

**Code No: 154AM****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech II Year II Semester Examinations, April/May - 2023****DATABASE MANAGEMENT SYSTEMS****(Common to CSE, IT, ECM, CSBS, CSIT, ITE, CSE(AI&ML), CSE(DS))****Time: 3 Hours****Max. Marks: 75**

- Note:** i) Question paper consists of Part A, Part B.  
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.  
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

**PART – A****(25 Marks)**

- 1.a) What are the goals of DBMS? [2]
- b) Explain about DML language and query processor. [3]
- c) Distinguish between super key and Candidate key. [2]
- d) Explain Domain relational calculus. [3]
- e) Define dependency preserving decomposition. [2]
- f) What is the difference between 3NF and BCNF? [3]
- g) Explain about durability of transaction. [2]
- h) What is transaction? Explain its states. [3]
- i) Why are tree-structure indexes are good for searches, especially range selections. [2]
- j) What is the main difference between ISAM and B+ tree indexes? [3]

**PART – B****(50 Marks)**

- 2.a) Identify the main components in a DBMS and briefly explain what they do?
- b) Explain the following:
  - i) View of Data
  - ii) Data Abstraction
  - iii) Instances and Schemas. [5+5]

**OR**

- 3.a) What is data model? Explain Relational Model and E-R model.
  - b) Draw an ER-Diagram for Library Management system. [5+5]
- 4.a) Differentiate between a relation schema and relation instance define the term arity and degree of a relation.
  - b) Let  $R = (ABC)$  and let  $r_1$  and  $r_2$  both relations on schema  $R$ . Give an expression in the Domain relational calculus that is equivalent to each of the following: [5+5]
    - i)  $\prod_A(r_1)$
    - ii)  $\sigma_{B=17}(r_1)$
    - iii)  $r_1 \cap r_2$

**OR**

- 5.a) What is Relational Model? Explain about various domain and integrity constraints in Relational Model with examples.
- b) Explain various fundamental operations in relational algebra with examples. [5+5]

- 6.a) What aggregate operators does SQL support ? Explain.  
b) Define Functional dependencies and Multi valued dependencies. How are primary keys related to FDs? [5+5]

**OR**

- 7.a) What are the conditions are required for a relation to be in 4NF and 3NF explain with examples.  
b) Explain various set operations are used in SQL with examples. [5+5]
- 8.a) What is locking Protocol? Describe the Strict Two Phase locking Protocol.  
b) Explain multiple granularity concurrency control scheme. [5+5]

**OR**

- 9.a) Explain the ACID Properties of transactions.  
b) What is log file? Explain the following log based recovery schemes.  
i) Deferred data base modification  
ii) Immediate data base modification. [5+5]

- 10.a) Explain about cluster index, primary and secondary indexes with examples.  
b) Explain Deletion and insertion operations in ISAM with examples. [5+5]

**OR**

- 11.a) Explain what are the differences between tree based and Hash based indexes.  
b) Explain deletion and insertion operation in *B+ trees*. [4+6]

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