



WEST BENGAL STATE UNIVERSITY

B.Sc. General Part-II Examination, 2022

COMPUTER SCIENCE

PAPER: CMSG-III-A

Time Allotted: 2 Hours

Full Marks: 50

*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.*

1. Answer any **five** questions from the following: 2×5 = 10
- (a) What is the objective of Software Design phase?
 - (b) Define Black Box testing.
 - (c) What is referential integrity constraint?
 - (d) What is Functional dependency?
 - (e) What is derived attribute? Explain with example.
 - (f) Define Natural join of two relations in RDBMS.
 - (g) Define Second Normal Form (2NF).
 - (h) Define Select and Project operations, used in Relational Algebra.

GROUP-A

Answer any *one* question from the following

8×1 = 8

2. (a) State the characteristics of a good SRS. 4
- (b) Write a brief note on different software quality factors. 4
3. (a) What is the purpose of DFD? 2
- (b) Define Synchronous DFD and Asynchronous DFD. 3
- (c) Define Software Verification and Software Validation. 3

GROUP-B

Answer any *four* questions from the following

8×4 = 32

4. (a) Define Strong Entity Set and Weak Entity Set. Explain with example. 3
- (b) Define Cardinality Constraints and Participation Constraints which are specified in ER diagram. 3
- (c) Define candidate key. 2
5. (a) What is the necessity of Normalization? 2

- (b) Give an example of a relational schema which is in 3NF but not in BCNF. 4
- (c) When two sets of functional dependencies are said to be equivalent? 2
6. Consider the following schema of a relational database: 2×4
sailors (sid, sname, rating, age)
reserves (sid, bid, day)
boats (bid, bname, colour)
Express the following Queries in SQL
- (i) Find the names of sailors who have reserved a green boat.
- (ii) Find the names of sailors who have reserved a boat having id 23.
- (iii) Find the names of sailors who have reserved at least two boats.
- (iv) Find the names of sailors having age more than 25 and reserved a red boat.
7. (a) Explain left outer join and right outer join with example. 4
- (b) Define Ternary relationship. Explain with ER diagram. 4
8. (a) Define DDL and DML. 4
- (b) What is Data Dictionary? 2
- (c) Why SQL is called relationally complete? 2
9. Consider the following relational schema for a library. 2×4
member (memo-no, name, date)
books (isbn, title, authors, publishers)
borrowed (memo-no, isbn, date)
Write the following queries in relational algebra.
- (i) Find the name of members who have borrowed all books published by “McGraw-Hill”.
- (ii) For each publisher, find the name and membership number of members who have borrowed more than five books of that publishers.
- (iii) Find the names of members who have borrowed any book published by “McGraw-Hill” and “Pearson”.
- (iv) Find the average number of books borrowed per member.
10. Write short notes on any *two* of the following: 4+4
- (i) Index Sequential File Organization
- (ii) Relational Algebra and Relational Calculus
- (iii) Generalization in ER model
- (iv) Data Abstraction in DBMS.

N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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