ROLL NO. _____

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

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours **DECEMBER 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. For each attribute of a relation, there is a set of permitted values, called the _____of that attribute.
(A) Domain **(B)** Relation
(C) Set **(D)** Schema

b. The most commonly used operation in relational algebra for projecting a set of tuple from a relation is
(A) Join **(B)** Projection
(C) Select **(D)** Union

c. The descriptive property possessed by each entity set is _____.
(A) Entity **(B)** Attribute
(C) Relation **(D)** Model

d. A query in the tuple relational calculus is expressed as:
(A) {t | P() | t} **(B)** {P(t) | t }
(C) {t | P(t)} **(D)** {t( )|P(t)}

e. Which one of the following is a procedural language?
(A) Domain relational calculus **(B)** Tuple relational calculus
(C) Relational algebra **(D)** Query language

f. There are two functional dependencies with the same set of attributes on the left side of the arrow:
A->BC
A->B
This can be combined as
(A) A->BC **(B)** A->B
(C) B->C **(D)** A->C

g. Which level of RAID refers to disk mirroring with block striping?
(A) RAID level 1 **(B)** RAID level 2
(C) RAID level 0 **(D)** RAID level 3

h. _____ states that only valid data will be written to the database.
(A) Consistency **(B)** Atomicity
(C) Durability **(D)** Isolation

i. In a granularity hierarchy the highest level represents the
(A) Entire database **(B)** Area
(C) File **(D)** Record

j. DBMS periodically suspends all processing and synchronizes its files and journals through the use of
(A) Checkpoint facility **(B)** Backup facility
(C) Recovery manager **(D)** Database change log

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

Q.2 a. Explain the database management system and discuss the advantages of database management system and when not to use a DBMS. **(8)**

b. Discuss the centralized and client/server architectures for DBMS. **(8)**

Q.3 a. Draw an Entity-Relation (E-R) diagram for a company database. Assume desired entities, attributes and relations for the company database by yourself and mention all at the starting. **(6)**

b. What is the difference between weak and strong entity set? Explain with example. **(4)**

c. Define and explain the different types of relationships exist in the DBMS. **(6)**

Q.4 a. Consider the relations: **(6)**
PROJECT(proj#,proj_name,chief_architect)
EMPLOYEE(emp#,emp_name)
ASSIGNED(proj#,emp#)
Use relational algebra to express the following queries:
(i) Get details of employees working on project COMP33.
(ii) Get details of project on which employee with name 'RAM' is working.
(iii) find project name whose chief architect name is RAJ.

b. Differentiate between inner join and outer join. **(4)**

c. What is the basic differences between relational algebra and relational calculus? **(6)**

Q.5 a. Discuss the various normal forms upto BCNF for normalizing a relation with suitable examples. **(8)**

b. Define the followings: **(4)**
i) Multivalued dependencies
ii) Join Dependencies

c. Given R(A,B,C,D,E) with the set of FDs, **(4)**
F{AB→CD, ABC → E, C → A}
(i) Find any two candidate keys of R
(ii) What is the normal form of R? Justify your answer.

Q.6 a. Discuss various indexing attributes based on indexing. **(6)**

b. What do you understand by RAID? Explain RAID Level5. **(5)**

c. Define two-phase locking protocol. **(5)**

Q.7 a. Describe the nested-loop join and block-nested loop join. Compare them. **(8)**

b. Draw a state diagram and discuss the typical states that a transaction goes through during execution. **(3)**

c. Explain the ACID properties of a transaction. **(5)**

Q.8 (For Current Scheme student i.e. AC61/AT61)

a. Compare wait-die deadlock prevention scheme with wait-wound scheme. **(8)**

b. Explain the differences between a file-oriented system and a database oriented system. **(8)**

Q.8 (For New Scheme student i.e. AC112/AT112)

a. Explain generalization and specialization with suitable examples. **(6)**

b. List the advantages of distributed database management system. **(5)**

c. Why is data replication useful in distributed DBMS? **(5)**

Q.9 (For Current Scheme student i.e. AC61/AT61)

a. Discuss the concept of serializability. What is a conflict & View Serializable schedule? **(6)**

b. What is the Purpose of a 2 Phase Commit protocol? How does it work? **(6)**

c. Define the followings: **(4)**
i) Multiple granularity
ii) Intention lock mode

Q.9 (For New Scheme student i.e. AC112/AT112)

a. Discuss the algorithm for SELECT and JOIN operations. **(8)**

b. List the commonly accepted threats to database security. **(4)**

c. What is meant by the term heuristic optimization, discuss. **(4)**