BTS-IV(S)-04-22-0250 Reg. No. | | | | | | | | |

B

B.Tech. Degree IV Semester Supplementary Examination April 2022

CS/IT 15-1406 DATABASE MANAGEMENT SYSTEMS

(*2015 Scheme*)

Time: 3 Hours Maximum Marks: 60

PART A

(Answer *ALL* questions)

(10 × 2 = 20)

I. (a) What are the different types of database users? Explain the role of database administrator in DBMS.

(b) Explain role of partial key in weak entity type with suitable example.

(c) What is the difference between single level index and multilevel index?

(d) Define B+ Tree with suitable example.

(e) What is integrity of database? Discuss on different types of integrity constraints.

(f) Define the following with suitable example

(i) Super Key

(ii) Candidate Key

(iii) Primary Key.

(g) Differentiate between select operation and project operation in relational algebra. Also discuss about cardinality and degree of the resulting relation with suitable example.

(h) How can you ensure that Time stamp ordering protocol always guarantees serializabilty? Explain with suitable example.

(i) What is dirty read problem? Explain with suitable example.

(j) Two transactions T1 and T2 are given as:
T1: r1(X)w1(X)r1(Y)w1(Y)
T2 : r2(Y)w2(Y)r2(Z)w2(Z)
where ri(V) denotes a read operation by transaction Ti on a variable V and wi(V) denotes a write operation by transaction Ti on a variable V. Find the total number of conflict serializable schedules that can be formed by T1 and T2.

PART B

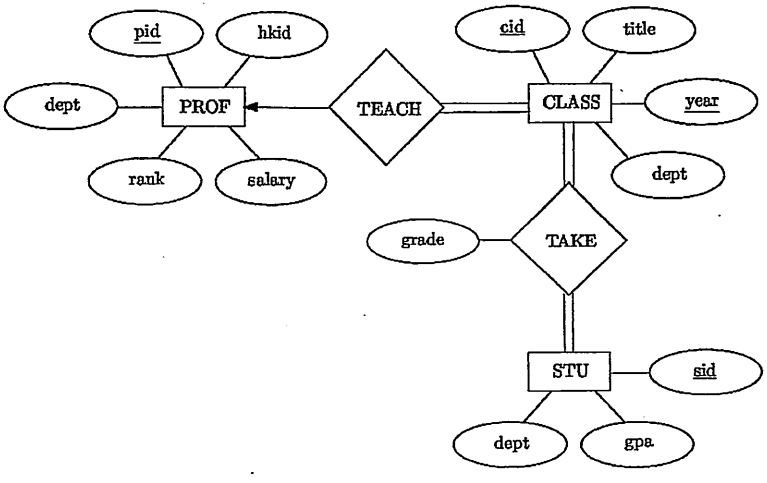
(4 × 10 = 40)

II. (a) Explain three schema architecture with neat diagram. (6)

(b) What you meant by program-data independence? Differentiate between physical data independence and logical data independence. (4)

OR

III. (a) Convert the following ER diagram into relations. (10)



(Write the appropriate rules used for conversion)

(P.T.O.)

IV. (a) Compare separate chaining and open addressing in hashing. (5)

(b) The keys 12, 18, 13, 2, 3, 23, 5 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table? (5)

OR

V. (a) What is indexing? What are the different kinds of indexing? (5)

(b) Explain collision in hashing. How collision can be resolved in external hashing? (5)

VI. Consider the schema for Company Database:
EMPLOYEE(SSN, Name, Address, Sex, Salary, SuperSSN, DNo)
DEPARTMENT(DNo, DName, MgrSSN, MgrStartDate)
DLOCATION(DNo,DLoc)
PROJECT(PNo, PName, PLocation, DNo)
WORKS_ON(SSN, PNo, Hours)
Write SQL queries to

(i) Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project. (2)

(ii) Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise. (2)

(iii) Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department (2)

(iv) Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). (2)

(v) For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than ₹ 6,00,000. (2)

OR

VII. (a) Why 3NF is preferred over BCNF? Explain with suitable example. (3)

(b) Define: (3)

(i) First Normal Form(1NF)
(ii) Second Normal Form(2NF)
(iii) Third Normal Form(3NF)

(c) Consider the following relational schema R=(A,B,C,D,E,H) on which the functional dependencies hold: {A→ B, BC→ D, E→ C, D→ A} (4)

(i) What are the candidate keys for R?
(ii) Find the normal form of a relation.

VIII. (a) Illustrate various problems in transaction management of a database. (6)

(b) Give a comparison between object oriented database and active database. (4)

OR

IX. (a) Why DBMS requires concurrency control? Explain with suitable example. (5)

(b) Consider the following schedules involving two transactions. (5)
S1: r1(X);r1(Y);r2(X);r2(Y);w2(Y);w1(X)
S2: r1(X);r2(X);r2(Y);w2(Y);r1(Y);w1(X)
comment on the statement " S1 is not conflict serializable and S2 is conflict serializable" and justify your answer.

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