Roll Number: _____

Thapar Institute of Engineering and Technology, Patiala

Department of Electrical and Instrumentation Engineering

END SEMESTER EXAMINATION

B. E. (EE, EIC)	Course Code: UCS312 Course Name: Database Management System
May 20, 2024	Friday, 2.00 – 05.00 pm
Time: 3 Hours, M. Marks: 45	Name of Faculty: Dr. Ravinder Kaur

Note: Attempt any 5 questions out of given 6 questions. Assume any missing data if required.

Sr. No.	Questions	Marks	CO	BL
Q.1 (a)	Suppose a relational schema R(w x y z), and set of functional dependency as following F : { x-→w, wz →xy, y→wxz }	(4)	CO3	L3
(b)	Find the canonical cover Fc (Minimal set of functional dependency). Consider the relation R(ABCDE) with following dependencies A→B, BC→E, and ED→A i) List all keys of R ii) Identify the normal form of R, by showing all the intermediate steps involved.	(5)	CO3	L3
Q.2 (a)	Consider the following database: S(Sid, Sname, City) P(Pid, Pname, Color, City) SP(Sid, Pid, Qty) The manager wishes to remove the entries of SP table automatically, when corresponding Supplier Number is removed from the S table. What strategy you will follow to ensure this? Write the commands for its implementation.	(4)	CO5	L2, L3
(b)	Outline the differences between the following terms with examples i. Partial and Full Functional Dependency ii. Correlated Query and Sub Query	(5)	CO3	L4
Q.3 (a)	What is "Two-Phase locking protocol"? Explain with the help of example of a schedule, how the protocol ensures a schedule to be conflict-serializable, but not Cascade-less?	(5)	CO4	L1, L2
(b)	Define entity set and also highlight the differences between weak entity set and strong entity set in respect of primary key with suitable examples.	(4)	CO2	L1,L4
Q.4 (a)	Consider the following information about the Library Management System database which keeps track of readers with the following considerations – • The system keeps track of the staff with a single point authentication system comprising login Id and password. • Staff maintains the book catalog with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details. • A publisher has publisher Id, Year when the book was published, and name of the book. • Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. • The staff keeps track of readers. Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too. • Staff also generate reports that has readers id, registration no of report, book no and return/issue info. Draw an ER diagram for given information. Be sure to indicate all key and cardinality constraints and any assumptions you make.	(5)	CO2	L4

(b)	Explain the term stored procedure, and give examples why stored procedures are useful.	(4)	CO5	L2
Q.5 (a)	Briefly answer the following questions based on this schema: *Emp(eid: integer, ename: string, age: integer, salary: real)* *Works(eid: integer, did: integer, pct time: integer)* *Dept(did: integer, budget: real, managerid: integer).* Suppose you have a view SeniorEmp defined as follows: *CREATE VIEW SeniorEmp (sname, sage, salary)* *AS SELECT E.ename, E.age, E.salary* *FROM Emp E* *WHERE E.age > 50* i. Explain what the system will do to process the following query: *SELECT S.sname FROM SeniorEmp S WHERE S.salary > 100,000* i. Give an example of a view on Emp that could be automatically updated by updating Emp. ii. Give an example of a view on Emp that would be impossible to update (automatically) and explain why your example presents the update problem that it does.	(6)	CO5	L2
(b)	Verify the conflict seriablibility of the given schedule by showing all the intermediate steps involved, also state reason for your answer S: r1 (X) ; r3 (X) ; w1(X) ; r2(X) ; w3(X)	(3)	CO4	L3
Q6	The following relations keep track of airline flight information: *Flights(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)* *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. Write each of the following queries in SQL. i. Find employees(s) with highest salary. ii. List flights where the departure time is later than the arrival time iii. Retrieve the names of employees who are certified to operate the aircraft with the longest cruising range iv. Find the average cruising range of all aircraft v. Find the names of pilots certified for some Boeing aircraft. vi. Find the aids of all aircraft that can be used on routes from Los Angeles to Chicago. vii. Find employees who are certified to operate any aircraft viii. List employees who are certified to operate the aircraft with the longest cruising range ix. Find flights with a price lower than the average price of all flights	(9)	CO5	L3

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Note: The Students can check their answer sheets on 27th May 2024 in CD 206A from 12:30-1:30pm