DBMS
(INFO 3104)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i)   In relational algebra, _____ is a binary operator.
(a) Project   (b) Rename
(c) Natural join   (d) None of the above

(ii)   A referential integrity constraint is
(a) primary key constraint   (b) Check constraint
(c) foreign key constraint   (d) None of the above.

(iii)   If a schedule S can be transformed into a schedule S′ by a series of
swaps of non-conflicting instructions ,we say that S and S′ are
(a) Conflict Serializable   (b) View equivalent
(c) Conflict Equivalent   (d) View Serializable

(iv)   A set of one or more attributes, whose no proper subset can uniquely identify an
entity in the entity set is called
(a) Super Key   (b) Primary Key
(c) Candidate Key   (d) Foreign key

(v)   A cascadeless schedule is also
(a) Revertable   (b) Recoverable
(c) Both   (d) None of the above

(vi)   Wait-die scheme for preventing deadlock is a
(a) Pre-emptive Scheme based on time-stamp
(b) Non-pre-emptive scheme
(c) Preemptive Scheme
(d) Non-preemptive Scheme based on timestamp

(vii)   A functional dependancy AB→A is
    (a) Trivial   (b) Nontrivial
    (c) Full   (d) All the above

(viii)   A functional dependency X→Y means that association from the domain of X to domain of Y is
    (a) many to many   (b) one to many
    (c) many to one   (d) one to one

(ix)   DCL statements are
    (a) Grant and revoke   (b) commit and rollback
    (c) Commit, rollback and savepoint   (d) None

(x)   In ACID property , the letter "C" denotes
    (a) Commitment   (b) Consistency
    (c) Concurrency   (d) Collective

Group – B

2.   (a)   Compare File processing system and Database Management System

        (b)   Design a generalization, specialization hierarchy using ERD model, for a motor vehicle sales company, where the company manufactures and sells motor cycles, passenger cars, vans, buses.

        (c)   Cite an example of Weak Entity Set and its identifying relationship with a strong entity set by using ER-notation.

4 + (2 + 2) + 4 = 12

3.   (a)   Design a database for MEDICAL CLINIC located in Chennai. The clinic has a number of regular patients and new patients come to the clinic regularly. Patients make appointments to see one of the doctors. Several doctors attend the clinic and they each have their own hours when they attend the clinic. Some doctors are general practitioners while others are specialist (like, cardiologists, dermatologists, endocrinologists etc). Doctors' hours are defined and fixed by each doctor but can be changed, if necessary. Different doctors may charge different fees. Doctors send patients to other clinics of *X*-rays and blood tests. These reports are sent from the clinics to doctors' electronically. Doctors write medical certificates. Patients have families and the family relationships are important. Medical records of each patient need to be maintained. Information on prescriptions, insurance, allergies, etc. needs to be maintained.
Design an ER model for the MEDICAL CLINIC.

        (b)   What is logical and physical data independence.

8 + 4 = 12

Group – C

4.   (a)   Explain the concept of foreign key with example.

(b)   A bank database has the following relations.
        Account(*account–number, branch–name, balance*),
        Depositor (*customer–name, account–number*),
        Customer (*customer–name, customer–street, customer–city*),
        Borrower (*customer_name, loan_number*),
        Write the SQL for the following queries.
        (i)   Find the largest account balance along with its branch-name in the bank
        (ii) Find the names of all customers who live in Kolkata or Delhi
        (iii) Find all customers name who have a loan in the bank and their names
              starts with the letter E.
        (iv) Find all customers who have an account but no loan.

        4 + 8 = 12

5. (a)   Consider a relational database as given below:
            *Train (**train-no**, train_name, start_station)*
            *Coach(**coach-no, train-no**, type, price)* where the underlined attributes are the
            primary keys. Using SQL create the two tables Train and Coach. Assign the
            constraints primary key for both the tables.

    (b)   Modify the Train Table to add another column destination_station.

            (3 + 3 + 2) + 4 =12

Group – D

6. (a)   Given a set of functional dependency (FD diagram) that exists in the relation R
            (A, B, C, D, E)
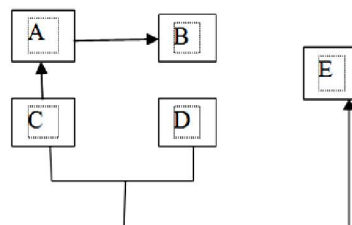
            (i)   Find out the functional dependencies
            (ii) Find out the Candidate key of the relation.

    (b)   Write the transitivity and pseudo transitivity rule of a functional dependency.
            (2 + 4) + (3 + 3) = 12

7. (a)   " Every candidate key is a superkey". Justify with example for or against. What is
            a key attribute.

    (b)   Find the attribute closure (AB+) for the following FD's
            (i) A → BC, AB→ D, AC→D
            (ii) A→B, B→C, AB→C.

            (4 + 2) + (3 + 3) = 12

Group – E

8. (a) Consider 2 transaction T1 and T2 running in a centralized environment such that
   T1 : R1(A) W1(A) R1(B) W1(B)
   T2 : R2(A) W2(A) R2(B) W2(B)
   Consider the schedule
   S : R1(A) R2(A)W2(A)R2(B)W1(A)R1(B)W1(B)W2(B)
   Find out whether the given schedule is conflict serializable or not.

   (b) Two phase locking does not ensure freedom from deadlock - Justify this using an example.

   (6 + 6) = 12

9. Write short notes on **any three** of the followings: **(3 × 4) = 12**
   (i) ACID property of Transaction
   (ii) Normalisation in Relational database design
   (iii) Concurrency Control
   (iv) DDI, DML,and DCL.

Department & Section	Submission Link
IT	https://classroom.google.com/c/MjgyNjM4OTQ1Mzk0/a/MjgyNjM4OTQ1NDQz/details