Sample Question Format

KIIT Deemed to be University
Online Mid Semester Examination(Spring Semester-2021)

Subject Name & Code: DBMS & CS-2004
Applicable to Courses: B.Tech CSE, IT, CSSE and ESCE

Full Marks=20 **Time:1 Hour**

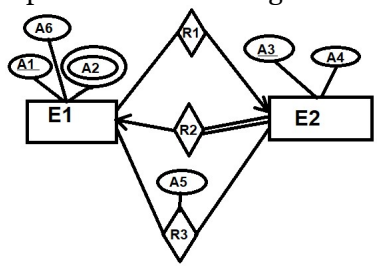
SECTION-A(Answer All Questions. All questions carry 2 Marks)

Time:20 Minutes **(5×2=10 Marks)**

Question No	Question Type(MCQ/SAT)	Question	Answer Key(if MCQ)	CO Mapping
Q.No:1(a)		_____ information is not provided by data dictionary. A.Where data is located B.Who owns or is responsible for the data C.How the data is used D.The size of the disk storage	D	CO1
		Which is correct about data models? I. Hierarchical model is more complex in structure than network model. II. Semantic content is added in relational model. III. ER model is widely used data model but it limits constraint representation. IV. Relational model visual representation in more efficient than ER model. A. I B. II C. III D. IV	C	CO1
		Which is wrong about single user database system? I. It supports only one user at a time. II. It is also called a desktop database system. III. It supports only one user all time. A.I B.II C.III D.ALL	C	CO1
		Which is more correct? I. Semantics are added in ER model. II. DML is added in ER model. III. DDL is added in ER model. A. I	C	CO1

		B. II C. III D. ALL		
Q.No:1(b)		Let E1 and E2 be two entities in an ER diagram with simple single-valued attributes. R1 and R2 are two relationships between E1 and E2, where R1 is many-to-many and R2 is many-to-many. R1 and R2 do not have any attributes of their own. What is the minimum number of tables required to represent this situation in the relational model. A. 2 B. 3 C. 4 D. 5	C	CO2
		Which one of the following option is CORRECT consider the following statements. (i) An attribute of an entity can be composite in ER model (ii) In a row of a relational table, an attribute can have exactly one value or a NULL value (A) i (B) ii (C) Both (D) None	C	CO2
		The rule which guarantees that every primary key attribute is NOT NULL? A.Entity Integrity B.Domain Constraint C.Referential Integrity D.Operational Constraint	A	CO2
		In a university database, every faculty must have to teach at least one course. However, a course can be taught by only one faculty. Again, there may be some courses for which no faculty has been allotted. Which one of the following correctly represents the cardinality and participation for the relationship between faculty and course? A. 1:1, total, partial B. 1:1, partial, partial C. 1:M, partial, total D. 1:M, total, partial	D	CO2
Q.No:1(c)		Select the relational expression which could possibly return the following result from a relation R: **a** | **c** 1 | 2	D	CO3

		2 | 3 (a) $\Pi_{a,c}(\sigma_{a=c}(R))$ (b) $\Pi_{a<c}(\sigma_{a,c}(R))$ (c) $\Pi_{a>2}(R)$ (d) $\sigma_{a<c}(\Pi_{a,c}(R))$		
		Which of the following is wrong? I. In the inner join, tuples with NULL valued join attributes appear in the result. II. The equi join is not the theta join based on equality of specified columns. III. Outer join is not an extension of the natural join operation. A. I B. II C. III D. ALL	D	CO3
		Given the relations Students(Name, Marks, SchoolNo) Schools (SchoolNo, SchoolName, Address) Which of the following queries cannot be expressed using the basic relational algebra operations ($\sigma, \pi, \times, \cup, -$) ? (A) School Address of every student (B) Students whose name is same as their school name (C) The sum of all students' marks (D) Name of students of a given school	C	CO3
		Which among the following is correct? I. Union operation is used to combine data of attribute of a relation. II. Division operation is the reverse of the Cartesian product operation. III. Difference operation is used to identify the rows that common to both relations. A. I B. II C. III D. None	B	CO3
Q.No:1(d)		For a weak entity set to be meaningful, it must be part of a which type of relationship A.One-to-one relationship B.Many-to-many relationship C.One-to-many relationship D.None of these	C	CO2
		Which is correct? I. All the super keys are candidate	**B**	CO2

		keys. II. All the candidate keys are super keys. III. Primary key is called as alternate key. IV. All candidate keys are primary keys. A. I B. II C. III D. IV		
		Which is incorrect? I. There is no confusion between entity set and attributes while designing ER model. II. There is no confusion of relationship type while designing ER model. A. I B. II C. BOTH D. NONE	A	CO2
		How many relational schemas you need to represent the following ERD.  A. 2 B. 3. C. 4 D. 5	C	CO2
Q.No:1(e)		What will be the output if the following is executed? Select * from customer where name like '%K%' A. Display the details of only the customers whose name starts with 'K'. B. Display the details of only the customers whose name ends with 'K'. C. Display the details of the customers whose name consists of 'K' at any position. D. All of the above.	C	CO3
		Consider two tables named as 'Product' and 'Order_items'. Which one of the following statements correctly represents the referential integrity constraint that is implemented at table level? A. CREATE TABLE order_items(order_id number(5) PRIMARY KEY, pid number(5)	D	CO3

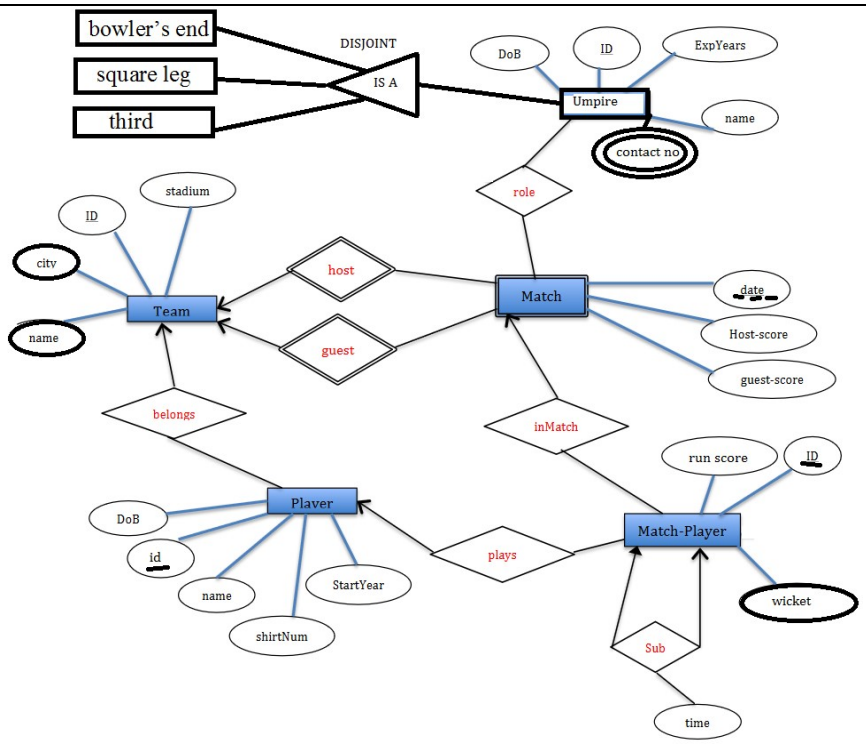
		REFERENCES product(product_id), product_name char(20), supplier_name char(20), unit_price number(10)); B. CREATE TABLE order_items (order_id number(5) PRIMARY KEY, pid number(5) REFERENCES product, product_name char(20), supplier_name char(20), unit_price number(10)); C. CREATE TABLE order_items(order_id number(5) CONSTRAINT od_id_pk PRIMARY KEY, product_id number(5) CONSTRAINT pd_id_fk REFERENCES product(product_id), product_name char(20), supplier_name char(20), unit_price number(10)); D. CREATE TABLE order_items(order_id number(5) , product_id number(5), product_name char(20), supplier_name char(20), unit_price number(10)CONSTRAINT od_id_pk PRIMARY KEY(order_id),CONSTRAINT pd_id_fk FOREIGN KEY(product_id) REFERENCES product(product_id));		
		Consider the following 3 statements for SQL query. (i) An SQL query automatically eliminates duplicates (ii) All attributes used in the GROUP BY clause may appear in the SELECT clause (iii) SQL permits attribute names to be repeated in the same relation Which one of the following option is CORRECT? (A) i (B) ii (C) iii (D) All of the above	B	CO3
		Consider the following two relational schemas and find out the right relational algebra expression that lists all manager's first name. Employee(id, f_name, l_name, dob, salary, dept_no) Department(dept_no, dept_name, dept_location, manager's_id)	B	CO3

		A. $\Pi_{f\_name}(\sigma_{employee.dept\_no = department.dept\_no}(employee \times department))$ B. $\Pi_{f\_name}(\sigma_{id=manager's\_id}(employee \times department))$ C. $\Pi_{manager's\_f\_name}(employee \times department)$ D. $\Pi_{id,f\_name}(employee) \div \Pi_{manager's\_id}(department)$		

SECTION-B(Answer Any One Question. Each Question carries 10 Marks)

Time: 30 Minutes **(1×10=10 Marks)**

Question No	Question	CO Mapping
Q.No:2	A. Assume there are different IPL cricket teams, having players in each team. In the ER design, we want to show the following: There are a set of teams, each team has an ID (unique identifier), name stadium_name, and to which city this team belongs. Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), player_name, DoB, age(as derived attribute) start year, and shirt number that he uses. Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team. For each match we need to keep track of the following: • The date on which the game is played • The final result of the match • The players participated in the match. • For each player, how many runs he scored, whether or not he took any wicket • During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place. • Each match has exactly three umpires (umpire can either be a bowler's end umpire, square leg umpire, third umpire). For each umpair we have an ID (unique identifier), name, contact number (as multi-valued attribute) DoB, years of experience. Design an ER diagram to capture the above requirements. State any assumptions you have that affect your design. Clearly specify the cardinalities and primary keys. [5 marks]	CO2



B. Map the ERD in above question to create the relational model. (Indicate primary keys as well as referential integrity constraint). [3 marks]

Team=(ID, name, city, stadium_name)
Match=(ID,date, final result, player participated)
Player=(number, dob, player name, age, shirtnum, startyear)
Role=(ID,date)
Bowler end umpire=(ID, name, year of experience, dob)
Contact no=(ID,cont_no)
Square leg umpire=(ID, name, year of experience, dob)
Third umpire=(ID, name, year of experience, dob)
Match player= (ID, run score, wicket time)

C. Why are entity integrity and referential integrity important in a database? [2 marks]

Full mark should be given if written correctly.

Q.No:3 — CO3

A. Consider a database that consists of the following relations.
SUPPLIER(Sno, Sname)
PART(Pno, Pname)
PROJECT(Jno, Jname)
SUPPLY(Sno, Pno, Jno)
The database records information about suppliers, parts, and projects and includes a ternary relationship between suppliers, parts, and projects. This relationship is a many-many-many relationship. Write the following queries using the relational algebra.

a. Find the name of the supplier who in involved in project number '1'.

$\pi_{Sname}(\sigma_{Jno='1'}(SUPPLIER \bowtie SUPPLY))$

b. Find the detail of the supplier who supplies part number '2'.

$\pi_{Sno, Sname}(\sigma_{Pno='2'}(SUPPLIER \bowtie SUPPLY))$

c. Obtain the details of supplier working on the 'smart-home' project.

$\pi_{Sno, Sname}(\sigma_{Jname='smart-home'}(SUPPLIER \bowtie SUPPLY \bowtie PROJECT))$

d. Find the Sno who don't work on project '1'.

$\pi_{Sno}(SUPPLY) - \pi_{Sno}(\sigma_{Jno='1'}(SUPPLY))$

[1.5*4=6 marks]

B. What is the difference between specialization and generalization? Why do we not display this difference in schema diagrams? How the specializations and generalizations will be affected if constraints are applied. [4 marks]

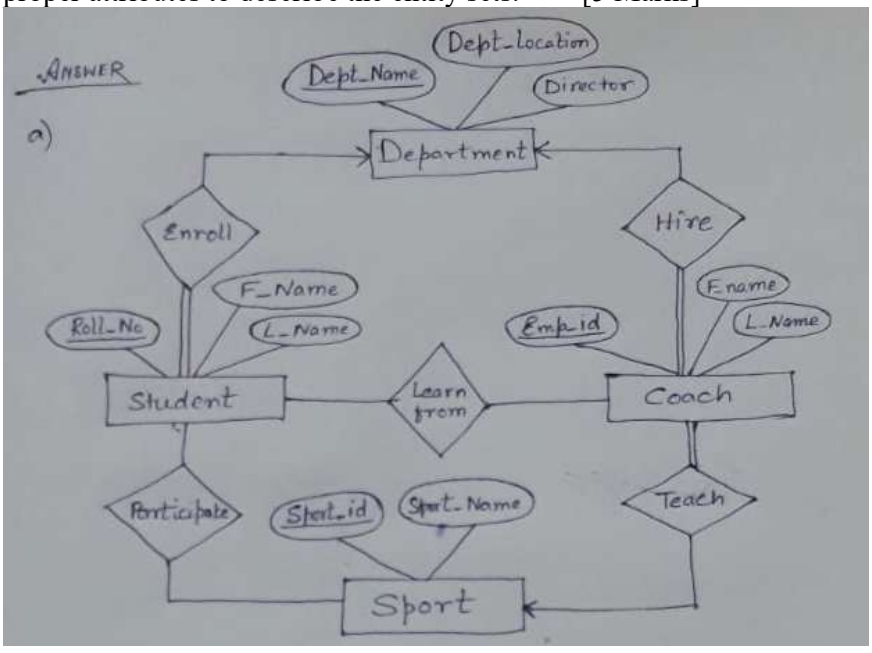
First and second part 1 mark.

Third part 2 mark.

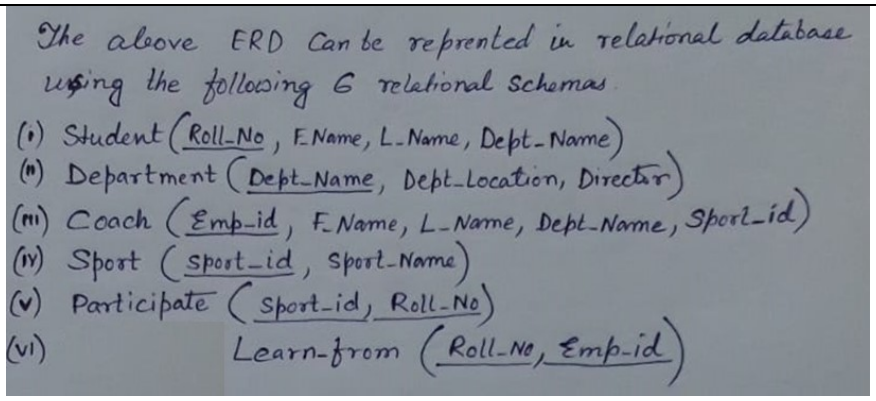
Q.No:4 CO2

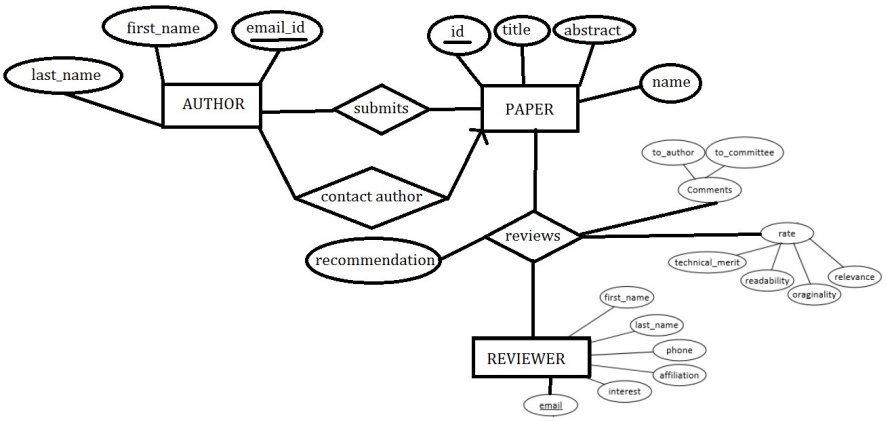
Students can take part in multiple sports. Each sport has minimum two coaches. One coach must be hired by a certain department and must coach only one sport, which may have many student-participants from different departments. A department can hire multiple coaches for multiple games. A department can enroll maximum 120 students. A student must be enrolled to one department only. Every student must have a first name and a last name along with a unique roll number, every coach must have a first name and a last name along with a unique employee id, every department should have a unique department name, and a sport must have a unique sports_id.

A. Draw an ERD for the University Sports System from the above description. Do not use any additional entities; however, you can add proper attributes to describe the entity sets. [5 Marks]



B. Represent your ERD of the above system in relational schemas. [3 Marks]

	 C. Justify whether the redundancy of data can be reduced with a foreign key or not. [2 mark] Full mark should be given if written correctly.	
Q.No:5	Consider a CONFERENCE_REVIEW database in which researchers submit their research papers for consideration. Reviews by reviewers are recorded for use in the paper selection process. The database system caters primarily to reviewers who record answers to evaluation questions for each paper they review and make recommendations regarding whether to accept or reject the paper. The data requirements are summarized as follows: ■ Authors of papers are uniquely identified by e-mail id. First and last names are also recorded. ■ Each paper is assigned a unique identifier by the system and is described by a title, abstract, and the name of the electronic file containing the paper. ■ A paper may have multiple authors, but one of the authors is designated as the contact author. ■ Reviewers of papers are uniquely identified by e-mail address. Each re-viewer's first name, last name, phone number, affiliation, and topics of interest are also recorded. ■ Each paper is assigned between two and four reviewers. A reviewer rates each paper assigned to him or her on a scale of 1 to 10 in four categories: technical merit, readability, originality, and relevance to the conference. Finally, each reviewer provides an overall recommendation regarding each paper. ■ Each review contains two types of written comments: one to be seen by the review committee only and the other as feedback to the author(s). A. Design an entity–relationship diagram for the CONFERENCE_REVIEW data-base.	CO2



B. Convert the ER model to relational schema.

Paper (id, title, abstract, name);
Author (email_id, first_name, last_name);
Reviewer (email, first_name, last_name, phone, interests);
Review (id,email, technical_merit, readability, oraginality, rele-vance, to_author, to_committee, Recommendation);
Submit (id, email_id);

C. Referential integrity always maintain the database into a consistent state explain this concept with help of a suitable example.

Full mark should be given if written correctly.

[6+2+2 marks]

Q.No:6 CO3

Consider the following relational database schema as mentioned below
EMPLOYEE(Emp_ID, Name, Dept_no, Age, Gender, Job, Manager, Salary, City)
Write the following queries in SQL and relational algebra.

a. Display the Emp_ID, Name, Salary, and Manager for all male employees either work for department number 10 or 20 and are getting salary above 50000.

Select Emp_ID, Name, Salary, Manager from employee where ((dept_no =10 or dept_no = 20) and salary>50000);

π Emp_ID, Name, Salary, Manager(σ ((dept_no = 10 or dept_no = 20) and salary>50000)(EMPLOYEE))

b. Display the details of the employees above 50yrs of age and they work under manager '5366' or who belongs to 'Delhi'.

Select * from employee where ((Age > 50 and Manager = 5366) or City = 'Delhi');

π Emp_ID, Name, Dept_no, Age, Gender, Job, Manager, Salary, City(σ((Age > 50 and Manager = 5366) or City = 'Delhi')(EMPLOYEE))

c. Display the Emp_ID, Name, and job whose name contains 'A' and Dept_no is 20.

Select Emp_ID, Name, Job from employee where Name like '%A'
UNION select dept_no, Job from employee where dept_no =20;

	π Emp_ID, Name,Job (σ Name like '%A%' (EMPLOYEE)) U π Dept_no, Job (σ Dept_no = 20 (EMPLOYEE)) d. Display the employee no of the employees who are not managers. Select Emp_ID from employee MINUS select Manager from employee; π Emp_ID (EMPLOYEE) - π Manager(EMPLOYEE) e. Display the details of the employees who are earning the second highest salary. Select * from employee where Salary =(select max(Salary) from emp where Salary <(select max(Salary) from employee)); π Emp_ID, Name, Dept_no, Age, Gender, Job, Manager, Salary, City(σ (Salary = ($\pi g_{max(Salary)}$ (σ (Salary< ($\pi g_{max(Salary)}$(EMPLOYEE))(EMPLOYEE))) [2*5 marks]	

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