



বিদ্যাসাগর বিশ্ববিদ্যালয়  
**VIDYASAGAR UNIVERSITY**  
**Question Paper**

**B.Sc. Honours Examinations 2022**  
(Under CBCS Pattern)  
**Semester - IV**  
**Subject : COMPUTER SCIENCE**  
**Paper : C 10 - T**  
**[ DATABASE MANAGEMENT SYSTEMS ]**

**Full Marks : 40**  
**Time : 2 Hours**

*Candidates are required to give their answers in their own words as far as practicable.  
The figures in the margin indicate full marks.*

**Group - A**

Answer any **four** questions :

5×4=20

1. What are the five main functions of a database administrator?
2. Explain the concept of physical data independence and its importance in database systems.
3. How does 'Aggregate' operations implemented in relational algebra?
4. What do you mean by self-join and theta join? Give examples.
5. Write the rename and division operations of relational algebra and mention their functions.
6. Distinguish 3NF and BCNF with example.

P.T.O.

**Group - B**

Answer any *two* questions : 10×2=20

1. (a) Discuss in brief the steps of normalization with respect to table decomposition. 7
- (b) Define Armstrong's Axioms related to any set of FD's. 3

2. Compute the closure of the following set F of functional dependencies for relation schema

R(A,B,C,D,E)

A→BC

CD→E

B→D

E→A

List the candidate keys for R. 10

3. Suppose that we decompose the schema R(A,B,C,D,E) into 10

r1(A,B,C)

r2(A,D,E)

Show that this decomposition is a lossless decomposition if the following set F of functional dependencies holds.

A→BC

CD→E

B→D

E→A

5. (a) Show that the two-phase locking protocol ensures conflict serializability, and that transaction can be serialized according to their lock points. 4

- (b) What do you mean by clustering? Define dense and sparse index, which one is better and why? 6

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