VIT
Vellore Institute of Technology

Slot : B1+TB1

School of Computer Science Engineering and Information Systems

Fall Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch: MCA

Course Name & code: Database Systems- PMCA503L

Class Number (s): VL2023240106181, VL2023240106185, VL2023240106189

Faculty Name (s) MUTHAMIL SELVAN T, KARTHIKEYAN J, TAPAN KUMAR DAS

Exam Duration: 90 Mins **Maximum Marks: 50**

Answer all the Questions. (10×5)

1. Let R (X, Y, Z, W) be a relational schema with the following functional dependencies:

{X→Y, Y→Z, Z→W, W→Y}

Prove that the decomposition of R into R_1(X, Y), R_2(Y, Z) and R_3(Y, W) is lossless join and dependency preserving.

2. Consider a relation schema R (A, B, C, D, E, G, H) and the following set of functional dependency.

F = {A → BC, B → CE, A → EG, AC → H, D → B}.

Find out a key of the schema and decompose it till Third normal form.

3. Consider the following relational database schema to record access of social networks. The primary keys are underlined. The foreign keys are self-explanatory.

USER (**User_id**, Name, Location, DoB, Profession),

ACCESSES (**User_id, Web_site_address**, Date_of_membership),

SOCIAL_NETWORK (Popular_name, **Web_site_address**, Rank_in_popularity, Date_of_inception),

Write down the necessary SQL statements for the following:

a) Create the above tables with the necessary primary key and foreign key. (4 Marks)

b) List the name and profession of all users from China. (2 Marks)

c) List the popular name of the social network and its web site address in decreasing order of its rank in popularity. (2 Marks)

d) List the user details who have taken membership after 1st September 2023 for the social network 'XYZ'. (2 Marks)

4. Write a PL/SQL code to print the student's grade accepting their marks in four different subjects interactively. 'A' grade is awarded if average mark is greater than 90, 'B' grade if average mark lies in between 80 and 90, 'C' grade if average mark lies in between 70 and 80, 'N' grade if average mark below 70.

5. Consider the following relational database schema.

EMPLOYEE (E_Id, Ename, Salary, DoB, D_Id)

DEPARTMENT (Dept_Id, P_Id, Dname, Budget, Status)

PROJECT (Prj_Id, Pname, Code, Report)

The primary keys are underlined. The attribute D_Id is a foreign key of the EMPLOYEE relation that refers to the DEPARTMENT relation and P_Id is the foreign key of the DEPARTMENT relation that refers to the PROJECT relation. Write down evaluation plans for the following query, develop the query tree and apply heuristic optimization technique.

Display project name, department name and employee name for employees drawing a salary higher than $50000 and budget higher than $2000000.