Total No. of Questions: 4

Enrollment No. EN20CS303035

Faculty of Engineering

Mid Sem – II Examination April – 2022

CS3CO25 Database Management System

Programme: B.Tech. Branch/Specialisation: CSE

Duration: 2 Hrs. **Maximum Marks: 40**

Q.1 i Consider the relation Sale (Date, Customer, Product, Vendor, VendorCity, SalesRep) 1

{Date, Customer, Product} is the composite candidate key and the following functional dependencies are also given:

Vendor -> VendorCity, Product -> Vendor

What is the highest normal form of the sale relation?

a). 0NF b) 1NF c) 2NF d) 3NF

ii Which functional dependency types is/are not present in following dependencies? 1

StaffNo, BranchNo -> StaffName, BranchName, Position, DOB

StaffNo -> StaffName, Position, DOB

BranchNo -> BranchName

a). Full functional dependency b). Partial functional dependency

c). Transitive functional dependency d). Both B and C

iii A BCNF is : 1

a). loss less join and dependency preserving

b). loss less join but not dependency preserving

c). not loss less join but dependency preserving

d). None of these

iv Third normal form is based on the concept of _____ 1

a). Closure Dependency b). Transitive Dependency

c). Normal Dependency d). Functional Dependency

v Anomalies are avoided by splitting the offending relation into multiple relations, is also known as 1

a). Accupressure b). Decomposition

c). Precomposition d). Both Decomposition and Precomposition

vi The state in which the transaction stays while it is executing is term as 1

(a) Active (b) Partial committed (c) initial (d) both A & C

vii Which of the following concurrency control protocols ensure both conflict serialzability and freedom from deadlock? I. 2-phase locking II. Time-stamp ordering. 1

(a) I only (b) II Only (c) both I & II (d) Neither I nor II

viii Which of the following scenarios may lead to an irrecoverable error in a database system ? 1

(a) A transaction writes a data item after it is read by an uncommitted transaction

(b) A transaction reads a data item after it is read by an uncommitted transaction

(c) A transaction reads a data item after it is written by a committed transaction
(d) A transaction reads a data item after it is written by an uncommitted transaction

ix Consider the following transaction involving two bank accounts x and y. 1
read(x); x := x – 50; write(x); read(y); y := y + 50; write(y)
The constraint that the sum of the accounts x is that of
(a) Atomicity (b) Consistency
(c) Isolation (d) Durability and y should remain constant

x What is ACID properties of Transactions? 1
(A) Atomicity, Consistency, Isolation, Database
(B) Atomicity, Consistency, Isolation, Durability
(C) Atomicity, Consistency, Inconsistent, Durability
(D) Automatically, Concurrency, Isolation, Durability

Q.2 i. Consider a relation R(A, B, C, D) with the following functional dependencies: A -> (B, C, D), (A, D) -> (B, C) and (C, D) -> (A, B). What is/are the candidate key(s). 2

ii. Explain ACID Properties. 3

iii. Explain various locking methods with examples. 5

OR iv Explain any two with example: - 5
Conflict Serializability
Functional Dependency
Timestamp based protocol

Q.3 i. What do you understand by dependency preservation? Give suitable example? 2

ii. Consider a relation R(A,B,C,D,E) with the following functional dependencies is given: A->B,C->B,B->E,E->D and decomposition of R into R1(A,B,C) and R2(B,D,E). 8
1) Does this decomposition have the lossless join property? Is it possible to reconstruct R from R1 and R2 using Natural Join? Give reason for you answer?
2) What is/are the candidate key(s) of R?

OR iii. Consider the following schedule due to three transaction (indicate in subscript) using read & write operation on a data items x, y & z, respectively. S: r1(x); r2(y); r3(y); w2(y); w1(x); w3(x); r2(x); w2(x) 8
Draw the precedence graph & find the transaction is conflict serializable or not.
What is the order of serializability?

Q.4 i. Explain the terms: 3
a. Shared lock
b. Exclusive lock

ii. Describe the two-phase locking protocol in detail. 7

OR iii. Explain 3NF and BCNF with an example and What is the main difference between these two ? 7

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