B.E.-Computer Science and Engineering Sem IV

CS 403 - Database Management System

P. Pages : 2 **GUG/S/18/3878**

Time : Three Hours * 0 9 9 7 * Max. Marks : 80

Notes : 1. All questions are compulsory.
2. All questions carry equal marks.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.

1. a) Describe the architecture of Database management system in detail with neat sketch. Explain the function of each component. **8**

b) Describe the purpose of E-R model. Illustrate your answer by taking example of banking system. **8**

OR

2. a) Explain the concept of generalization and aggregation in dbms with example. **8**

b) Write short note on following data models. **8**

I) Object-oriented data model.

II) Network and Hierarchical data model.

3. a) Explain the basic structure of sql query. **8**

b) List the following relation schemas be given:- **8**

R = (A,B,C)
S = (D,E,F)
Let relations r(R) and s(S) be given give an expression in SQL that is equivalent to each of the following.

i) $\Pi_A(r)$

ii) $\sigma_B = 17(r)$

iii) $\Pi_{A,F}\left(\sigma_C = D(rxs)\right)$

iv) $r \times s$

OR

4. a) Explain extended relational algebra operation. **8**

b) Consider the Insurance database:
Person (ss#, name, address)
car (License, year, model)
accident (Date, Driver, damage, amount)
Owns (ss#, License)
Log (license, Date, Driver)
construct the SQL queries for the above database:

i) Find the total number of people whose car was involved in an accident in 1989 **2**

ii) Find the number of accidents in which of least one car belonging to "John Smith" were involved. **2**

iii) Add a new policy holder to the database **2**

iv) Delete the car "Mozdo" that belongs to "John Smith" **2**

5. a) Define the following with examples. **8**

i) 1NF
ii) 2NF
iii) 3NF
iv) BCNF

b) What is Join? Explain all join strategies with suitable example. **8**

OR

6. a) What is functional dependency and multivalued dependency? Explain in brief. **8**

b) Explain Codd's rule related to database. **8**

7. a) Discuss the test for conflict serializability and explain lock based protocol. **8**

b) Specify what is meant by "Transaction" Explain abstract transaction model using state diagram. **8**

OR

8. a) Explain Timestamp based protocol. **8**

b) Explain Shadow paging with example. **8**

9. a) Explain data warehouse architecture with a neat diagram. **8**

b) Explain client-server systems. **8**

OR

10. a) Explain online analytical processing (OLAP) in detail. **8**

b) Write short note on **8**

i) Centralized systems
ii) Distributed systems.

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