WALCHAND COLLEGE OF ENGINEERING

(Government Aided Autonomous Institute)
Vishrambag, Sangli – 416415
Second Year B.Tech. Computer Science and Engineering
Re-Exam, Odd and Even Semester AY 2023-24
Database Engineering (6CS223)

Re-Exam

PRN: _____

Day & Date: Tuesday, 09/07/2024 Time : 02.00 pm to 05.00 pm

Max Marks: **100**

IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (Only for faculty use)

			Marks	
Q1	A)	State three levels of abstraction	6	CO1
	B)	Differentiate between file processing system and Database management system.	6	CO1
	C)	State and explain various data models with suitable example	6	CO1
	D)	Differentiate between week and strong entity set with an example.	6	CO2
Q2	A)	List and draw any 8 symbols used in ER diagram.	8	CO2
	B)	Elaborate DDL commands with an example	8	CO2
	C)	Consider the following relational schemas:		CO2

Student (StudentID, Name, Age, Major)
Course (CourseID, CourseName, Instructor)
Enrollment (StudentID, CourseID, Grade)

Write the relational algebra expressions for the following queries: 8

a) Retrieve the names of students who are majoring in 'Computer Science'.

b) Find the names of instructors who are teaching at least one course.

c) List the course names that are enrolled by the student with StudentID 'S123'.

d) Retrieve the names of students who have received an 'A' grade in any course.

Q3 A) Explain the process of normalization and its importance in database design. Describe the first three normal forms (1NF, 2NF, 3NF) with examples. 6

B) Given the following unnormalized relation for a library database, normalize it up to the third normal form (3NF). 6

Relation: Library(BookID, Title, Author, AuthorCountry, Publisher, PublisherAddress, BorrowerID, BorrowerName, BorrowerAddress, BorrowDate)

C) Explain the concept of functional dependency in the context of relational databases. Why is it important for normalization? Provide an example to illustrate your explanation. 6

D) What are transitive dependencies in a relational database? Why should they be removed, and how are they related to the Third Normal Form (3NF)? Provide an example to demonstrate the identification and removal of transitive dependencies. 6

Q4 A) Explain the ACID properties of a transaction in a database management system. Why are these properties important for maintaining the integrity of a database? Provide an example scenario where each property is essential. 7

B) Discuss different concurrency control techniques used in DBMS to handle concurrent transactions. Compare and contrast at least two techniques. Provide examples to illustrate their differences. 7

C) What is a deadlock in the context of database transactions? Explain the conditions that lead to deadlock. Describe two strategies for deadlock prevention and two strategies for deadlock detection. 7

D) Discuss the different isolation levels defined by SQL standard. Explain how each isolation level handles issues like dirty reads, non-repeatable reads, and phantom reads. Provide an example for each isolation level. 7

End of question paper