

ROLL NO. _____

ENROLLMENT NO. _____

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, SCHOOL OF ENGINEERING
SCIENCES & TECHNOLOGY, JAMIA HAMDARD**

ODD SEMESTER EXAMINATION 2024

BTCSE 704 (ADVANCE DBMS)

TIME: 3 HRS**MAXIMUM MARKS: 75**

Note: Do not write anything on paper except Roll No. & Enrollment No. Use of mobile phone is not allowed. Please follow proper numbering while answering the questions Proper steps are required to be specified for all questions

SECTION A

All questions of Section A are compulsory (7*5)

S.NO	QUESTIONS	MARKS	CO	BL																								
Q1.	Consider we are using extendable hashing on a file that contains records with the following search-key values: (3, 9, 12, 15, 16, 17, 18, 20, 21, 34, 44, 49) Sketch the extendable hash structure if the hash function is $hx = x \bmod 8$ and buckets can hold up to three records. Initially, the structure is empty, and global depth is 1. (Note: Use a directory of pointers to buckets) What are the final global and local depths of all the buckets in the hash structure?	5	CO2	L4																								
Q2.	Consider an unordered file with 50000 records with record size of 200 bytes stored with a spanned record organization. We will assume that no system related information is stored within a block. Suppose that we construct a single level, secondary index for the file where search key field is 10 bytes and block pointers is 4 bytes. Assume that hard disk block size is 2048 bytes. How many blocks would be needed to store record file? How many blocks would be needed to store index file.	5	CO3	L4																								
Q3.	Create a cursor and declare that for SELECT query. Open the cursor and fetch the cursor to the record. Display the roll number & name of the records and create a trigger that checks if "value" is greater than 1000 for any new row inserted to "Test" table, then insert a row to Audit table?	5	CO2	L6																								
Q4.	What is the maximum number of nodes splitting operations when a B+ tree of order 4 is built from scratch by 10 successive insertions? Determine by an example.	5	CO1	L4																								
Q5.	A company is migrating its databases to a public cloud provider. What are the key security strategies you would adopt to secure the databases in the cloud, including securing data at rest, encryption, access controls, and ensuring that the cloud provider meets security compliance standards?	5	CO4	L4																								
Q6.	The size of key field is 4-byte, record pointer is 10 byte and child pointer size is 6 byte, and size of 1 block of hard disk is 1024 bytes then find the order of internal node of B tree.	5	CO5	L6																								
Q7.	Explain the concept of nesting and un-nesting (through queries specifying 1NF and 4NF) through the following table: <table><tr><th>title</th><th>author list</th><th>date</th><th>keyword list</th></tr><tr><td></td><td></td><th>day month year</th><td></td></tr><tr><td>salesplan</td><td>Smith</td><td>1 April 89</td><td>{profit, strategy}</td></tr><tr><td>salesplan</td><td>Jones</td><td>1 April 89</td><td>{profit, strategy}</td></tr><tr><td>status report</td><td>Jones</td><td>17 July 94</td><td>{profit, personnel}</td></tr><tr><td>status report</td><td>Frick</td><td>17 July 94</td><td>{profit, personnel}</td></tr></table>	title	author list	date	keyword list			day month year		salesplan	Smith	1 April 89	{profit, strategy}	salesplan	Jones	1 April 89	{profit, strategy}	status report	Jones	17 July 94	{profit, personnel}	status report	Frick	17 July 94	{profit, personnel}	5	CO4	L4
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SECTION B
Answer any 4 questions in Section B (4*10)

S.NO	QUESTIONS	MARKS	CO	BL
Q1.	Consider the following Schedule: S: R1(A), W1(A), R3(A), W3(A)R2(A) Assume Time Stamp of T1 =2, T2 = 4, T3 = 6. If we are applying Thomas write rule protocol then which of the following is true? (a) Transaction T1 needs rollback (b) Transaction T2 needs rollback (c) Transaction T3 needs rollback (d) No transactions needs rollback	10	CO3	L2
Q2.	A company has migrated most of its workloads to the cloud, including critical applications. They are concerned about potential data loss or corruption due to unexpected cloud service failures or malicious attacks. How would you design a real-time backup and recovery strategy for cloud-based data and applications to minimize data loss and ensure rapid recovery?	10	CO3	L3
Q3.	Suppose you have a file that contains records with the following search key values: 42, 71, 43, 70, 12, 22, 91, 62, 53, 82. Now build an Extensible hash index structure by inserting these search keys sequentially where the hash function is $h(\text{search-key}) = (\text{reverse the digits of the search key}) \bmod 8$ and each bucket can hold at most three records.	10	CO1	L1
Q4.	Consider a B and B+ tree of order 4. After inserting the following keys 10, 20, 5, 6, 15, 30, 25, what will the structure of the tree be? Assume that the tree is initially empty.	10	CO4	L4
Q5.	Consider the relation R (A, B, C, D) with the following set of functional dependencies: • $A \rightarrow B$ • $B \rightarrow C$ • $C \rightarrow D$ Is the relation R in BCNF? If not, which functional dependency violates BCNF?	10	CO5	L5
Q6.	Check whether the given schedule S is conflict and view serializable or not. If yes, then give the serial schedule: S: R1(A), W2(A), R3(A), W1(A), W3(A)	10	CO2	L6

BLOOMS TAXANOMY LEVELS (BL)

1-REMEMBERING, 2-UNDERSTANDING, 3-APPLYING, 4-ANALYSING,
5-EVALUATING, 6-CREATING