Subject Name & Code: DBMS (CS-2004) **Applicable to Courses:** BTech (CSCE)

Full Marks=50   **Time:2 Hours**

SECTION-A(Answer All Questions. Each question carries 2 Marks)

Time:30 Minutes   **(7×2=14 Marks)**

Question No	Question Type (MCQ/SAT)	Question	CO Mapping	Answer Key (For MCQ Questions only)
Q.No:1	**SAT**	How data integrity is different from data security?	CO1	
	SAT	What are the disadvantages of database processing?	CO1	
	SAT	What are the advantages of relational data model?	CO1	
	SAT	What are the advantages of Entity-Relationship data model?	CO1	
Q.No:2	**SAT**	In an E-R diagram, _____ are represented by a rectangular box with the name of the entity in the box.	CO2	
	SAT	_____ is an association between entities.	CO2	
	SAT	_____ entities are also referred to as owner or identifying entities.	CO2	
	SAT	The generalization process is the reverse of _____ process.	CO2	
Q.No:3	**MCQ**	A correlated sub-query always executes in a. Top-Bottom-Top b. Top-Bottom c. Bottom-Top	CO3	a. Top-Bottom-Top

			d. None of these		
	MCQ	The correct order of SQL expression is: a. select, group by, where, having b. select, where, group by, having c. select, group by, having, where d. select, having, where, group by	CO3	b. select, where, group by, having
	MCQ	Write an SQL statement to select the customers living in a city that starts with 'B' from 'Customer' table? a. SELECT * FROM Customer WHERE city LIKE 'B_'; b. SELECT * FROM Customer WHERE city LIKE 'B%'; c. SELECT * FROM Customer WHERE city LIKE '_B%'; d. SELECT * FROM Customer WHERE city LIKE '%B_';	CO3	b. SELECT * FROM Customer WHERE city LIKE 'B%';
	MCQ	Which of the following query is correct for using comparison operators in SQL? a. SELECT sname, coursename FROM StudentInfo WHERE age>50 and <80; b. SELECT sname, coursename FROM StudentInfo WHERE age>50 and age<80; c. SELECT sname, coursename FROM StudentInfo WHERE age>50 and WHERE age<80;	CO3	b. SELECT sname, coursename FROM StudentInfo WHERE age>50 and age<80;

			d. None of these		
Q.No:4	**SAT**		Given a relation R(X,Y,W,Z, P,Q) and the set F={XY→W, XW→P, PQ→Z, XY→Q}. Consider the decomposition R1(Z,P,Q)and R2=(X,Y,W,P,Q). Check whether the decomposition is lossless or lossy type?	CO4	
	SAT		Consider the FDs of relation R(ABCDE) AB-->C, C-->E, B-->D, E-->A The relation is further decomposed into two relations R1(BCD) & R2(ACE). Check whether the decomposition is lossless or lossy type?	CO4	
	SAT		Let R (A, B, C, D) is a relational schema with the following FDs: A→B, B→C, C→D, D→B. The decomposition of R into (A, B), (B,C) and (B, D). Check whether the decomposition is lossless or lossy type?	CO4	
	SAT		A relation schema R(A, B, C, D) having functional dependencies F:{A→BC, C→D} is decomposed into R1(A, B, C) and R2(C, D). Check whether the decomposition is lossless or lossy?	CO4	
Q.No:5	**SAT**		Consider the given schedules S S: r1(x), r1(y), r2(x), r2(y), w2(y), w1(x) Check whether this schedule is conflict serializable or not?	CO5	
	SAT		Consider the given schedules S	CO5	

		S: r1(x), r2(x), r2(y), w2(y), r1(y), w1(x) Check whether this schedule is conflict serializable or not?		
	SAT	Consider the given schedules S S: r1(x), r2(x), w1(x), w2(x), r1(y), w1(y), r2(x), w2(y). Check whether this schedule is conflict serializable or not?	CO5	
	SAT	Consider the given schedules S S: r1(x), w1(x), r2(x), w2(x), r2(y), w2(y), r1(y), w1(y) Check whether this schedule is conflict serializable or not?	CO5	
Q.No:6	**SAT**	The result of the Cartesian product of two relations which have n and m columns is a relation that has _____ columns.	CO3	
	SAT	The result of the Cartesian product of two relations which have n and m tuples respectively is a relation that has _____ tuples.	CO3	
	SAT	Associations between tables are defined by using _____ keys.	CO3	
	SAT	_____ is an attribute(s) of one relation whose values are required to match those of the primary key of some other relation.	CO3	
Q.No:7	**SAT**	Differentiate between B tree and B$^+$ tree?	CO6	
	SAT	What are the differences between a dense index and a sparse index?	CO6	
	SAT	Explain the distinction between a primary index and a secondary index.	CO6	
	SAT	Differentiate between a clustering index and a secondary index.	CO6	

Question No	Question	CO Mapping (Each question should be from the same CO(s))
Q.No:8	Draw the ER diagram for the movie industry. A movie has a title, a year and a length. Since some movies have the same title, it takes a title and a year to uniquely identify a movie. Some movies are remakes of others. A star has a name and an address. A star's name uniquely identifies the star. A star can appear in any number of movies. Some movies have many stars and some have none. A studio has a name and an address, and is uniquely identified by its name. A star can belong to at most one studio. A studio can own any number of movies. A movie is always owned by at most one studio, but some are not owned by any studio. A studio may or may not have a president, but nobody can be a studio president without being the president of some studio. Studio presidents are uniquely identified by their name, but they also have an address. No one can be the president of more than one studio. Stars and studio presidents are both examples of movie people, but there are other types of movie people as well. No star can be a studio president. Make necessary assumptions. Identify the primary and foreign keys. Then convert the above ER diagram into relational schemas.	CO2
	Draw the ER diagram for IPL 2019; which consists of different teams. Each team is identified by	

	unique team_name, city, coach, and one or more than one sponsors. Each team is owned by a franchise. In each year, there is a auctioning of players in which players are auctioned/ purchased by franchises. A franchise can purchase more than one player; but, a player can't be purchased by more than one franchise. The system should keep track of the following details about the franchise such as unique franchise name, address, budget and contact numbers. A player can be identified by unique player name, base_price, playing_club. Players are playing for their team; a player can not play for more than one team. One of the players is heading the team as captain. Every player has the career like number of matches, total runs, batting average, batting strike rate, total wickets, bowling average and bowling strike rate. A franchise can acquire shares in more than one team. Also, a player can be categorized as a bowler or a batsman or an all-rounder. Make necessary assumptions. Identify the primary and foreign keys. Then convert the above ER diagram into relational schemas.	
	Draw the ER diagram for a Hospital management system. The database maintains all the details of the doctor (name, designation, specialization) who enrolled to Department and also all employee information who works for the department. Department of the hospital identified through the deptno, and department name. There is a registration process required for all patient to a department before they treated by any doctor. Patient	

	details information must contain their name, address, and age. The database also keeps track the payment details of the patient once the patient discharged from the hospital. If the patient having any insurance policy (policyno, type, company) then that information also stored into the database. Make necessary assumptions. Identify the primary and foreign keys. Then convert the above ER diagram into relational schemas.	
Q.No:9	Compute the closure of the following set F of functional dependencies for relation schema R(A, B, C, D, E). Also, compute the canonical cover F_c. $A\rightarrow BC$, $CD\rightarrow E$, $B\rightarrow D$, $E\rightarrow A$	CO4
	Given R (A, B, C, D, E, G) and the set of functional dependencies on R given by F:{$ABC\rightarrow DE$, $AB\rightarrow D$, $DE\rightarrow ABCG$, $E\rightarrow C$}, in what normal form is R? If it is not in 3NF, decompose R and find a set of 3NF relations of R.	
	Consider the relation schema R (A, B, C, D, E) and the set F={$AB\rightarrow CE$, $E\rightarrow AB$, $C\rightarrow D$}. What is the highest normal form of this relation?	
Q.No:10	Emp(<u>eid</u>, ename, age, salary) Works(<u>eid</u>, <u>did</u>, timing) Dept(<u>did</u>, budget, mgrid) Solve the following queries using SQL statements: a. Find the employees getting 50000 as salary. b. Display the employees' name, their ages and the timing for their work. c. Find out the manager's name who manages the department with the largest budget. d. Display the employees who are	CO3

	getting more salary than the average salary of all employees.	
	Emp(eid, ename, age, salary) Works(eid, did, timing) Dept(did, budget, mgrid) Solve the following queries using Relational Algebra expressions: a. Display the employees' name, their ages and the timing for their work. b. Find the employees' name and their corresponding managers. c. Find the managers who manage only departments with budget larger than 500000000. d. Find the name of the employees who are managing all departments.	
	Emp(eid, ename, age, salary) Works(eid, did, timing) Dept(did, budget, mgrid) Solve the following queries using Relational calculus expressions: a. Find the name of the employees who are of minimum 50 years of old. b. Display the employees' name, their ages and the timing for their work. c. Find the did of the departments who are being managed by 'Akash'. d. Find the managers who manage only departments with a maximum budget of 1o lakhs.	
Q.No:11	What is serializability? Explain any one serializable technique for controlling the concurrent execution with suitable example.	CO5
	Why is concurrency control needed? Explain lost update, dirty read and incorrect summary	

	problem with suitable example.	
	Explain the working of Timestamp-ordering protocol. Also, discuss how it guarantees the serilizability.	