Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), JULY 2022
COMPUTER SCIENCE AND ENGINEERING
(2020 SCHEME)

Course Code : **20CST204**

Course Name: **Database Management Systems**

Max. Marks : **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. List out various database users.
2. Compare the strong and weak entity with example
3. $\sigma_{\text{(subject = "database" or price = "450")}}$(Books) rewrite the query using union operator
4. Illustrate theta join with example
5. What is the use of assertion?
6. List out various aggregate functions in SQL.
7. When do you say that the relation is in 3NF but not in BCNF?
8. Determine any two candidate keys of the relation R(A,B,C,D,E,F) With FDs AB→C, C→AD, D→EF, F→B.
9. What is meant by rollback.
10. What is meant by incorrect summary problem

PART B

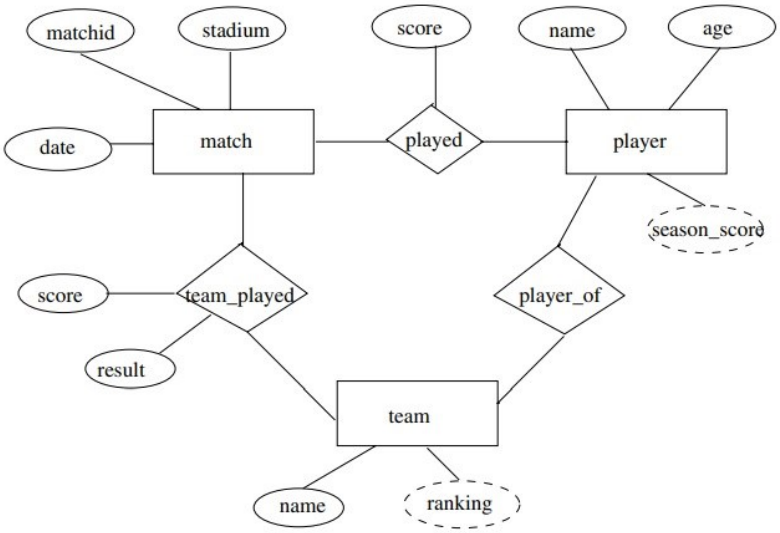
(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):
    • the NHL has many teams,
    • each team has a name, a city, a coach, a captain, and a set of players,
    • each player belongs to only one team,
    • each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records, (14)
    • a team captain is also a player,
    • a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 2017) and a score (such as 4 to 2). Construct a clean and concise ER diagram for the NHL database using min max notation.

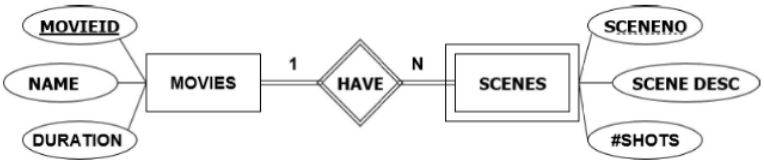
OR

12. a) Explain the following scenario



(8)

b)



(6)

In the above ER diagram how can we replace the weak entity set. Draw the new ER diagram.

MODULE II

13. ALBUMS(ALBUM-ID, ALBUM-NAME, PRODUCED-BY, YEAR)
SONGS(SONG-ID, SONG-START, DURATION, ALBUM-ID)
For the relations listed below, write SQL statements for the following
    i) Create both the tables with appropriate datatypes
    ii) Add a column named Genre to the table ALBUMS.
    iii) Delete the column named PRODUCED BY from the table ALBUMS
    iv) Update the year of the album with name 'SUHANA RATH' to 2018.
    v) Delete the album 'YADON KI BAARISH' along with all the songs in it.

(14)

OR

14. Consider the following tables
Employee (ssn, name, address, sex, salary,Dno)
Department (Dname, Dno, Mgr_ssn, Mgr_start_date)
Dept_locations((Dno, Dlocation)
Project(Pname, Pno, Plocation, Dno)
Works_on (ssn, Pno, Hours)
Dependent(Essn, Dependent_name, Sex, Bdate, Relationship)
Write the relational algebra queries to
    i) Retrieve the name and address of all employees who work for the 'Research' department.

(14)

ii) For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

iii) Find the names of employees who work on all the projects controlled by department number 5

iv) Make a list of project numbers for projects that involve an employee whose last name is 'Smith', either as a worker or as a manager of the department that controls the project.

v) List the names of all employees with two or more dependents.

MODULE III

15. Consider the following tables
STUDENT (id, name, dept)
FACULTY(id, name, dept)
Teaches(student_id, faculty_id, marks)
Student_id and faculty_id are foreign keys.
Write the SQL queries to (14)

i) get the name of students of 'CS' department

ii) get the id of students taught by staff in 'CS' department (No redundant values)

iii) get the number of students in each department.

iv) get departments which has more than 200 students

v) get the values of name of students with highest mark in each department

OR

16. a) Consider a disk with block size B = 512 bytes. Block pointer is of size 6 bytes. A file has 30,000 EMPLOYEE records of fixed length. Each record has the following fields: Name (30 bytes),Ssn (9 bytes, Primary key), Department code (9 bytes), Address (40 bytes), Phone (10 bytes), Birth_date (8 bytes), Sex (1 byte), Job_code (4 bytes), and Salary (4 bytes). An additional byte is used as a deletion marker. Calculate the number of block access if multilevel primary indexing is used. (9)

b) Explain user defined Functions in SQL with example (5)

MODULE IV

17. a) Compare Equivalency and minimal cover of functional dependencies with suitable examples (7)

b) R = (A, B, C, D, E). R is decomposed into R1 = (A, B, C), R2 = (C, D, E). The set of functional dependencies is: A → BC, CD → E, B → D, E → A. Check whether the relation is lossless. (7)

OR

18. a) Given a relation R(A,B,C,D,E,F,G, H) with keys BD and C and functional dependencies D→G, E→F and H→C, decompose the R into the third normal form. (7)

b) Illustrate dependency preserving algorithm with example (7)

MODULE V

19.	a)	With the help of suitable logs, illustrate how recovery is done in deferred database modification scheme.	(7)
	b)	Determine whether the following schedule is conflict serializable or not S: R1(X) R1(Y) R2(X) R2(Y) W2(Y) W1(X)	(7)

OR

20.	a)	Explain main characteristics of Key value DB and Document DB	(7)
	b)	Illustrate two-phase locking with a schedule containing three transactions. Argue that 2PL ensures serializability. Also argue that 2Pl can lead to deadlock.	(7)

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