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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

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

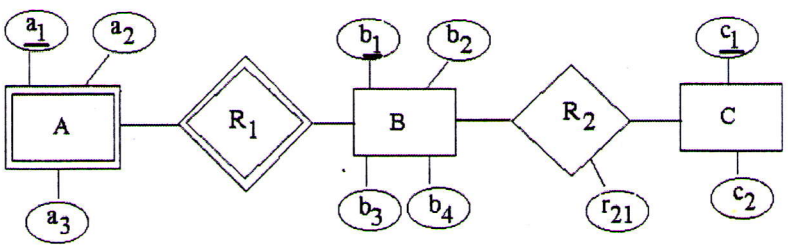
Answer all questions. Each carries 3 marks.

1 What are the responsibilities of the DBA? (3)

2 Define the following terms: (3)

i) Data model ii) Database schema iii) Meta-data

3 Consider the following ER diagram. Using this ER diagram create a relational database (primary keys are underlined). (3)



4 What are the different ways of classifying a DBMS? (3)

PART B

Answer any two questions. Each carries 9 marks.

5 With the help of a neat diagram explain the three-schema architecture of DBMS. (9)

6 Explain the following terms briefly: - (9)

i) Participation constraint

ii) Overlap constraint

iii) Covering constraint

7 Consider the following database with primary keys underlined (9)

Suppliers (*sid, sname, address*)

Parts (*pid, pname, color*)

Catalog (*sid, pid, cost*)

sid is the key for Suppliers, *pid* is the key for Parts, and *sid* and *pid* together form the key for Catalog. The Catalog relation lists the prices charged for parts by Suppliers.

Write relational algebra for the following queries: -

i) Find then names of suppliers who supply some red part

ii) Find the *sids* of suppliers who supply some red or green part

iii) Find the *sids* of suppliers who supply some red part and some green part.

PART C

Answer all questions. Each carries 3 marks.

8 What are the basic data types available for attributes in SQL? (3)

9 List the aggregate functions in SQL. (3)

10 Let E = {B →A, D→A, AB→D} is a set of Functional Dependencies. Find a minimal cover for E. (3)

11 Define Boyce-Codd normal form(BCNF). Give an example of a relation that is in 3NF but not in BCNF. (3)

PART D

Answer any two questions. Each carries 9 marks.

12 Consider the following relations for bank database (Primary keys are underlined):

Customer (customer-name, customer-street, customer-city)
Branch (branch-name, branch-city, assets)
Account (account-number, branch-name, balance)
Depositor (customer-name, account-number)
Loan (loan-number, branch-name, amount)

Answer the following in SQL:

i) Create tables with primary keys and foreign keys (5)

ii) Create an assertion for the sum of all loan amounts for each branch must be less than the sum of all account balances at the branch. (4)

13 Given R(A,B,C,D,E) with the set of FDs, F = {AB→CD, ABC →E, C →A}.

i) Find any two candidate keys of R (3)

ii) What is the normal form of R? Justify your answer. (6)

14 a) What are Armstrong's axioms? (3)

b) Write an algorithm to compute the attribute closure of a set of attributes (X) under a set of functional dependencies (F). (3)

c) Explain three uses of attribute closure algorithm. (3)

PART E

Answer any four questions. Each carries 10 marks.

15 What are the different types of single-level ordered indices? Explain. (10)

16 a) What is a B^+-tree? (2)

b) Describe the structure of both internal and leaf nodes of a B^+-tree of order p (8)

17 Differentiate between static hashing and dynamic hashing. (10)

18 How concurrency is controlled using Timestamp Ordering algorithm. (10)

19 Explain the concepts behind the following: -

i) Log-Based Recovery (5)

ii) Deferred Database Modification. (5)

20 a) What are the components of GIS? (3)

b) Explain the characteristics of data in GIS. (3)

c) What are the constraints in GIS? (4)

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