

(3 Hours)

[Total Marks: 80]

- N.B.:**
- 1) Question No.1 is **compulsory**.
  - 2) Attempt any **three** from the remaining **five** questions.

Write a short note on following (any Four)

1. (a) Role of DBA (5)
- (b) Weak entity sets (5)
- (c) Clustered index (5)
- (d) ACID Properties (5)
- (e) Distributed deadlock (5)
- (f) Inheritance (5)

2. (a) A university registrar's office maintains data about the following entities: (10)

(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 registrar's office. Document all assumptions that you make about the mapping constraints.

- (b) Explain Conceptual design with the E R Model. (10)

3. (a) How database recovery is possible in distributed database? (10)

(b)

Staff No	Dentist name	Patient No	Patient name	Appointment Date Time	Surgery No
S1011	Tony smith	P100	Gillian white	12-Aug-02 10:00	S10
S1011	Tony smith	P105	Jill bell	13-Aug-02 12:00	S15
S1024	Helen Pearson	P108	Ian Mackay	12-Sept-02 10:00	S10
S1024	Helen Pearson	P108	Ian Mackay	14-Sept-02 10:00	S10
S1032	Robin Pelvin	P105	Jill bell	14-Oct-03 16:30	S15
S1032	Robin Pelvin	P110	John walker	15-Ocy03 18:00	S13

(10)

(a) The above table shown is susceptible to update anomalies. Provide examples of insertion, deletion, and modification anomalies.

(b) Describe and illustrate the process of normalizing the table from 1 to 3NF. State any assumptions you make about the data shown in this table.

Q4 (a) Given the relation schema  $R = (A, B, C, D, E)$  and the canonical cover of its set of functional dependencies

$$F_c = \{ A \rightarrow BC \\ CD \rightarrow E \\ B \rightarrow D \\ E \rightarrow A \}$$

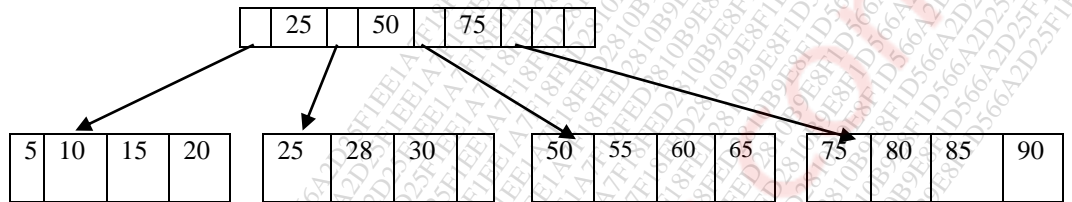
Compute lossless join decomposition in Boyce-Codd Normal Form for  $R$ .

(b) What is Extendible Hashing? How does it handle search, insert, and delete?

Q5 (a) What is log based recovery in database Explain. 10

(b) (i) What are the main differences between ISAM (indexed sequential access method) and B+ tree indexes? 5

(ii) Consider the following B+ tree 5



Perform following operations on B+ tree assuming maximum capacity of node as four

- A. Insert 95
- B. Delete 25

Q6 (a) Explain Architecture of distributed database system. 10

(b) What is serializability? Explain conflict serializability and view serializability. 10