2019

UG Even Semester (CBCS) Exam., May—2019

COMPUTER SCIENCE

(4th Semester)

Course No. : MCSCC–403

(Database Management System)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* Discuss the main characteristics of the database approach and state how it differs from traditional file systems. 7

(b) Discuss the differences between database systems and information retrieval systems. 7

2. *(a)* Explain the three-tier client/server architecture. Where is it used? 7

(b) What is the difference between logical data independence and physical data independence? Which one is harder to achieve? Why? 7

UNIT—II

3. (a) Discuss the main categories of data models. 5

(b) What is the difference between a database schema and a database state? 5

(c) What is the difference between procedural and non-procedural DMLs? 4

4. (a) What is an entity type? What is an entity set? Explain the differences among an entity, an entity type and an entity set. 2+2+3=7

(b) When is the concept of a weak entity used in data modeling? Define the terms owner entity type, weak entity type, identifying relationship type and partial key. 3+4=7

UNIT—III

5. (a) What are the conditions to be fulfilled for two relations to be involved in a Union operation? Why do the Union, Intersection and Set difference operations require the operand relations to be union compatible? 10

(Continued)

(b) Explain the following terms : 4

(i) Tuple calculus

(ii) Domain calculus

6. (a) What are the basic data types available for attributes in SQL? 4

(b) How does SQL implement the entity integrity and referential integrity constraints of the relational data model? Explain with an example. 5+5=10

UNIT—IV

7. (a) Given below are two sets of FDs for a relation R(A, B, C, D, E). Are they equivalent? 6

(i) $A \rightarrow B$, $AB \rightarrow C$, $D \rightarrow AC$, $D \rightarrow E$

(ii) $A \rightarrow BC$, $D \rightarrow AE$

(b) What undesirable dependencies are avoided when a relation is in 2NF? 2

(c) Discuss insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with examples. 6

(Turn Over)

8. (a) When are two sets of functional dependencies equivalent? How can their equivalence be determined? 7

(b) Describe the concept of transitive dependency and explain how this concept is used to define 3NF. 5

(c) What undesirable dependencies are avoided when a relation is in 3NF? 2

UNIT—V

9. (a) Draw a state diagram and discuss the typical states that a transaction goes through during execution. 7

(b) With an example, explain multiprogramming and parallel processing. 7

10. (a) What is a lock? Describe the types of locks used in concurrency control. 7

(b) What is two-phase locking protocol? How does it guarantee serializability? 7

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