Register Number

Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Department of Computer Science and Engineering

Continuous Assessment Test – I

Question Paper

Degree & Branch	B.E CSE				**Semester**	IV
Subject Code & Name	UCS1404 Database Management Systems				**Regulation: 2018**	
Academic Year	2021-22	**Batch**	2020-24	**Date**	**30.03.2022**	**FN**
Time: 90 Minutes	**Answer All Questions**				**Maximum: 50 Marks**	

Part – A (6×2 = 12 Marks)

<K1>	1. Define a database schema? A database schema defines its entities and the relationship among them	<CO1>	1.3.1
<K2>	2. Define data models and list the categories of the data models. The data models are used to represent the data and how it is stored in the database and to set the relationship between data items. conceptual data models, logical data models, and physical data models, and each one has a specific purpose.	<CO1>	1.4.1
<K2>	3. Explain the six clauses in the syntax of a DML query. Which of the six clauses are required and which are optional? Select, from, where, orderby, having , groupby	<CO2>	1.4.1
<K2>	4. A key is a superkey, but not vice versa – Interpret the statement and justify. From a superkey from which we cannot remove any attributes and still have the uniqueness constraint hold. This minimality property is required for a key but is optional for a superkey	<CO2>	1.4.1
<K3>	5. Make use of the relations below and retrieve the name of each employee's manager. EMPLOYEE (**<u>emp_id</u>**, e_name, job_id, salary, manager_id, dept_id) DEPARTMENTS (**<u>dept_id</u>**, dept_name, manger_id, loc_id)	<CO2>	1.1.1 1.4.1
<K4>	5. Distinguish between nested subquery and correlated subquery. The subquery executes once before the main query. The result of the subquery is used by the main query. • Correlated Subquery: **Correlated subqueries are used for row-by-row processing.** • **Each subquery is executed once for every row of the outer query.** • **A subquery references a column from a table in the parent query.**	<CO2>	1.4.1

Part – B (3×6 = 18 Marks)

<K2>	7. Explain the three-schema architecture for database systems with a neat diagram. Internal schema at the internal level to describe physical storage structures and access paths (e.g indexes). Typically uses a physical data model. Conceptual schema at the conceptual level to describe the structure and constraints for the whole database for a community of users. Describes entities,data types, user operations and constraints Uses a conceptual or an implementation data model. External schemas at the external level to describe the various user views. Usually uses the same data model as the conceptual schema. Explain about physical data independence:changing the conceptual without changing the external schema logical data independence(changing internal without changing the conceptual schema)	<CO1>	1.4.1
<K3>	8. Consider the following relations for a database that keep track of student enrollment in courses and the books adopted for each course: STUDENT (**SSN**, Name, Major, Bdate) COURSE (**Course#, Cname,** Dept) ENROLL (**SSN, Course#,** Quarter, Grade) BOOK_ADOPTION (**Course#, Quarter**, Book_ISBN) TEXT (**Book_ISBN,** Book_Title, Publisher, Author) 1. Specify the foreign keys for this schema, stating any assumptions you make. ENROLL 1. SSN references STUDENT (SSN) 2. {Course#, Quarter} references BOOK_ADOPTION{Course#, Quarter} BOOK_ADOPTION 1. Course# references Course(Course#) 2. Book_ISBN references TEXT(Book_ISBN) 2. Create the ENROLL relation with the constraint that the Grade should be from the values (O,A,B,C,F). CREATE ENROLL(SSN NUMBER(8) CONSTRAINT EN_FK1 REFERENCES STUDENT(SSN), COURSENO VARCHAR2(10), QUARTER VARCHAR2(6), GRADE CHAR(1) CONSTRAINT CH_GR CHECK(GRADE IN(‘O’,’A’,’B’,’C’,’F’). CONSTRAINT ENROLL_PK PRIMARY KEY(SSN,COURSENO,QUARTER), CONSTRAINT EN_FK2 FOREIGN KEY(COURSENO,QUARTER) REFERENCES BOOK_ADOPTION(COURSENO,QUARTER)); 3. Update the grade to ‘A’ for the student Manoj Tiwari who registered for the course CS302 during the Spring Quarter. UPDATE ENROLL SET GRADE=’A’ WHERE COURSENO=’CS302’ AND QUARTER=’Spring’ AND SSN = (SELECT SSN FROM STUDENT WHERE NAME=’Manoj Tiwari’); 4. Delete the book(s) which are not adopted by any of the courses. DELETE FROM TEXT WHERE BOOK_ISBN NOT IN (SELECT BOOK_ISBN	<CO2>	1.4.1 2.4.1

	FROM BOOK_ADPOTION); a. Specify the foreign keys for this schema, stating any assumptions you make. b. Construct the ENROLL relation with the constraint that the Grade should be from the values (O,A,B,C,F). c. Make use of appropriate command to update the grade to ‘A’ for the student Manoj Tiwari who registered for the course CS302 during the Spring Quarter.		
<K3>	9. Consider the database with the following relations: HOUSESALES (**Address, City, Datesold,** Price) HOUSES (**Address, City,** No_of_bedrooms, No_of_bathrooms, Sqft) Construct the following queries in relational algebra. a. List all the houses that were sold in 2000 with more bathrooms than bedrooms. List the address, city, numbers of bedrooms and bathrooms. b. List all houses that were sold and then later sold again for less money. Include the address, city and both dates sold and both prices. Write the following queries in relational algebra. (4) i) List all the houses that were sold in 2000 with more bathrooms than bedrooms. List the address, city, numbers of bedrooms and bathrooms. $\pi_{\text{address, city, bathrooms, datesold}}(\sigma_{\text{date sold}>31/12/1999 \text{ and date sold} < 01/01/2001} \text{HouseSales} \bowtie \sigma_{\text{bathrooms} > \text{bedrooms}} \text{Houses})$ ii) List all houses that were sold and then later sold again for less money. Include the address, city and both dates sold and both prices. $\rho_{HS1}(\text{address, city, datesold1, price1})\ \text{Housesales}$ $\rho_{HS2}(\text{address, city, datesold2, price2})\ \text{Housesales}$ $\pi_{\text{address, city, datesold1, price1, datesold2, price2}}(\sigma_{\text{datesold1} < \text{datesold2 and price1} > \text{price2}}(HS1 \bowtie HS2))$	<CO2>	1.4.1 2.4.1

Part – C (2×10 = 20 Marks)

<K2>	10. With a help of a neat block diagram, explain the basic architecture of a Database management system.	<CO1>	1.4.1
(OR)			
<K2>	11. Explain the Characteristics of Database Management System and Enumerate the advantages of DBMS over a file-processing system.	<CO1>	1.4.1
<K3>	12. . The following relation keeps track of the airline flight information: Flights (**flno : integer,** from : **string**, to : **string**, distance : **integer**, departs : **time**, arrives : **time**, price : **integer**)	<CO2>	1.4.1 2.4.1

	Aircraft (**aid : integer**, aname : **string**, cruisingrange : **integer**) Certified (**eid : integer, aid : integer**) Employees (**eid : integer**, ename : **string**, salary : **integer**) Note that the Employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft, and only pilots are certified to fly. Construct the following queries in SQL: a. For each pilot who is certified for more than three aircraft, find the eid and the maximum cruisingrange of the aircraft that he(or she) is certified for. b. Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu. c. Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago.		
(OR)			
<K3>	13. Consider the following schema: Suppliers (**si d: integer**, sname: string, address: string) Parts (**pi d: integer**, pname: string, color: string) Catalog (**si d : integer, pi d: integer**, cost: real) The Catalog relation lists the prices charged for parts by Suppliers. Construct the following queries in SQL: a. Find the sids of suppliers who supply some red or green part. b. Find pairs of sids such that the supplier with the first sid charges more for some part than the supplier with the second sid. c. Find the sids of suppliers who supply some red part or are at 221 Packer Street. Find the sids of suppliers who supply some red or green part. SELECT C.sid FROM Catalog C, Parts P WHERE (P.color = ‘red’ OR P.color = ‘green’) AND P.pid = C.pid; 2. Find pairs of sids such that the supplier with the first sid charges more for some part than the supplier with the second sid. SELECT C1.sid,C2.sid FROM Catalog C1, Catalog C2 WHERE C1.pid=C2.pid AND C1.sid!=C2.sid AND C1.cost>C2.cost; 3. Find the sids of suppliers who supply some red part or are at 221 Packer Street. SELECT S.sid FROM Suppliers S WHERE S.address = ‘221 Packer street’ OR S.sid IN (SELECT C.sid FROM Parts P, Catalog C WHERE P.color=’red’ AND P.pid = C.pid) 4. For each part, find the sname of the supplier who charges the most for that part. SELECT P.pid, S.sname FROM Parts P, Suppliers S, Catalog C <CO2> WHERE C.pid = P.pid AND C.sid = S.sid AND C.cost = (SELECT MAX (C1.cost) FROM Catalog C1 WHERE C1.pid = P.pid)	<CO2>	1.4.1 2.4.1
