a department which has an annual budget. student(sid, sname, courseID, year, semester, grade) Faculty(fid, fname, deptname, deptbudget), List the functional dependencies you would expect to hold on the above relations, and give possible decompositions for them to be in BCNF. Consider the case of student taking the same course in multiple year and semester in writing the FD. (this may be the case when student fails in a course and takes it again later.)	8
5.	a)	How is a deadlock identified in concurrent transactions? What are the different approaches for handling deadlocks?	4
	b)	Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below. Draw the precedence graphs for S1 and S2 and state whether each schedule is conflict-serializable or not. If a schedule is conflict-serializable, write down the equivalent serial schedule(s). T1: r1(x); r1(z); w1(x) T2: r2(z); r2(y); w2(z); w2(y) T3: r3(x); r3(y); w3(y) S1: r1(x); r2(z); r1(z); r3(x); r3(y); w1(x); w3(y); r2(y); w2(z); w2(y) S2: r1(x); r2(z); r3(x); r1(z); r2(y); r3(y); w1(x); w2(z); w3(y); w2(y)	8
	c)	With an example briefly explain Write-Read Conflict and Write-Write Conflict while executing interleaved transactions.	
	d)	Briefly explain the two main approaches of Access Control in Data base security.?	