2017/EVEN/08/24/MCS–403 (C)/ CS–403 (O)/563

UG Even Semester (CBCS) Exam., May—2017

COMPUTER SCIENCE

(4th Semester)

Course No. : MCS–403 (C)/CS–403 (O)

(Database Management System)

Full Marks : 75
Pass Marks : 30/26
Time : 3 hours

The figures in the margin indicate full marks for the questions

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

UNIT—I

1. *(a)* Discuss the advantages of using DBMS approach. 8

(b) What are different types of database end user? Discuss the main activities of each. 7

2. *(a)* What are the responsibilities of the Database Administrator (DBA)? 7

(b) Define the following terms : 8

(i) Data model

(ii) Database system

(iii) Data independence

(iv) DDL and DML

UNIT—II

3. *(a)* Discuss the entity integrity and referential integrity constraints. 6

(b) Discuss various reasons that lead to the occurrence of null values in relations. 4

(c) Define the following terms : 2+1+2=5

(i) Multivalued attribute

(ii) Entity

(iii) SuperKey and foreign key

4. *(a)* List the operations of relational algebra and purpose of each. 9

(b) When is the concept of a weak entity used in data modelling? Define the terms owner entity type, weak entity type, identifying relationship type and partial key. 6

UNIT—III

5. *(a)* What is a view in SQL, and how is it defined? Discuss the problems that may arise when one attempts to update a view. 7

(b) How does the tuple relational calculus differ from domain relational calculus? 4

(c) Define the following terms with respect to the tuple calculus : 4

tuple variable, range relation, atom, formula

6. *(a)* Discuss the correspondences between the ER model, constructs and the relational model constructs. 10

(b) Consider the relational database : 5

EMPLOYEE (Fname, Mname, Lname, SSN, Bdate, Address, Sex, Salary, DNO, SuperSSN)

DEPARTMENT (Dname, DNO, Mgr_SSN, Mgr_Start_date)

(i) Retrieve the date of birth and address of the employee whose name is 'Mahesh B. Kumar'.

(ii) Retrieve the names and addresses of all employees who work for the 'Research' department.

UNIT—IV

7. *(a)* Write the inference rules for functional dependencies. 6

(b) What is meant by the completeness and soundness of Armstrong's inference rules? 4

(c) What is meant by the closure of a set of functional dependencies? Illustrate with an example. 5

8. *(a)* Define 2NF, 3NF and BCNF. 6

(b) Discuss insertion, deletion and modification anomalies. Why are they considered bad? Illustrate with examples. 7

(c) What is minimal set of functional dependencies? 2

UNIT—V

9. *(a)* Discuss different types of failure. What is meant by catastrophic failure? 7

(b) Discuss the atomicity, durability, isolation and consistency preservation properties of a database transaction. 6

(c) What is meant by the concurrent execution of database transactions in a multiuser system? 2

10. *(a)* What is the system log used for? What are the typical kinds of records in a system log? What are transaction commit points, and why are they important? 2+2+2+3=9

(b) Write short notes on : 3×2=6

(i) Serializable schedule

(ii) Dirty read problem

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