

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 2026****Second Semester****Master of Computer Applications****PMCT2422 – ADVANCED DATABASE TECHNOLOGY****Regulations - 2024****Duration: 3 Hrs.****Maximum: 100 Marks****PART – A(ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	summarize the advantages of centralized and distributed databases	L2	1	2
2.	List the two primary methods for generating unique global timestamps in a distributed timestamping scheme.	L1	1	2
3.	Distinguish between valid time and transaction time in the context of temporal databases.	L4	2	2
4.	How do database systems often handle the storage and management of multimedia files, and what kind of related information is usually kept within the database itself?	L4	2	2
5.	State the three properties that constitute the CAP Theorem.	L1	3	2
6.	Highlighting the key concepts of keyspace and table in the Cassandra model.	L2	3	2
7.	<pre> <university-3> <department dept_name="Comp. Sci."> <building> Taylor </building> <budget> 100000 </budget> </department> <department dept_name="Biology"> <building> Watson </building> <budget> 90000 </budget> </department> <course course_id="CS-101" dept_name="Comp. Sci" instructors="10101 83821"> <title> Intro. to Computer Science </title> <credits> 4 </credits> </course> <course course_id="BIO-301" dept_name="Biology" instructors="76766"> <title> Genetics </title> <credits> 4 </credits> </course> <instructor IID="10101" dept_name="Comp. Sci."> <name> Srinivasan </name> <salary> 65000 </salary> </instructor> <instructor IID="83821" dept_name="Comp. Sci."> <name> Brandt </name> <salary> 72000 </salary> </instructor> <instructor IID="76766" dept_name="Biology"> <name> Crick </name> <salary> 72000 </salary> </instructor> </university-3> </pre> Infer the given XML document and Predict the result of the XPath expression <code>/university-3/instructor/name</code> on the XML document provided to the left	L3	4	2
8.	List the key differences between XML representation and traditional database representation.	L1	4	2
9.	Relate the concept of Inverted Index in information Retrieval.	L2	5	2
10.	Name two common retrieval models used in IR systems.	L1	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11. a	Discuss the two primary approaches for storing a relation in a distributed database like replication and fragmentation. For each approach, elaborate on its advantages and disadvantages, and illustrate with examples scenarios where one approach might be preferred over the other.	L2	1	16
	Or			
b	Consider a transaction Transfer(AccountA, AccountB, Amount) that involves debiting Amount from AccountA at Site X and crediting it to AccountB at Site Y. Assume the coordinator for this transaction resides at a third site, Site Z. During the execution of the 2PC protocol for this transaction: - Site X successfully prepares the transaction and sends a "ready" message to Site Z. - Before Site Y can respond to the "prepare" message from Site Z, Site Z experiences a temporary network failure and becomes unreachable for a short period. Discuss the possible states of Site Y and Site X during this network failure at Site Z. What actions should Site X and Site Y take upon the recovery of Site Z to ensure the atomicity of the Transfer transaction? Explain how the 2PC protocol ensures that either both the debit and credit operations are successfully committed, or both are rolled back, despite this temporary failure.	L2	1	16
12. a	Consider a scenario where a city planning department uses a spatial database to manage information about land parcels, roads, and utility lines. Examine the key spatial data types they would use, the essential spatial operators for analyzing this data (provide specific examples), and the importance of spatial indexing for tasks like identifying all properties within a certain distance of a proposed new road.	L4	2	16
	Or			
b	Assess the significance of location and handoff management in mobile database systems. Choose any one technique used for location tracking and assess the process of a hard handoff, highlighting the potential impact on transaction continuity and data integrity.	L4	2	16
13. a	Examine the fundamental CRUD like Create, Read, Update, Delete operations in MongoDB and analyze the importance of indexing in optimizing query performance in MongoDB, describing different types of indexes and when they are most beneficial.	L4	3	16
	Or			
b	Inspect how Hive's data types relate to typical database types. Show with examples how HiveQL queries data in partitioned tables, and mention the specific syntax rules or best practices for such queries.	L4	3	16
14. a	i Elaborate on the key advantages of XML Schema over DTD	L2	4	6
	i Illustrate with examples how XML Schema can be used to define:	L2	4	10
	i A simple type for an "email" element, ensuring it adheres to a specific pattern.			

- A complex type for an "address" element, containing sub-elements like "street," "city," and "zipcode," with specified data types and cardinality.
- An element "student" that uses the defined "address" complex type and includes other elements like "name" and "major" with appropriate data type constraints.

Or

b	Compare and contrast XPath and XQuery in terms of their expressiveness, complexity, and suitability for different XML data querying tasks.	L2	4	16
15. a	Evaluate the impact of various text preprocessing techniques (e.g., tokenization, stemming, stop word removal) on the overall effectiveness and efficiency of an Information Retrieval system.	L5	5	16
Or				
b	Examine the unique challenges and complexities of web search compared to traditional information retrieval. Elaborate on the key components of a web search engine and the techniques used for crawling, indexing, and ranking web pages.	L5	5	16
