ROLL NO. _____

Code: AC14 / AT11 Subject: DATABASE MANAGEMENT SYSTEMS

AMIETE – CS/IT (OLD SCHEME)

Time: 3 Hours **JUNE 2012** **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. A schema describes

(A) Record Relationship **(B)** Data Elements
(C) Record and files **(D)** All of the above

b. The physical location of a record is determined by a mathematical formula that transforms a file key in to a record location in

(A) B-Tree File **(B)** An indexed file
(C) Hashed file **(D)** None of the above

c. An abstraction concept for building composite objects from their component object is called

(A) Specialization **(B)** Normalization
(C) Generalization **(D)** Aggregation

d. A model used to describe data at the logical and view level is

(A) Object based logical model.
(B) Record based logical model
(C) Physical model
(D) None of the above

e. A normal form in which every determinant is a key

(A) 2NF **(B)** 3NF
(C) BCNF **(D)** 4NF

f. A statement that is executed automatically by the system as a side effect of a modification to the database is known as

(A) Assertion **(B)** Triggers
(C) Referential constraints **(D)** None of the above

g. Consider the relation scheme R(A,B,C,D) where A is candidate key. With no information about FDs involved, then R is in which normal form?

(A) First Normal form **(B)** Second Normal form
(C) BCNF **(D)** Third Normal form

h. Which of the following cannot enhance database system throughput?

(A) Database system throughput can be enhanced by locking the smallest sized objects possible
(B) Database system throughput can be enhanced by reducing time that transaction that hold locks.
(C) Database system throughput can be enhanced by reducing the hot spots
(D) Increasing the main memory capacity can enhance database system throughput

i. B+ Trees are preferred to binary trees since

(A) Disk capacities are higher than memory capacities
(B) Memory access is faster than disk access
(C) Disk are more reliable than memory
(D) Disk data transfer rates are much less than memory transfer rates.

j. Which of the following is not transaction characteristic in SQL?

(A) Access mode **(B)** diagnostics size
(C) isolation level **(D)** commit

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

Q.2 a. Explain the following Database terms with the help of an example
(i) Data Independence (ii) Domain
(iii) Foreign Key (iv) Cardinality **(8)**

b. Differentiate between a database Management System and a file system. Illustrate the relative advantages of the DBMS. **(4)**

c. Suppose you have been designated as a database administrator of an organization. Describe the responsibilities that may be generally assigned to you in order to maintain the centralized database efficiently. Also, include at least 2 responsibilities with respect to the Database security. **(4)**

Q.3. a. Discuss in brief: Basic structure and Database scheme of Relational Databases. **(4)**

b. Explain the following relational algebra operations with their notations, citing suitable example:
(i) INTERSECTION (ii) PROJECT
(iii) ASSIGNMENT (iv) SELECT **(12)**

Q.4 a. Suppose you have a table for a dance studio. The attributes are dancer's identification number, dancer's name, dancer's address, dancer's telephone number, class identification number, day that the class meets, time that the class meets, instructor name, and instructor identification number. Assume that each dancer takes one class, each class meets only once a week and has one instructor and each instructor can teach more than one class.
Dancer (Dancer_ID, Dancer_Name, Dancer_Address, Dancer_Phone, Class_ID, Class_Day, Class_Time, Instructor_Name, Instructor_ID)
Draw an entity-relationship diagram (ERD) for this database. **(6)**

b. What are the problems caused by data redundancies? Can data redundancies be completely eliminated when a database approach is used? Explain this with the help of an example. **(6)**

c. Explain a weak entity set. Give an example illustrating how the primary key of the weak entity is decided? **(4)**

Q.5 a. What is Indexed sequential file processing? How is it different from Sequential file processing method? What is the disadvantage of Indexed sequential file processing when compared to Multikey access? **(8)**

b. What is the difference between a sub query and a join? Under what circumstances would you not be able to use a sub query? Give examples. **(8)**

Q.6 a. List the difference between Equijoin and Natural join. Give example of each join operation. **(4)**

b. Explain in brief ACID properties of a database transaction. **(6)**

c. Explain the purpose of triggers in SQL with the help of an example. **(6)**

Q.7 a. A schema describing theatres, cities where they are located and shows is defined as follows:
CITY (Name, State, Country)
THEATRE (Name, City, State, Capacity)
SHOW (Title, Artist, Hall, Attendance)
Write the following queries in both 1) SQL and 2) Relational Algebra
(i) Find names of artists who performed before at least 5000 people, together with cities where those performances took place.
(ii) Find all states in India where Mr. X has performed.
(iii) List all artists who never played in Delhi.
(iv) Find the name of theatres in Bombay whose capacity exceeds 5000. **(12)**

b. Why is it not straightforward to integrate SQL queries with a host programming language? **(4)**

Q.8 a. Give a brief note on Disk access using RAID technology. **(6)**

b. Write the general transformation rules for relational expressions. **(4)**

c. Give examples for various hashing techniques. **(6)**

Q.9 a. Describe in brief the various access control policies that are to be determined in light of the security features provided by the DBMS. **(8)**

b. Write brief note on

(i) Time-Stamp based protocol
(ii) Shadow Paging. **(8)**