

2024

COMPUTER SCIENCE — HONOURS

Paper : CC-11

(Database Management System)

Full Marks : 50

The figures in the margin indicate full marks.

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

Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any five** questions: 2×5
- (a) State the difference between Candidate key and Super key.
 - (b) How 'delete' command differs from 'drop' command in SQL?
 - (c) Define Instance.
 - (d) What is the function of division operation in relational algebra?
 - (e) What is data independence?
 - (f) Compare Strong entity set and Weak entity set.
 - (g) What is the importance of Data Dictionary?
 - (h) Define Cardinality and give an example.
2. (a) From the following information draw an ER-diagram :
- A store has different counters managed by different employees. A counter has item but no two counters has common items. Customer buy from different counters but bills are prepared from the bill counter only. Once in a month the performance of the persons managing different counter is evaluated in terms of sale. Items are also reviewed and slow moving items are identified.
- (b) Why is aggregation required in ER-diagram? Explain. 7+3
3. Consider the following database :
- Boat (**BoatID**, BName, Colour)
- Sailor (**SID**, SName, Joining_Date, Rating)
- Reserve (BoatID, SID, RDate)
- Write Relational Algebra for the following :
- (a) List the name of the sailors who have reserved boat for today.

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- (b) List the name of the boat/s that is reserved by both 'Abdul Majhi' and 'Bimal Majhi' for the month September 2024.
- (c) Give the name of the most experienced sailor.
- (d) Give the name of the sailor reserved the boat 'Sonar Tori'. 3+3+2+2
4. (a) Explain referential integrity with a suitable example.
- (b) Define Functional Dependency (FD) and Closure of a relation.
- (c) Given $R(X, Y, Z, W)$ and set of Functional Dependency
 $FD = \{X \rightarrow Y, WX \rightarrow Y, Z \rightarrow W\}$. Compute the Candidate key. 3+(2+2)+3
5. (a) Given $R(A, B, C, D)$ with functional dependencies $\{A \rightarrow B, A \rightarrow C, C \rightarrow D\}$ are decomposed into $R_1(A, B, C)$ and $R_2(C, D)$. Check whether this decomposition is lossy or lossless?
- (b) What is spurious tuple? How is it generated? 6+4
6. (a) State and proof Pseudo Transitivity rule.
- (b) When is it more appropriate to use a dense index, and when should a sparse index be preferred?
- (c) How variable length records are managed in DBMS? 3+4+3
7. (a) Consider the relational schema $R(P, Q, R, S, T, U, V)$ with the following functional dependencies :
- $$P \rightarrow S, Q \rightarrow TU, S \rightarrow U, PQ \rightarrow R, T \rightarrow V$$
- Normalize the relation upto 3NF.
- (b) Explain 'Inner Join' and 'Outer Join' with example. 6+4
8. Write short notes on the following : 2½×4
- (a) Transitive dependency
- (b) Armstrong axioms
- (c) Data Manipulation Language
- (d) Tuple relational calculus.
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