	E.G.S. PILLAY ENGINEERING COLLEGE (An Autonomous Institution, Affiliated to Anna University, Chennai) Nagore Post, Nagapattinam – 611 002, Tamilnadu.	Rev.0 COE/2017/QB

2002CA104- ADVANCE DATABASE				
Academic Year	**2021- 2022**	**Question Bank**	**Programme**	**MCA**
Year / Semester	**I/I**		**Course Coordinator**	**Mr.S.Selvaganapathy**

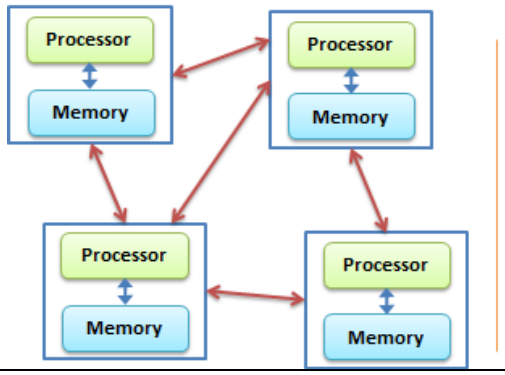
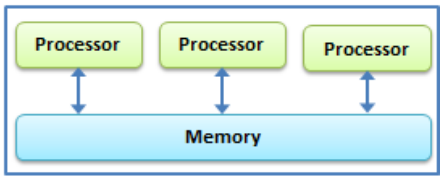
Course Objectives	Course Outcomes
1. To learn the fundamentals of Parallel and Distributed Databases 2. To make a study on Object Oriented Databases 3. To explore the concepts of XML Databases and Mobile Databases 4. To gain knowledge on the intelligent Databases.	CO1: Develop transaction processing systems with concurrency control CO2: Design Object oriented databases for real time applications. CO3: Develop XML databases for web applications. CO4: Design Mobile databases for mobile devices CO5: Apply intelligent rules in database developement

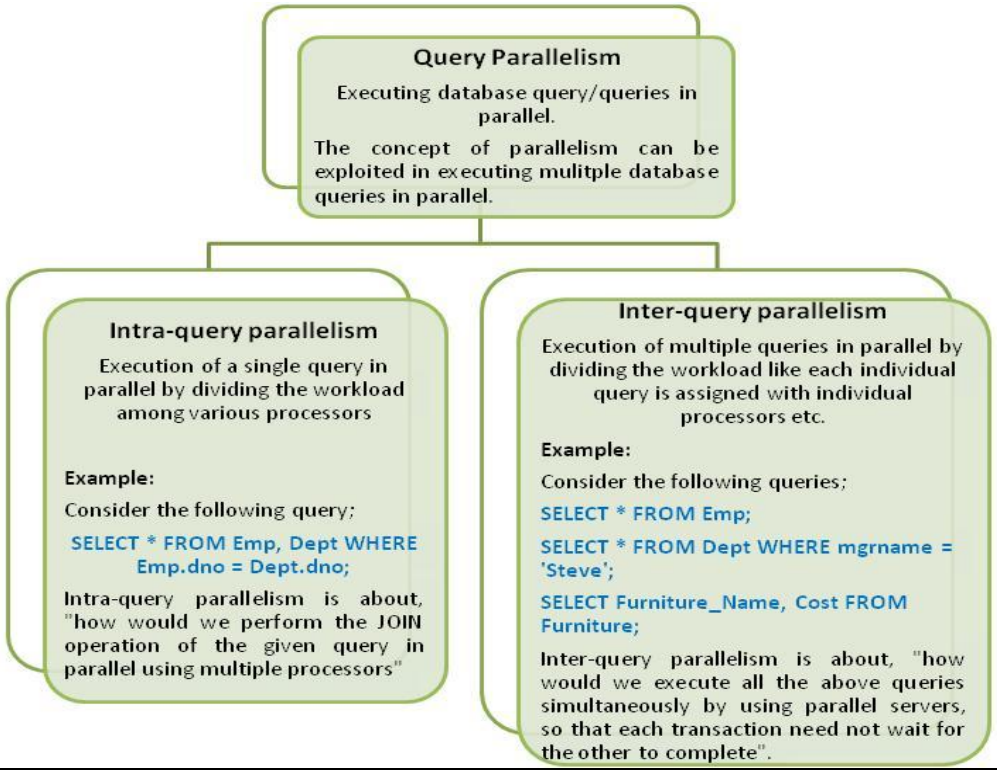
UNIT I – PARALLEL AND DISTRIBUTED DATABASES

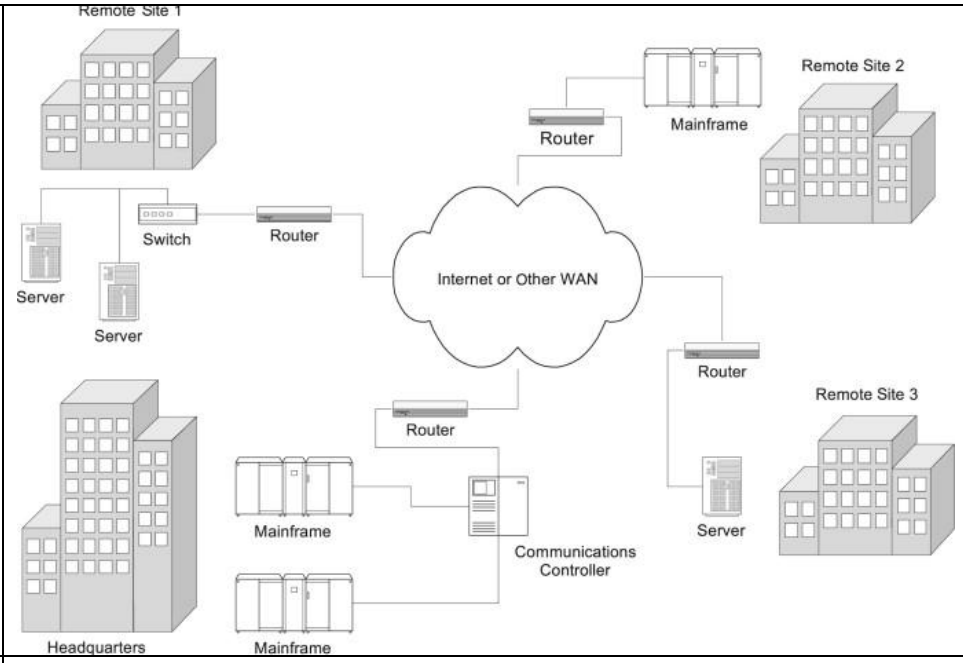
Terminology and Background – Substitution Ciphers – Transpositions – Making Good Encryption Algorithms- Data Encryption Standard- AES Encryption Algorithm – Public Key Encryption –Cryptographic Hash Functions – Key Exchange – Digital Signatures – Certificates

PART – A (2 Mark Questions with Key)

S. No.	Questions	Mark	BTL
1.	**CO1 : Develop transaction processing systems with concurrency control**		
1	**Define centralized database system**	2	K2
	A centralized database (sometimes abbreviated CDB) is **a database that is located, stored, and maintained in a single location**. Users access a centralized database through a computer network which is able to give them access to the central CPU, which in turn maintains to the database itself	1	
2	**State any two features of distributed database**	2	K2
	Location independent. Distributed query processing. Distributed transaction management. Hardware independent. Operating system independent. Network independent. Transaction transparency.		

	DBMS independent.		
3	**Define parallel DBMS**	**2**	**K2**
	A parallel database system seeks to improve performance through parallelization of various operations like loading data, building index and evaluating queries parallel systems improve processing and I/O speeds by using multiple CPU's and disks in parallel		
4	**Give few drawbacks of having centralized database architecture**	**2**	**K2**
	If the network is slow, the accessibility of required because all data is stored in one place. Since all the data is at one location. The searching process takes much time. If centralized server failure due to some reasons all database will be a loss		
5	**Difference between parallel system and distributed system**	**2**	**K2**
	A parallel computing system consists of multiple processors that communicate with each other using a shared memory, whereas a distributed computing system contains multiple processors connected by a communication network **Distributed Computing**  **Parallel Computing** 		
6	**Describe the shared-nothing system**	**2**	**K1**
	A shared-nothing architecture (SN) is **a distributed computing architecture in which each update request is satisfied by a single node (processor/memory/storage unit) in a computer cluster**		
7	**List out the types of fragmentation?**	**2**	**K1**
	There are three different but related forms of fragmentation: **external fragmentation, internal fragmentation**, and data fragmentation, which can be present in isolation or conjunction.		
8	**Show the different between homogeneous and heterogeneous DDBMS**	**2**	**K1**
	Homogeneous and Heterogeneous databases are the two main classifications of **DDBMS**. In Homogenous distributed database system, the data is distributed but all servers run the same Database Management System (DBMS) software. In Heterogeneous distributed databases dissimilar sites run under the control of different DBMSs		

9	**What is serializability and its types?**	**2**	
	It can be of two types namely, **Serializable and Non-Serializable Schedule**. The Non-Serial Schedule can be divided further into Serializable and Non-Serializable. Serializable: This is used to maintain the consistency of the database.		**K2**
10	**Differentiate inter and intra operation parallelism**	**2**	
	Inter-query parallelism refers to the ability of multiple applications to query a database at the same time. ... Intra-query parallelism refers to the **ability to break a single query into a number of pieces** and replicate them at the same time using either intra-partition parallelism or inter-partition parallelism, or both  		**K1**
11	**What is snapshot? What is the benefit of snapshot?**	**2**	
	A snapshot log is **a copy of the master table**. The snapshot table is updated using batch updates. The log can also be used to track the rows that have been updated in the master table A key benefit of snapshots is that **they allow a faster roll-back to a previous point-in-time than from backups**. Another plus is that snapshots allow much more frequent protection than backup.		**K2**
12	**Identify the need for building a distributed database system**	**2**	
	Distributed databases allow **local users to manage and access the data in the local databases** while providing some sort of global data management which provides global users with a global view of the data		**K1**

			
13	**What are the failures the can occur in distributed environment**	**2**	**K1**
	Failures in Distributed System Method failure : In this type of failure, the distributed system is generally halted and unable to perform the execution. System failure Secondary storage device failure Communication medium failure		
14	**Define concurrency control**	**2**	**K1**
	In a database management system (DBMS), concurrency control **manages simultaneous access to a database**. It prevents two users from editing the same record at the same time and also serializes transactions for backup and recovery		
15	**Summarize the implementation issues in distributed database**	**2**	**K1**
	Distributed database allows to end worker to store and retrieve data anywhere in the network where database is located, during storing and accessing any data from distributed database through computer network faces numerous difficulties happens **e.g. deadlock, concurrency and data allocation using fragmentation**		
S. No.	**Questions**	**Mark**	**BTL**
CO1 :	Develop transaction processing systems with concurrency control		
1	**Discuss in details about the different Database System Architectures design**	**12**	**K3**

	EXPLAIN ABOUT What Is Database Architecture? 1. 1-tier architecture 2. 2-tier architecture 3. 3-tier architecture 4. n-tier architecture		
2	**Explain the Functions and Architecture of a DDBMS**	**12**	**K2**
	Function of a DDBMS *Architecture for a DDBMS* Global Conceptual Schema Fragmentation and allocation schemas Local Schemas		
3	**With proper illustration explain in details about the Parallel Databases**	**12**	**K2**
	What is parallel database *Working of parallel database* *Explain the following for your example.* *Performance measures* *Benefits of parallel Database* *Speed, Capacity, Reliability, Benefits for queries*		
4	**Explain how I/O parallelism is attained in a parallel database environment**	**12**	**K2**
	I/O Parallelism ***Partitioning Techniques*** Round-robin. Hash partitioning Range partitioning ***Comparison of Partitioning Techniques***		

5	**Explain in details about the Distributed Data Storage**	**12**	
	What Is a Distributed Database? *Distributed Database Features* *Distributed Database Storage* • **Replication** • **Fragmentation** *Advantages and Disadvantages* Conclusion		**K2**
6	**Explain in detail about the Three Tier Client Server Architecture with proper illustrations**	**12**	**K2**
	• What is Client Server Architecture • Diagram of Client Server Architecture • Types of Client-Server Architecture • Components of Client Server Architecture		

PART – C (20 Mark Questions with Key)			
S. No.	**Questions**	**Mark**	**BTL**
CO 1:	Develop transaction processing systems with concurrency control		
1.	Explain about inter query and intra query parallelism with suitable example	**20**	**K3**
	Case Study for Intra and Inter query implementation		
2.	Generalize the methods of how the locking is achieved in concurrency control distributed database	**20**	**K3**
	Case study for concurrency control in distributed database		

UNIT II - OBJECT AND OBJECT RELATIONAL DATABASES

Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies

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PART – A (2 Mark Questions with Key)			
S. No.	**Questions**	**Mark**	**BTL**
CO2 :	Design Object oriented databases for real time applications		
1	**Mention the characteristics of objects?**	**2**	**K2**
	Characteristics of Objects • An object has identity (each object is a distinct individual). • An object has state (it has various properties, which might change). • An object has behavior (it can do things and can have things done to it).		
2	**Classify the different types of Persistence of Objects**	**2**	**K2**
	A **persistent object** is one that continues to exist after the program that created it has been unloaded. An object's class and current state must be saved for use in subsequent sessions There are two types of persistence: **object persistence and process persistence** **object persistence** object persistence refers to **an object that is not deleted until a need emerges to remove it from the memory** **process persistence** it's when a process your user is running continues to exist even after the process that created it is no longer running.In this sense, a persistent process is a **process that cannot be killed or shut down**		
3	**Generalize the need of creating the object identity**	**2**	**K2**
	The object need not expose its internal structure. It can still be referred to, and its other properties can be accessed via its external behaviour associated with the identity. identity **is the basis for polymorphism** in object-oriented programming. Identity allows comparison of references		
4	**What are the goals of OODB**	**2**	**K2**
	The main goal of OODBMS design is **to hide from the programmer unnecessary complexity of manipulation with persistent data**. Unlike normal (transient) object, persistent object survey execution of the program and so are stored either on disk, either in some other non-volatile media		

5	**Contrast Repeated Inheritance with Selective Inheritance**	**2**	**K2**
	Repeated inheritance occurs whenever (as a result of multiple inheritance) **two or more of the ancestors of a class D have a common parent A**. D is then called a repeated descendant of A, and A a repeated ancestor of D. Selective inheritance dependencies, or SIDs, are **introduced to capture formally the inheritance of attribute values between tuples of any relation over a given relation scheme**. It is shown that the membership problem		
6	**Give the Features Supported By Object-Relational Data Model**	**2**	**K1**
	An Object relational model is a combination of a Object oriented database model and a Relational database model. So, it supports **objects, classes, inheritance etc**. just like Object Oriented models and has support for data types, tabular structures etc. like Relational data model		
7	**What are the object database standards?**	**2**	**K1**
	Having a standard for a particular type of database system is very important because of following reasons portability of database applications achieve interoperability compare commercial products		
8	**Classify the object constructor, destructor?**	**2**	**K1**
	Constructor is called automatically, while the object is created. Destructor is called automatically, as block is exited or program terminates. Constructor allows an object to initialize some of its value before, it is used. **Destructor allows an object to execute some code at the time of its destruction**		
9	**Distinguish the Inheritance, Generalization and Specialization**	**2**	**K2**

GENERALIZATION	SPECIALIZATION
Generalization works in Bottom-Up approach.	Specialization works in top-down approach.
In Generalization, size of schema gets reduced.	In Specialization, size of schema gets increased.
Generalization is normally applied to group of entities.	We can apply Specialization to a single entity.
Generalization can be defined as a process of creating groupings from various entity sets	Specialization can be defined as process of creating subgrouping within an entity set
In Generalization process, what actually happens is that it takes the union of two or more lower-level entity sets to produce a higher-level entity sets.	Specialization is reverse of Generalization. Specialization is a process of taking a subset of a higher level entity set to form a lower-level entity set.
Generalization process starts with the number of entity sets and it creates high-level entity with the help of some common features.	Specialization process starts from a single entity set and it creates a different entity set by using some different features.

10	**Analyze the reason for using Complex Data Types**	**2**	**K1**

Need for Complex Data Types

- Traditional database applications in data processing had conceptually simple data types
  - Relatively few data types, first normal form holds
- Complex data types have grown more important in recent years
  - E.g. Addresses can be viewed as a
    - Single string, or
    - Separate attributes for each part, or
    - Composite attributes (which are not in first normal form)
  - E.g. it is often convenient to store multivalued attributes as-is, without creating a separate relation to store the values in first normal form
- Applications
  - computer-aided design, computer-aided software engineering
  - multimedia and image databases, and document/hypertext databases.

Database System Concepts 8.1 ©Silberschatz, Korth and Sudarshan

11	**Compare the OODM with relational data model.**	**2**	**K2**

RDBMS and OODBMS are database management systems. RDBMS uses tables to represent data and their relationships whereas OODBMS represents data in form of objects similar to Object Oriented Programming. ... RDBMS stands for Relational DataBase Management System. OODBMS stands for Object Oriented DataBase Management System

12	**What are the benefits of using OODBMS over an ORDBMS?**	**2**	**K1**

- Enriched Modelling Capabilities.
- Extensibility.
- Removal of Impedance Mismatch.
- More Expressive Query Language.
- Support for Schema Evolution.
- Support for Long Duration Transactions.

	• Applicability to Advanced Database Applications. • Improved Performance.		
13	**What is meant by Interface Repository?**	**2**	**K2**
	An interface repository is an object implementing the CORBA::Repository interface. ... The purpose of the interface repository is **to maintain type information about IDL files**. Once an IDL file is compiled, its definitions can be stored in an interface repository and can be retrieved remotely by other ORBs		
14	**What is the use of persistent programming language?**	**2**	**K1**
	Programming languages that natively and seamlessly allow objects to continue existing after the program has been closed down are called persistent programming languages. JADE is one such language. A persistent programming language is a **programming language extended with constructs to handle persistent data**.		
15	**Predict the Differentiate among ODL and OQL.**	**2**	**K1**
	ODL = Object Description Language, like CREATE TABLE part of SQL. **OQL = Object Query Language**, tries to imitate SQL in an OO framework		

PART – B (12 Mark Questions with Key)			
S. No.	**Questions**	**Mark**	**BTL**
CO 2: Understand the importance of Digital signature for secure e-documents exchange			
1	Explain Object oriented Concepts in database and storing objects in Relational Database	**12**	**K3**
	Object Database Definition *Object-Oriented Programming Concepts* *Object-Oriented Database Examples* *Object-Oriented Database Advantages and Disadvantages*	**2**	
2	Differentiate the following with respect to object oriented data model. i. Classes, subclasses and super classes ii. Regular inheritance, multi valued and selective inheritance	**12**	**K2**
	i. Classes, subclasses and super classes Explanation about Classes, subclasses and super classes		

	and examples iii. Regular inheritance, multi valued and selective inheritance Explanation about Regular inheritance, multi valued and selective inheritance and examples		
3	**1. Describe briefly about Structured and unstructured complex object**	**12**	
	What is the difference between structured and unstructured complex objects? *Operations on structured and unstructured data* *Object identifier by using References* *Data encapsulation and ADT*		**K2**
4	Describe the following i. Object Query Language (OQL) ii. Persistence Schemes OODBMS	**12**	
	i. Object Query Language (OQL) What is object query language with example Is OQL similar to SQL? Example Queries **ii. Persistence Schemes OODBMS** *How is persistence handled in typical of database systems?* *How persistent objects are maintained in Oodbms?* What is the difference between persistent and transient objects How is persistence handled in typical OO database systems**?**		**K2**
5	Explain in detail about the Issues in OODBMS	**12**	
	Lack of universal data model: There is no universally agreed data model for an OODBMS, and most models lack a theoretical foundation. This . disadvantage is seen as a significant drawback, and		**K2**

	is comparable to per-relational systems Sample case study		
6	**Discuss the basic built in interfaces of the ODMG model**	**12**	**K2**
	The ODMG· Object Model Objects and Literals An object has five aspects: identifier,♣ name,♣ lifetime,♣ structure,♣ creation. types of literals: atomic, structured, and collection		

PART – C (20 Mark Questions with Key)			
S. No.	**Questions**	**Mark**	**BTL**
CO 2 : Understand the importance of Digital signature for secure e-documents exchange			
1.	Discuss in detail about structure and various operations of OO query language	**20**	**K3**
	What is the structure of query language? What are the different types of structured query language? What are the four basic database query operations access?		
2.	Discuss the modeling and designing of OODB in detail with suitable example	**20**	**K3**
	Object-Oriented Design • Relational Design 1. Identify entities/attributes 2. Resolve many-to-many relationships 3. Translate entities into relations 4. Create primary/foreign key relationships 5. Implement relations • Object-Oriented Design 1. Identify objects/attributes 2. Identify operations on objects 3. Establish interface for each object 4. Implement objects		