

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours

DECEMBER 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.
- 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. The DBMS acts as an interface between which two components of an enterprise- class database system?

- (A) Database application and the database
- (B) Data and the database
- (C) The user and the database application
- (D) Database application and SQL

b. In the relational modes, cardinality is termed as:

- (A) Number of tuples
- (B) Number of attributes
- (C) Number of tables
- (D) Number of constraints

c. In the architecture of a database system external level is the

- (A) Physical level
- (B) Logical level
- (C) Conceptual level
- (D) View level

d. Which of the following database object does not physically exist?

- (A) Base table
- (B) Index
- (C) View
- (D) None of these

e. The following are components of a database except

- (A) User data
- (B) Metadata
- (C) Reports
- (D) Indexes

- f. ____ is a combination of two or more attributes used as a primary key
(A) Composite Key (B) Alternate Key
(C) Candidate Key (D) Foreign Key
- g. ____ allows individual row operation to be performed on a given result set or are generated by a selected statement.
(A) Procedure (B) Trigger
(C) Cursor (D) None of these
- h. Cartesian product in relational algebra is
(A) A Unary operator (B) A Binary operator
(C) A Ternary operator (D) Not defined
- i. The default date format in SQL is
(A) DD-MON-YY (B) DD-MM-YY
(C) DD/MON/YY (D) DD/MM/YY
- j. The file organization that provides very fast access to any arbitrary record of a file is
(A) Ordered file (B) Unordered file
(C) Hashed file (D) B- tree

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

- Q.2** a. With an E/R diagram, illustrate student database. Include all types of attributes and entities. (6)
- b. Describe the three-schema architecture. Why do we need mappings between schema levels? How do different schema definition languages support this architecture? (10)
- Q.3** a. List the operations of relational algebra and the purpose of each. (4)
- b. Explain the various constraints of relation model in detail. (6)
- c. Describe conceptually how an SQL retrieval query will be executed by specifying the conceptual order of executing each of the six clauses. (6)
- Q.4** a. With necessary example illustrate the steps E/R to Relational model mapping Algorithm. (12)
- b. Discuss the two main types of constraints on specializations and generalizations.(4)
- Q.5** a. What are the six phases of database design? Discuss each phase. (4)
- b. Write notes on 1st, 2nd, 3rd and BCNF normal forms with necessary examples. (12)

- Q.6** a. Give the algorithm to determine whether a particular schedule is conflict serializable or not. (4)
- b. Explain in detail internal and external hashing techniques. (12)
- Q.7** a. Differentiate Shared Locks with Exclusive Locks. (2)
- b. Discuss on Thomas's Write Rule. (6)
- c. Draw a state diagram and discuss the typical states that a transaction goes through during execution. (4)
- d. Discuss the different types of failures. What is meant by catastrophic failure? (4)
- Q.8 (FOR CURRENT SCHEME – AC61/AT61)**
- a. Discuss the various types of file operations. (6)
- b. What are the reasons for having variable-length records? What types of separator characters are needed for each. (10)
- Q.8 (FOR NEW SCHEME – AC112/AT112)**
- a. What is distributed database? Explain the three tier architecture of distributed database. (12)
- b. Discuss concurrency control and recovery in distributed databases. (4)
- Q.9 (FOR CURRENT SCHEME – AC61/AT61)**
- a. with a neat diagram explain the steps of processing a high level query. (8)
- b. Develop cost functions for the PROJECT UNION INTERSECTION SET DIFFERENCE, and CARTESIAN PRODUCT algorithms. (8)
- Q.9 (FOR NEW SCHEME – AC112/AT112)**
- a. write notes on control measures used to provide security of data in databases. (8)
- b. Illustrate the challenges of Database Security. (8)