

December – 2023

BCA – III semester

Database Management System (BCA-17-203)

Time: 3 Hours

Max. Marks:75

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
 2. Answer any four questions from Part -B in detail.
 3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

- Q1 (a) Write limitations of file-based approach. (1.5)
- (b) List three responsibilities of Database designer. (1.5)
- (c) Differentiate between DDL and DML (1.5)
- (d) Discuss the term consistency. (1.5)
- (e) What is spurious tuple? (1.5)
- (f) Write any four responsibilities of database administrator. (1.5)
- (g) Explain Referential integrity. (1.5)
- (h) Explain ACID properties. (1.5)
- (i) Differentiate between natural join and inner join. (1.5)
- (j) Define: Primary Key and Foreign Key. (1.5)

PART -B

- Q2 (a) What is functional dependency? Discuss its types. Explain the role of Functional dependency in the process of normalization. (10)
- (b) Compare relational, network and hierarchical models. (5)
- Q3 (a) What is database modeling? How is E-R model different from other data models? What are the main advantages of the E-R model? (10)
- (b) Differentiate between Physical and Logical Independence. (5)
- Q4 (a) Specify the key of the relation and find a BCNF decomposition of the relation schema with the following set of FDs: (10)
- Ship → Capacity
- ShipDate → Cargo
- Cargo, Capacity → Value
- (b) What are the various types of failures that can occur in database? Discuss log-based recovery mechanism. (5)

Q5

Let the following relational scheme be given

Employee (SSN, Name, age, DNo)

Salary (SSN, Salary)

Works_On (Project#, SSN)

Project (Project#, Project_Name, Location)

Write Relational Algebra expression for the following:

- (a) Display the name of projects at "DELHI". (5)
- (b) Find the project_name of employee whose salary is greater than 10,000. (5)
- (c) Retrieve the name and SSN of employees working on Project# A100. (5)

Q6 Write short note on followings:

- (a) Object based Data Models (5)
- (b) Integrity constraints over relations (5)
- (c) Query Optimization (5)

- Q7 (a) Explain Inference Rules for Functional Dependencies. (5)
- (b) Consider the following set F of Functional Dependencies for relation schema R =(A, B,C,D,E) and $F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$ List the candidate keys for R (5)
- (c) Explain different types of anomalies along with example. (5)
