ROLL NO. _____

Code: DC62 Subject: DATABASE MANAGEMENT SYSTEMS

DipIETE – CS (Current Scheme)

Time: 3 Hours **June 2018** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The characteristic that allows program-data independence and program-operation independence is called
(A) Data Representation **(B)** Data Independence
(C) Data Model **(D)** Data Abstraction

b. An executing program or process that includes one or more database accesses is called
(A) Transaction **(B)** Recovery
(C) Consistency **(D)** Isolation

c. A row is called a
(A) Data **(B)** Value
(C) Tuple **(D)** Attribute

d. If each value in the domain is indivisible then the domain is said to be
(A) Atomic **(B)** Consistent
(C) Recoverable **(D)** Cascadeless

e. The EXISTS function in SQL is used to check whether the result of correlated nested query is
(A) Full **(B)** Empty
(C) Divisible **(D)** Indivisible

f. _____ is a condition database always need to satisfy.
(A) Trigger **(B)** Assertion
(C) Integrity **(D)** Predicate

g. If β is a subset of α then the functional dependency α →β is said to be
(A) Partial **(B)** Full
(C) Transitive **(D)** Trivial

h. 2NF removes
(A) Full Dependency **(B)** Multi-Valued Dependency
(C) Transitive Dependency **(D)** Partial Dependency

i. To transform from one relational algebra expression to another _____ is used.
(A) Parse tree **(B)** Equivalence rule
(C) A1 Algorithm **(D)** A2 Algorithm

j. B^+ is a
(A) Multi level indexing Technique **(B)** Hashing Technique
(C) Secondary Index **(D)** None of these

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Discuss in detail about Actors on the scene who are involved in the day-to-day use of a large database. **(8)**

b. With neat diagram explain Three Schema Architecture and Data Independence. **(8)**

Q.3 a. List and explain the features of Entity Relationship model. Draw the ER diagram for the Banking Enterprise. **(8)**

b. Explain in brief about Domain Constraints. **(8)**

Q.4 a. Explain in detail about Join types in Relational Algebra with neat examples. **(8)**

b. Discuss the different types of user-friendly interfaces and the types of users who typically use each. **(8)**

Q.5 a. For the following relation schema: **(2+2+2+2)**
employee(employee-name, street, city)
works(employee-name, company-name, salary)
company(company-name, city)
manages(employee-name, manager-name)

Give an expression in SQL for each of the following queries:
(i) Find the names, street address, and cities of residence for all employees who work for 'First Bank Corporation' and earn more than $10,000.
(ii) Find the names of all employees in the database who live in the same cities as the companies for which they work.
(iii) Find the names of all employees in the database who live in the same cities and on the same streets as do their managers.
(iv) Find the names of all employees who earn more than the average salary of all employees of their company. Assume that all people work for at most one company.

b. Define views. How views are created in SQL? What are the problems associated with views? Discuss about View Maintenance. **(1+2+2+3)**

Q.6 a. Consider the relation R(ABCDEF) and the set of functional dependencies FD1: AB → C, FD2: C → D, FD3: B → E, FD4: B → F. What is the maximum Normal form of relation R? Explain. **(8)**

b. Explain in detail about 2NF and 3NF with neat examples. **(4+4)**

Q.7 a. Consider the relation schema R(ABCDEFGH) with the set of functional dependencies {AB → C, AC → B, AD → E, B → D, BC → A, E → G}. Decompose the Relation R till BCNF. **(8)**

b. Explain database of normalization and discuss about the level of normalization. **(8)**

Q.8 a. List and explain the different types of records and its representation. **(8)**

b. Construct B+ tree to insert the following numbers (order of the tree is 3): **(8)**
3, 2, 5, 7, 6, 23, 24, 35, 67, 44, 43, 42, 17, 18, 19

Q.9 a. For the given database schema, **(8)**
Student(sid, name, major, age)
Class(cname, meets_at, room, facultyId)
Enrolled(studentId, className)
Faculty(fid, fname, deptid)

Draw the logical query tree for the following query:
SELECT name, major FROM Student, Enrolled, Class, Faculty
WHERE facultyId = fid AND studentId = snum
AND className = cname AND fname = 'Jones'

Using relational algebra laws, perform heuristic optimization on the query tree. Explain the optimizations (laws) that you apply and draw the optimized query tree.

b. Diagrammatically illustrate and discuss the range of activities involved in query processing. What are the measures of query cost? **(6+2)**