

U.G. 4th Semester Examination - 2022

COMPUTER SCIENCE

[HONOURS]

Course Code : COM.SC-H-CC-L-410

(Database Management Systems)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

1. Answer any **ten** questions: $2 \times 10 = 20$
- a) What is DML?
 - b) Write the difference between partial key and primary key.
 - c) What is the derived attribute?
 - d) What is lossless join decomposition?
 - e) What is the tuple?
 - f) What is partial participation?
 - g) What is the purpose of normalization?
 - h) What is descriptive attribute?

[Turn over]

- i) What is the difference between strong entity and weak entity?
- j) What is referential integrity?
- k) What do you mean by projection operation in relational algebra?
- l) What is the transitive dependency?
- m) What do you mean by data dictionary?
- n) What is arity?
- o) What is relation in DBMS?

GROUP-B

- Answer any **four** questions: $5 \times 4 = 20$
- 2. Draw and explain the detailed system architecture of DBMS. 5
 - 3. Differentiate between specialization and generalization. What is a view? How views are implemented? 2+1+2
 - 4. What is meant by the closure of functional dependencies? State 3NF and explain it with examples. 2+3
 - 5. What is Functional Dependency? Explain it briefly. Illustrate lost update problem with suitable example. 2+3

6. Explain in detail about timestamp-based concurrency control techniques. 5
7. By considering relevant example, show insertion and deletion operations on a B-Tree. 5

GROUP-C

Answer any **two** questions: 10×2=20

8. Discuss about different types of failures. What is 2-phase locking protocol? How does it guarantee serializability? 3+3+4
9. Discuss in detail about the concepts of E-R model with suitable example. What is a group function? List and explain how to use group functions in SQL with appropriate examples. 4+3+3
10. Why the concurrency control is needed? Explain it. Write and explain optimistic concurrency control algorithm. 5+5
11. Consider the Relation R(ABCDXY) and Functional Dependency set $F = \{A \rightarrow B, C \rightarrow DX, AC \rightarrow Y\}$ decomposed into $D = R_1(BX), R_2(ACDXY)$. Find whether D is Lossless or Lossy. “BCNF is stronger than 3NF”– Justify the statement. 5+5
