ROLL NO. _____

Code: AC61/AT61/AC112/AT112 Subject:DATABASE MANAGEMENT SYSTEMS

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **JUNE 2015** **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.**
- **Q2 TO Q7 CAN BE ATTEMPTED BY BOTH CURRENT AND NEW SCHEME STUDENTS.**
- **Q8 AND Q9 HAVE BEEN GIVEN INTERNAL OPTIONS FOR CURRENT SCHEME (CODE AC61/AT61) AND NEW SCHEME (CODE AC112/AT112) STUDENTS.**
- **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. A locked file can be_____

(A) Accessed by only one user
(B) Modified by users with correct password
(C) Is used to hide sensitive information
(D) Both **(B)** and **(C)**

b. A trigger is_____

(A) A statement that enables to start any DBMS
(B) A statement that executed by user when debugging an application program
(C) A condition the system tests for the validity of the database user
(D) A statement that is executed automatically by the system as a side effect of modification of the system

c. An unnormalized relation contains values_____

(A) Atomic **(B)** Non- atomic
(C) Classified **(D)** None of these

d. A second normal form does not permit.....dependency between a non prime attribute and a key relation

(A) Partial **(B)** Multi
(C) Functional **(D)** Valued

e. In the..... normal form, a composite attribute is converted to individual attributes.

(A) First **(B)** Second
(C) Third **(D)** Fourth

f. The ..... operator preserves unmatched rows of the relations.

(A) Inner join **(B)** Outer join
(C) Union **(D)** Union join

g. ……..specifies a search condition for a group or an aggregate.

(A) GROUP BY Clause
(B) HAVING Clause
(C) FROM Clause
(D) WHERE Clause

h. Drop Table cannot be used to drop a table referenced by a …… constraint.

(A) Local Key **(B)** Primary Key
(C) Composite Key **(D)** Foreign Key

i. Which of the following is not comparison operator?

(A) < > **(B)** <
(C) =< **(D)** >=

j. What operator tests column for the absence of data?

(A) IS NULL operator **(B)** ASSIGNMENT operator
(C) LIKE operator **(D)** NOT operator

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

Q.2 a. A database is being constructed to keep track of the employees, customers and other entities of the banking system. Design an E-R schema diagram for this application and also list corresponding relation, attributes, primary eys using your own assumption. **(10)**

b. List out the reasons when not to use DBMS. Also state under what circumstances, regular files are more desirable to use. **(6)**

Q.3 a. Explain about primary key, super key, candidate key, alternate key using suitable example. **(8)**

b. List four significant differences between a file-processing system and a DBMS. **(4)**

c. Which of the following plays an important role in *representing* information about the real world in a database? Explain briefly. **(4)**
(i) The data definition language
(ii) The data manipulation language

Q.4 a. Consider the following two sets of functional dependencies F= {A→C, AC→D, E→AD, E→H} and G = {A→CD, E→AH}. Check whether or not they are equivalent. **(6)**

b. What is a minimal set of functional dependencies? Does every set of dependencies have a minimal equivalent set? Give an algorithm for finding a minimal cover G for F. **(6)**

c. What is meant by a safe expression in relational calculus? **(4)**

Q.5 a. Employee (**employee_name**, street, city) **(6)**
Works (**employee_name**, company_name, salary)
Company (**company_name**, city)
Manages (**employee_name**, manager_name)

Consider the given relational database. Give an expression in SQL for each of the following queries:
(i) Give all employees of First Bank Corporation a 10 percent raise.
(ii) Give all managers of First Bank Corporation a 10 percent raise.
(iii) Delete all tuples in the *works* relation for employees of Small Bank Corporation.

b. Give a relational-algebra expression for each of the following queries: **(6)**
(i) Find the company with the most employees.
(ii) Find the company with the smallest payroll.
(iii) Find those companies whose employees earn a higher salary, on average, than the average salary at First Bank Corporation.

c. List any four Codd's rule for relational database. **(4)**

Q.6 a. Explain Write-Ahead Logging (WAL). **(8)**

b. Describe the optimistic concurrency control techniques. **(4)**

c. During the execution of a transaction, it passes through several states, until it finally commits or aborts. List any two possible sequences of states through which a transaction may pass. Explain why each state transition may occur. **(4)**

Q.7 a. How the schedules are characterized based on serializability? **(8)**

b. Explain how a System Crash can be recovered using ARIES algorithm? **(8)**

Q.8 (For current scheme students i.e., AC61/AT61)

a. What do you understand by the term INDEX? Briefly describe various types of Indexes used for records in tables. **(6)**

b. What is Partitioned Hashing? What are its advantage and disadvantage? **(6)**

c. What are the causes of bucket overflow in a hash file organization? What can be done to reduce the occurrence of bucket overflows? **(4)**

Q.8 (For New scheme students i.e., AC112/AT112)

a. Explain specialization, generalization and constraint on spcialization and generalization. **(8)**

b. What is distributed database? Explain different types of distributed database systems in brief. **(2+6)**

Q.9 (For current scheme students i.e., AC61/AT61)

a. Describe how to incrementally maintain the results of the following operations, on both insertions and deletions. **(8)**
(i) Union and set difference
(ii) Left outer join

b. Briefly explain the different methods for implementing joins. **(8)**

Q.9 (For New scheme students i.e., AC112/AT112)

a. Explain different type of discretionary privileges. **(4)**

b. Differentiate between discretionary and mandatory access control. **(4)**

c. What is public key infrastructure scheme? How does it provide security? **(4+4)**