APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fourth semester B.Tech examinations (S), September 2020

Course Code: CS208

Course Name: PRINCIPLES OF DATABASE DESIGN (CS, IT)

Max. Marks: 100   Duration: 3 Hours

Limit answers to the required points.

PART A
Answer all questions, each carries 3 marks.   Marks

1	Illustrate three schema architecture with a suitable diagram.	(3)
2	With a help of an example, elaborate weak entity set and strong entity set.	(3)
3	Differentiate DDL and DML with suitable example.	(3)
4	With suitable example, define integrity constraint?	(3)

PART B
Answer any two full questions, each carries 9 marks.

5   Design an ER diagram for the given scenario;   (9)

Suppose that you are designing a schema to record information about reality shows on TV. Your database needs to record the following information:

_ For each reality show, its name, genre, basic_info and participants name. Any reality show has at least two or more participants.

- For each producer, the company name, company country. A show is produced by exactly one producer. And one producer produces exactly one show.

- For each television, its name, start year, head office. A television may broadcasts multiple shows. Each show is broadcasted by exactly one television.

-For each user, his/her username, password, and age. A user may rate multiple shows, and a show may be rated by multiple users. Each rating has a score of 0 to 10.

6   Covert the following ER Model to Relational Model   (9)
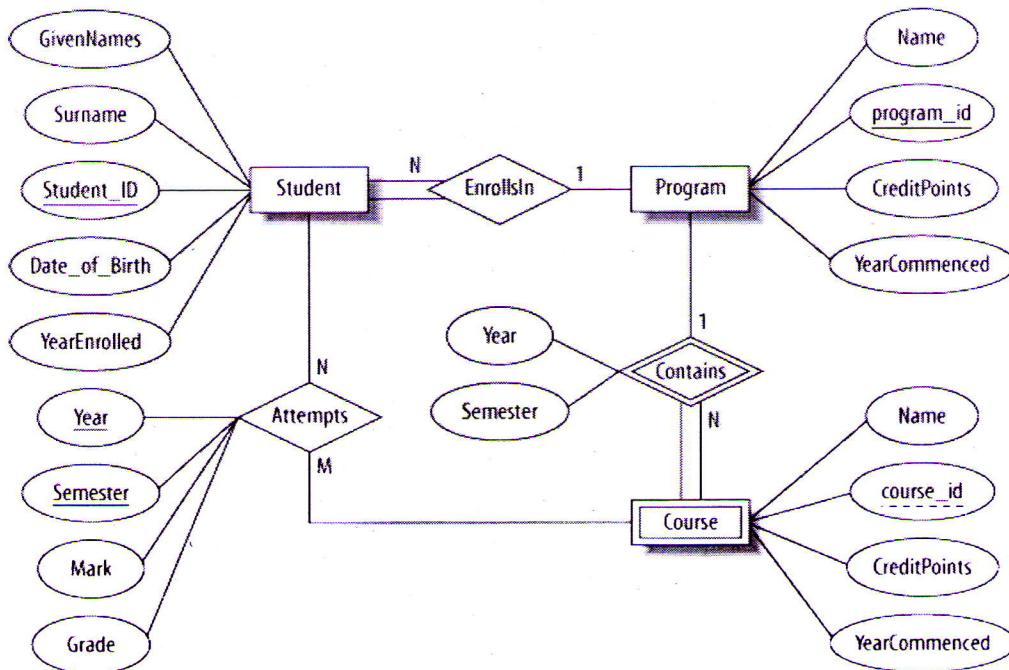
7   a)   Differentiate Natural join, Equi-join and Left outer join   (3)

7   b)   Consider the schema given below.   (6)

      employee (person-name, street, city)

      works (person-name, company-name, salary)

      company (company-name, city)

      manages (person-name, manager-name)

      Write relational algebra queries for the following questions

      a. Find the names and cities of residence of all employees who work for First Bank Corporation.

      b. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000 per annum.

      c. Find the names of all employees in this database who live in the same city as the company for which they work.

PART C
Answer all questions, each carries 3 marks.

8   With suitable example, list aggregate functions in sql   (3)

9   What is the importance of views in sql? Explain with suitable example.   (3)

10   Illustrate different anomalies in designing a database.   (3)

11   How can we conclude two FDs are equivalent?   (3)

PART D

Answer any two full questions, each carries 9 marks.

12 a) Consider the schema given below.   (9)

person (driver-id, name, address)

car (reg-no, model, year, driver-id)

accident (report-number, date, location)

participated (driver-id, reg-no, report-number, damage-amount)

Write SQL queries for the following

a. Find the name of driver, who is drives the car with reg-no='AABB2000'. Find the total number of people who were involved in car accidents in 01-01-1989.

c. Find the number of accidents in which the cars belonging to "John Smith" were involved.

d. Update the damage amount for the car with reg-no "AABB2000"in the accident with report number "AR2197" to $3000.

13 a) Compute the closure of the following set F of functional dependencies for relation   (3)
schema R = (A, B, C, D, E).

A → BC

CD → E

B → D

E → A

List the candidate keys for R.

   b) Define 3NF and BCNF. Let R (A, B, C, D, E) be a relational schema in which the   (6)
following functional dependencies are known to hold: AB → C, C → E and E → D . Identify the highest normal form

14 a) Illustrate triggers with a suitable example.   (4)

   b) R = (A, B, C, D, E). We decompose it into R1 = (A, B, C), R2 = (C, D, E). The set   (5)
of functional dependencies is: A → BC, CD → E, B → D, E → A. Check whether this decomposition is a lossless join decomposition or not.

PART E

Answer any four full questions, each carries 10 marks.

15 a) Compare primary indexing, secondary indexing and clustered indexing with   (6)
suitable diagram.

   b) Define the structure of B+ tree   (4)

16 a) Database system implementers have paid much more attention to the ACID   (6)
        properties than have file-system implementers. Why might this be the case?

    b) Explain deferred database modification with an example.   (4)

17 a) Consider a file with 450000 records. Each record size is 125 bytes and block is   (10)
        1000 bytes. The primary key of the file is 10 bytes and record pointer size is 6
        bytes.

        1). Calculate number of index block required in case of primary indexing

        2) Calculate number of index blocks required in case of multilevel indexing.

18 a) Differentiate serial and concurrent schedules. Elaborate Conflict serializability   (6)
        with suitable example.

    b) Illustrate two phase locking   (4)

19 a) Why recovery is needed in transaction processing   (5)

    b) Illustrate heuristic query optimization with suitable example.   (5)

20 a) Write short notes on   (10)

        1) Big Data

        2) Biological Database

        3) GIS

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