Second Year B.Tech. (Computer Science and Engineering)

END SEMESTER EXAMINATION (EVEN SEM AY 2021-22) JUN. - 2022

ESE

Database Engineering (5CS224)

-Comp. 4-Sem - Even c21-22

PRN: _____

Day, Date and Time: Thursday, 09/06/2022, 02.00PM to 04.00PM

Max Marks: 60

IMP: Verify that you have received question paper 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 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)	A university registrars of college maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prerequisites; (b) course offerings, including course number, year, semester, section number, instructor(s), timings, and classroom; (c) students, including student-id, name, and program; and (d) instructors, including identification number, name, department, and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled. Construct an E-R diagram for the registrars of college. Document all assumptions that you make about the mapping constraints.	6	CO2
Q1 B)	Consider the following relations: Student(snum: integer, sname: string, major: string, level: string, age: integer) Class(name: string, meets at: string, room: string, fid: integer) Enrolled(snum: integer, cname: string) Faculty(fid: integer, fname: string, deptid: integer) Write the following queries in SQL. No duplicates should be printed in any of the answers. 1. Find the names of all juniors (level = JR) who are enrolled in a class taught by I. Teach. 2. Find the age of the oldest student who is either a History major or enrolled in a course taught by I. Teach. 3. Find the names of all classes that either meet in room R128 or have five or more students enrolled. 4. Find the names of all students who are enrolled in two classes that meet at the same time. 5. Find the names of faculty members who teach in every room in which some class is taught.	10	CO3
Q2 A)	Explain RAID Levels in detail.	8	CO1
Q2 B)	Differentiate between Clustered and non-Clustered indexes.	6	CO2
Q3 A)	What is transaction? Explain the ACID Properties.	8	CO1

Q3 B) Consider the following two transactions: 6 CO1

T_{31}: read(A);
read(B);
if $A = 0$ then $B \leftarrow B + 1$;
write(B).

T_{32}: read(B);
read(A);
if $B = 0$ then $A \leftarrow A + 1$;
write(A).

Add lock and unlock instructions to transactions T31 and T32, so that they observe the two-phase locking protocol. Can the execution of these transactions result in a deadlock?

Q3 C) Explain Two phase locking protocol with suitable example. 6 CO1

Q4 A) Compare the deferred- and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost. 5 CO1

Q4 B) Explain log-Based Recovery in detail. 5 CO1