

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: IMSc
BRANCH: MATHS**

**SEMESTER : V
SESSION : MO/18**

SUBJECT: CS4105 DATABASE MANAGEMENT SYSTEM

TIME: 3.00 HOURS

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Interpret the meaning of Data Abstraction using suitable diagram. [2]
Q.1(b) Illustrate the four main disadvantages of File Processing System. [4]
Q.1(c) Demonstrate the following with suitable examples: [6]
i) Weak Entity sets ii) One-to-Many Relationship Set iii) Data- Manipulation Language
- Q.2(a) Differentiate between Superkey and a candidate key. [2]
Q.2(b) Prove with example that the set intersection operation can be achieved by applying some fundamental operation of relational algebra. [4]
Q.2(c) Explain the following Relational -Algebra Operations with suitable examples: [6]
i) Outer Join Operations ii) Assignment Operation
- Q.3(a) Write an SQL using ALTER to drop an attribute from a table (Assume table and column name). [2]
- Consider the Following tables:
WORKS(Pname,Cname,Salary)
LIVES(Pname, Street City)
LOCATED_IN(Cname,City)
MANAGER(Pname,Mgrname)
Here Pname = Person name, Cname = Company,and Mgrname = Manager name. Assuming the suitable foreign keys, answer the following queries:
- Q.3(b) a. Find the names of the persons who live and work in the same city. [4]
b. Find the name of a person who do not work for company 'X'.
- Q.3(c) [6]
i) Find the persons whose salaries are more than that of every employee of company 'x'.
ii) Find the names of the companies that are located in every city where company 'x' is located.
iii) Find the names of the employees who work for company 'x' along with the cities they live in.
- Q.4(a) Prove Decomposition rule using Armstrong rules. [2]
Q.4(b) Consider the following set F of functional dependencies on schema(A,B,C) [4]
A->BC, B->C, A->B, AB->C
Compute the canonical cover for F.
Q.4(c) Define 3NF and BCNF. Compare them with suitable example explaining their significance for database design. [6]
- Q.5(a) What do you mean by Clustering index? Explain. [2]
Q.5(b) Differentiate between dense index and sparse index with example. Also explain their advantages and disadvantages. [4]
Q.5(c) Discuss thoroughly the structure and the working of B+ - Trees using suitable example. [6]
- Q.6(a) Define Query Processing. [2]
Q.6(b) Explain the steps in Query Processing with suitable diagram. [4]
Q.6(c) Discuss various evaluation plans for measuring the Query cost in Query Processing. [6]
- Q.7(a) What is a recoverable schedule? Explain with example. [2]
Q.7(b) Explain Conflict serializability. Write an algorithm which checks for the conflict-serializability of a schedule. [4]
Q.7(c) Explain two Time stamp-based protocols used to avoid deadlock. [6]