

2063
B.E. (Computer Science and Engineering)
Third Semester
CS-302: Database Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

Q1) Define the following:

- i) Relational Completeness
- ii) Dynamic SQL
- iii) Dirty read
- iv) wait die and wound wait conditions
- v) Trivial and Non Trivial FDs
- vi) Query optimization techniques
- vii) Aggregation
- viii) Referential Integrity
- ix) Correlated query
- x) Granularity

(10x1)

PART- A

Q2)a) Design an Entity Relationship and Relational model for the Admission procedure in a university. An advertisement is issued giving essential qualifications for the course, the last date for recipient of application, and the fee to be enclosed with the application. A clerk in the registrar's office checks the received applications to see if the mark sheet and the fee are enclosed and sends a valid application to the concerned academic department. The department checks the application in detail and decides the applicant to be admitted, those to be put in the waiting list, and those to be rejected. Appropriate letters are sent to the registrar's office which intimates the applicant.

b) What is the Bell Lapadula model and where is it used?

c) How do we convert ER model to relational model. Give example.

(5+2.5+2.5)

Q3)a) List various integrity constraints of the ER model.

b) Write expression in relational algebra and SQL for following:

EMP(empno, ename, job_title, managerno, hiredate, sal, comm, deptno) DEPT(deptno, dname, loc)

- i) Find Employees along with their Manager name.
- ii) Find the Employees who are working in Alexa's department
- iii) Find the Employees who get salaries more than Alexa's salary.
- iv) Display employees who are getting maximum salary in each department (without using aggregate function).

(2+8)

P.T.O.

(2)

- Q4) a)** With an example Justify the statement "Multi valued dependencies are consequences of First Normal Form". Also discuss how the multivalued dependencies are eliminated with examples?
- b)** Discuss the similarities and dissimilarities between BCNF and 3rd Normal form. Also explain why BCNF is stronger than the 3rd normal form.
- c)** Define FD, MVD and JD.
- d)** "Each and every normal form removes one type of dependency". Justify this statement.

(3+3+2+2)

PART- B

- Q5) a)** Find the list of 5 highest paid employees from an employee table using an explicit cursor. Assume that the employee table having emp_no, ename, designation, department and salary as attributes.
- b)** Design a trigger named auditor to insert data into an existing table audi_trail_for_bank of all insertions, deletions and updations carried on table Bank_Transactions. The audi_trail_for_bank maintains the type of operation, user name, date and time of operation as fields.

(5+5)

- Q6) a)** Give various advantages and disadvantages of log base recovery and shadow paging.
- b)** Explain forward and backward recovery techniques
- c)** Explain various concurrency control protocols with an example. Give advantages and disadvantages of each

(3+2+5)

- Q7)** Compare and contrast the following
- i) DAC, MAC and RBAC
 - ii) Sparse, Dense, Clustered and Non clustered Indexing
 - iii) B Tree, B+ Tree indexing.
 - iv) Sequential, Heap, Index Sequential and Direct file organization

(2+2+2+4)

x-x-x