2022

COMPUTER SCIENCE

M.Sc. Second Semester End Examination - 2022

Paper - CS-201

Advanced Database Management System

Full Marks : 50 *Time : 2 hours*

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

Group - A

(Short answer type question)

Answer any four questions. 4×2=8

1. What is multivaled dependency?
2. "All Primary keys are the super key but the converse is not true"– Clarify. 2
3. What is DKNF?

4. What are advantages of the object oriented database approach for database management? 2

5. What do you mean by query optimization? 2

6. Write down the advantages of triggers. 2

Group - B

(Long answer Questions)

Answer any four questions **4×4=16**

7. What is the highest NF of each of the following relations?4
   i) R1(J,K,L) with FD's are J→K, J→L, K→L
   ii) R2 (J,K,L,M) with FD's are J→KL, LM→K

8. Consider the following tables. 4
   Employee(emp-name, street, city)
   Works (emp-name, company-name, salary)
   Company (company-name, City)
   Manager (emp-name, manager-name)
   Write down SQL statements for the follwoing queries :

   iii) Find the names, Street address and cities of residence of all employees who work for First Bank Corporation and earn more than 10000.

   iv) Find all the employees in the database who earn more than each employee of Small Bank Corporation.

   v) Assume that the companies may be located in several cities. Find all companies located in every city in which Small Bank Corporation is located.

   vi) Find the company that has the most employees.

9. What are the basic differences between Database Management System and a data warehousing? What is the need for a data warehouse? 2+2

10. What is granularity of data? How does granularity of data items affect the performance of concurrency control? 2+2

11. How does BCNF differ from 3NF? Why is it considered stronger than 3NF? 2+2

12. Test the serializability for the following schedule with explanation. 4

T_1	T_2
read(A) A:=A-50 write(A)	
	read(A) temp:=A*0.1 A:=A-temp write(A)
read (B) B:=B+50 write(B)	
	read(B) B:=B+temp write(B)

Group - C
(Long answer Questions)

Answer any two questions 8×2=16

13. a) Describe the two phase commit protocol with appropriate diagram. What are the demerits of this protocol? 4

b) What is the locking? What are shared and exclusive locks? 4

14. Consider the following relation for published books :

BOOK (Book_title, Author_name, Book_type, List_price, Author_affil, Publisher)

Author_affil refers to the affiliation of author. Suppose the following dependencies exist:

Book_title → Publisher, Book_type
Book_type → List_Price
Author_name → Author_affil

i) What normal form is the relation in? Explain your answer. 4

ii) Apply normalization until you cannot decompose the relation further. State the reasons behind each decomposition. 4

15. a) State the basic features / characteristics of object oriented databse systems. 4

b) What is transparency? Discuss network transparency and replication transparency with example. 4

16. (i) What do you mean by query processor?

(ii) Discuss wait-die and wound-wait protocol for deadlock prevention.

(iii) What are the basic differences between Two-phase commit protocol and Three-phase commit protocol in distributed databases.

(iv) "The Three-phase commit protocol increases the system avaliability and does not allow transactions to remain blocked until the failure is repaired."–Justify the statement. 2+2+2+2=8