

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

**CLASS: B.TECH
BRANCH: IT**

**SEMESTER : IV
SESSION : SP/2023**

SUBJECT: CS247 DATABASE MANAGEMENT SYSTEM

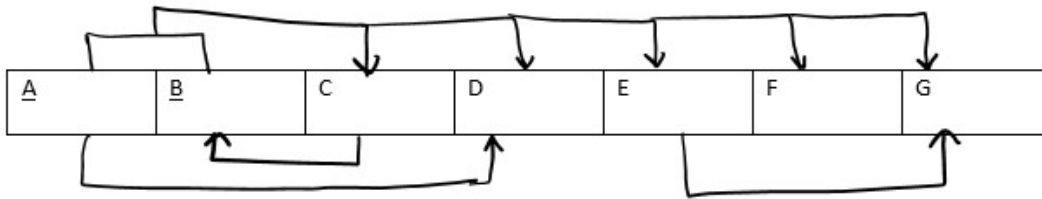
TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 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.
-

		CO	BL
Q.1(a)	Differentiate with appropriate diagrams: 1. A primary key Vs A Discriminator 2. Partial Vs total completeness constraint 3. Schema Vs Instance 4. 2 tier Vs 3 Tier architecture	[1+1+1+2]	1,2 BT1,2
Q.1(b)	Create a complete ERD with attributes, cardinality mappings, constraints and keys based on the following requirements. 1. An invoice is written by a sales representative. Each sales Rep. can write many invoices, but each invoice is written by a single sales Rep. 2. The invoice is written for a single customer. However, each customer can have many invoices. 3. The invoice can include many lines as a description about the product bought by the customer. 4. The product information is stored in the product entity. 5. The product's vendor information is found in vendor entity.	[5]	1,2 BT3, 4,5,6
2(a)	Consider the following relations containing airline flight information: Flights (flno, aid, from, to, distance, departs, arrives) Aircraft (aid, aname, cruisingrange) Certified (eid, aid) Employees (eid, ename, salary) Write the queries in Relational Algebra (i) Find the eids of employees who are certified for the largest number of aircraft. (ii) Find the aids of all aircraft that can be used on non-stop flights from Bonn to Madras.	[5]	3 BT3,6
Q.2(b)	Write the following queries in SQL (i) Find the eids of employees who are certified for exactly three aircraft. (ii) Identify the flights that have been piloted by every pilot whose salary is more than \$100,000.	[5]	3 BT 3,6
Q.3(a)	Illustrate with an example how normalization is done for relations with Multivalued Dependency and join dependency.	[5]	4 BT3,4
Q.3(b)	Consider the following dependency graph and answer the following questions: Write the closure set of functional dependencies. What are the prime attributes of the relation. Decompose the relation in 3NF. Are all the relations in BCNF also? If, No identify the relation that invalidates BCNF.	[5]	4 BT3,4



- Q.4(a) Explain the mechanism and cost when you use nested loop join and merge join. [5] 5 BT3 4
- Q.4(b) Differentiate between primary and secondary indexes. Why is it better to use a sparse index? How is a conflict and overflows resolved in hashing technique? [5] 5 BT1,2
- Q.5(a) Design a recoverable schedule and explain its features? How can it be made cascadeless? [5] 5 BT3,4
- Q.5(b) How do we recover from a deadlock in 2 phase locking? Write down the Thomas' write rule. [5] 5 BT1,2

.....27/04/2023:.....M