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Periyanaickenpalayam, Coimbatore – 641020

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

III YEAR

ODD SEMESTER(V SEMESTER)

ACADEMIC YEAR 2024 – 2025

INDEX

HEAD OF THE DEPARTMENT

ACOE **PRINCIPAL** **CHAIRMAN**

CCS334 - BIG DATA ANALYTICS

UNIT I

UNDERSTANDING BIG DATA

Introduction to big data – convergence of key trends – unstructured data – industry examples of big data – web analytics – big data applications– big data technologies – introduction to Hadoop – open source technologies – cloud and big data – mobile business intelligence – Crowd sourcing analytics – inter and trans firewall analytics.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Big data.	1	1	2
2.	List out the key trends in big data.	1	2	2
3.	Define Web analytics.	1	1	2
4.	Define HDFS	1	1	2
5.	State the difference between inter and trans firewall analytics.	1	2	2
6.	Define Crowdsourcing	1	1	2
7.	What is the Internal Firewall?	1	1	2
8.	State the difference between Big data and cloud computing.	1	2	2
	PART B			
1.	Generalize the characteristics of big data applications and explain how the big data use cases leverages the benefits and values.	1	5	16
2.	i)Write brief notes about Web analytics ii)Explain in detail about the big data technologies .	1	3	8 8
3.	With a neat sketch explain Apache Hadoop Ecosystem.	1	4	16
4.	Explain about mobile business intelligence with an example and Explain in detail about inter and trans firewall analytics.	1	5	16

UNIT II

NOSQL DATA MANAGEMENT

Introduction to NoSQL – aggregate data models – key-value and document data models – relationships – graph databases – schemaless databases – materialized views – distribution models – master-slave replication – consistency - Cassandra – Cassandra data model – Cassandra examples – Cassandra clients.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is the primary Advantage of aggregate data models in NoSQL databases?	2	1	2
2.	How do graph databases differ from other NoSQL databases?	2	2	2
3.	What are materialized views in the context of NoSQL databases?	2	2	2
4.	State CAP Theorem.	2	2	2
5.	List the advantages of Sharding.	2	2	2
6.	Why is Cassandra known for its high availability and fault tolerance?	2	2	2
7.	What does it mean for a database to be schemaless?	2	1	2
8.	What are the primary key characteristics in a Cassandra data model?	2	1	2
	PART B			
1.	Explain in detail about all the Aggregate Data Model in NOSQL databases	2	5	16
2.	i)Explain in detail about Schema less databases. ii)Explain details about materialized views in NOSQL.	2	5	8 8
3.	Elaborate the Distribution model with a neat sketch.	2	6	16
4.	Elaborate the architecture and Data model of Cassandra with a neat sketch.	2	6	16

UNIT III

MAP REDUCE APPLICATIONS

MapReduce workflows – unit tests with MRUnit – test data and local tests – anatomy of MapReduce job run – classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling– shuffle and sort – task execution – MapReduce types – input formats – output formats.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Map Reduce.	3	1	2
2.	List out failures in classic map reduce.	3	2	2
3.	Define the term MR unit	3	1	2
4.	What is fair Scheduler?	3	1	2
5.	What are the limitations of Map Reduce.	3	1	2
6.	Define the term YARN.	3	1	2
7.	Differentiate YARN and Map Reduce.	3	2	2
8.	What is Text Input Format?	3	1	2
	PART B			
1.	Explain in detail about YARN architecture. Write about failures in classic Map-reduce.	3	2	16
2.	How are failures managed in MapReduce and YARN, and what mechanisms ensure the reliability and fault tolerance of MapReduce jobs in the face of node or task failures?	3	4	16
3.	What are the key considerations in job scheduling for MapReduce, and how do fair scheduling and capacity scheduling algorithms work to optimize resource allocation?	3	4	16
4.	Explain detail about anatomy of MapReduce job run.	3	5	16

UNIT IV

BASICS OF HADOOP

Data format – analyzing data with Hadoop – scaling out – Hadoop streaming –Hadoop pipes – design of Hadoop distributed file system (HDFS) – HDFS concepts –Java interface – data flow – Hadoop I/O – data integrity – compression – serialization –Avro – file-based data structures - Cassandra – Hadoop integration.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define the term scaling out.	4	1	2
2.	Why do we need Hadoop streaming?	4	2	2
3.	Define the term name node and data node.	4	1	2
4.	Write down the advantages of Hadoop.	4	1	2
5.	What is data locality optimization?	4	2	2
6.	List out types of Hadoop data formats.	4	1	2
7.	Define serialization.	4	1	2
8.	What is Cassandra and its uses?	4	1	2
	PART B			
1.	i)What is Hadoop streaming? Explain the concept by using the diagram. ii)Explain in detail about the Hadoop I/O system.	4	2	8 8
2.	i)With a neat sketch explain Hadoop distributed file system Architecture. ii)Explain in detail about serialization in Hadoop.	4	5	8 8
3.	i)Explain in detail about Avro with an example. ii)Write brief notes on Cassandra and its functions in big data.	4	3	8 8
4.	Explain in detail HDFS concepts in Hadoop and Java interface.	4	5	16

UNIT V

HADOOP RELATED TOOLS

Hbase – data model and implementations – Hbase clients – Hbase examples – praxis. Pig – Grunt – pig data model – Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Write down the Hive QL queries.	5	2	2
2.	List the features of Hbase.	5	1	2
3.	What is the difference between HBase and Hive?	5	2	2
4.	List down the Hive DDL commands.	5	2	2
5.	Write down the Hive QL queries.	5	2	2
6.	What is Pig, HBase, Hive?	5	1	2
7.	Define Pig Latin.	5	1	2
8.	What is CRUD operation?	5	1	2
	PART B			
1.	Explain in detail about Hbase data model Hbase clients with an example.	5	2	16
2.	i)Explain in detail about Pig data model. ii)Write a brief about Pig Latin scripts	5	4	8 8
3.	Explain in detail about HiveQL queries.	5	5	16
4.	Explain in detail about Hive data types and file formats.	5	5	16

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CS3551

DISTRIBUTED COMPUTING

UNIT I

INTRODUCTION

Introduction:Definition-RelationComputerSystemComponents–Motivation–Message-Passing Systems versus Shared Memory Systems – Primitives for Distributed Communication – Synchronous versus Asynchronous Executions – Design Issues and Challenges; A Model of Distributed Computations: A Distributed Program – A Model of Distributed Executions – Models of Communication Networks – Global State of a Distributed System.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What are the main components of a computer system related to distributed systems?	1	1	2
2.	Compare message-passing systems and shared memory systems.	1	2	2
3.	List any two advantages of a distributed system	1	1	2
4.	What are the primitives used for distributed communication?	1	1	2
5.	Compare synchronous and asynchronous execution.	1	2	2
6.	What is the significance of the global state in a distributed system?	1	1	2
7.	State any two challenges in designing a distributed system.	1	1	2
8.	What are the models of communication networks in a distributed system?	1	1	2
	PART B			
1.	Discuss the motivation for using distributed systems. What are the advantages and challenges?	1	6	16
2.	Explain the primitives for distributed communication and their significance in real-world applications.	1	5	16
3.	Differentiate between synchronous and asynchronous execution in distributed systems with examples.	1	5	16
4.	Design a simple distributed system architecture for a cloud-based application and discuss its components.	1	6	16

UNIT II

LOGICAL TIME AND GLOBAL STATE

Logical Time: Physical Clock Synchronization: NTP – A Framework for a System of Logical Clocks – Scalar Time – Vector Time; Message Ordering and Group Communication: Message Ordering Paradigms – Asynchronous Execution with Synchronous Communication – Synchronous Program Order on Asynchronous System – Group Communication – Causal Order – Total Order; Global State and Snapshot Recording Algorithms: Introduction–SystemModelandDefinitions– Snapshot Algorithms for FIFO Channels.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is clock drift in a distributed system?	2	1	2
2.	Compare physical clocks and logical clocks.	2	2	2
3.	What is the happened-before (→) relation in Lamport timestamps?	2	1	2
4.	What are the types of message ordering in distributed systems?	2	1	2
5.	Compare FIFO order and total order in message communication.	2	2	2
6.	Define causal order in message passing.	2	1	2
7.	What is a snapshot algorithm in a distributed system?	2	1	2
8.	Mention any two properties of FIFO channels in distributed systems.	2	1	2
	PART -B			
1.	Explain Lamport's logical clock algorithm with an example. How does it ensure event ordering?	2	5	16
2.	Explain asynchronous execution with synchronous communication in distributed systems.	2	5	16
3.	Compare and contrast different message ordering paradigms (FIFO, causal order, total order) in distributed systems	2	5	16
4.	Explain the Chandy-Lamport snapshot algorithm for recording global states in FIFO channels.	2	5	16

UNIT III

DISTRIBUTED MUTEX AND DEADLOCK

Distributed Mutual exclusion Algorithms: Introduction – Preliminaries – Lamport's algorithm – RicartAgrawala's Algorithm — Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm; Deadlock Detection in Distributed Systems: Introduction – System Model – Preliminaries – Models of Deadlocks – Chandy-Misra-Haas Algorithm for the AND model and OR Model.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Lamport's algorithm for mutual exclusion.	3	1	2
2.	What is the key difference between Lamport's and Ricart-Agrawala's algorithm?	3	1	2
3.	list two advantages of token-based mutual exclusion algorithms	3	1	2
4.	How does Suzuki-Kasami's algorithm ensure mutual exclusion?	3	1	2
5.	Define deadlock in distributed systems.	3	1	2
6.	What is a wait-for graph (WFG) in deadlock detection?	3	1	2
7.	Compare AND and OR models in deadlock detection.	3	2	2
8.	What are the methods to handle deadlocks in distributed systems?	3	1	2
	PART B			
1.	Explain Ricart-Agrawala's algorithm in detail. How does it improve Lamport's algorithm?	3	5	16
2.	Compare and contrast token-based and timestamp-based mutual exclusion algorithms.	3	5	16
3.	Discuss different approaches to handling deadlocks in distributed systems.	3	6	16
4.	Explain the working of the Chandy-Misra-Haas algorithm for the OR model with an example.	3	5	16

UNIT IV

CONSENSUS AND RECOVERY

Consensus and Agreement Algorithms: Problem Definition–Overview of Results–Agreement in a Failure-Free System(Synchronous and Asynchronous) –Agreement in Synchronous Systems with Failures; Check pointing and Rollback Recovery: Introduction–Background and Definitions–Issues in Failure Recovery–Checkpoint-based Recovery–Coordinated Check pointing Algorithm-Algorithm for Asynchronous Check pointing and Recovery

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is the difference between synchronous and asynchronous agreement?	4	1	2
2.	Define the role of failure detectors in achieving consensus.	4	1	2
3.	What is Byzantine agreement in distributed systems?	4	1	2
4.	What are the main challenges in reaching consensus in asynchronous systems?	4	1	2
5.	compare coordinated and uncoordinated checkpointing .	4	2	2
6.	What is rollback propagation?	4	1	2
7.	What is a stable storage in the context of rollback recovery?	4	1	2
8.	Define asynchronous checkpointing.	4	1	2
	PART-B			
1.	Explain the consensus problem in distributed systems. Why is it difficult to achieve in asynchronous systems?	4	5	16
2.	Discuss Byzantine agreement and its solutions in a distributed system.	4	6	16
3.	Explain the challenges and techniques used in checkpoint-based rollback recovery.	4	5	16
4.	Discuss the issues in failure recovery and how rollback recovery handles them.	4	6	16

UNIT V

CLOUD COMPUTING

Definition of Cloud Computing – Characteristics of Cloud – Cloud Deployment Models – Cloud Service Models – Driving Factors and Challenges of Cloud – Virtualization – Load Balancing – Scalability and Elasticity – Replication – Monitoring – Cloud Services and Platforms: Compute Services – Storage Services – Application Services

Q.No	Question	CO	BTL	Marks
	PART A			
1.	List any two characteristics of cloud computing**.**	5	1	2
2.	What are the three main cloud service models?	5	1	2
3.	Compare between public and private clouds.	5	2	2
4.	List any two driving factors of cloud computing.	5	1	2
5.	LIst two challenges of cloud computing.	5	2	2
6.	What is virtualization in cloud computing?	5	1	2
7.	What is the role of load balancing in cloud computing?	5	1	2
8.	What is replication in cloud computing?	5	1	2
	PART B			
1.	Explain the cloud service models (IaaS, PaaS, SaaS) with suitable examples.	5	5	16
2.	Compare and contrast private, public, hybrid, and community cloud models.	5	5	16
3.	Explain virtualization in cloud computing and its role in resource optimization	5	5	16
4.	Evaluate different cloud computing platforms and their services (AWS, Azure, Google Cloud).	5	5	16

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CS3591

COMPUTER NETWORKS

UNIT I

INTRODUCTION AND APPLICATION LAYER

Data Communication - Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Introduction to Sockets - Application Layer protocols: HTTP – FTP – Email protocols (SMTP - POP3 - IMAP - MIME) – DNS – SNMP.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What are the different transmission modes in data communication?	1	1	2
2.	Define Flow Control.	1	1	2
3.	What is DNS?	1	1	2
4.	Define Computer Network.	1	1	2
5.	Differentiate between LAN, MAN, and WAN.	1	2	2
6.	What is protocol layering?	1	1	2
7.	List the four layers of the TCP/IP model.	1	1	2
8.	List the seven layers of the OSI model.	1	1	2
	PART B			
1.	Explain in detail about the OSI architecture.	1	5	16
2.	(i)Explain HTTP with an Example . (ii)Explain SMTP in detail.	1	5	16
3.	Demonstrate the working of an E-Mail in detail.	1	5	16
4.	Demonstrate the working of Domain Name System with example.	1	5	16

UNIT II

TRANSPORT LAYER

Introduction - Transport-Layer Protocols: UDP – TCP: Connection Management – Flow control - Congestion Control - Congestion avoidance (DECbit, RED) – SCTP – Quality of Service.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Explain about the socket address?	2	2	2
2.	What is SCTP? List the services of SCTP.	2	1	2
3.	Define QOS .	2	1	2
4.	What are the services provided by the transport layer protocol?	2	1	2
5.	What is the purpose of the transport layer?	2	1	2
6.	State two characteristics of UDP.	2	1	2
7.	How does TCP provide reliability?	2	2	2
8.	What is the difference between TCP and UDP?	2	2	2
	PART B			
1.	With a neat sketch, Explain about the segment format of TCP and UDP.	2	5	16
2.	With a neat Sketch, Explain in detail the events and transitions about the TCP State-Transition diagrams (STD).	2	5	16
3.	Explain in detail about congestion control techniques in transport layer.	2	5	16
4.	Explain in detail i)SCTP flow control ii)SCTP error control.	2	5	16

UNIT III

NETWORK LAYER

Switching : Packet Switching - Internet protocol - IPV4 – IP Addressing – Subnetting - IPV6, ARP, RARP, ICMP, DHCP

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Explain the three Phases involved in the circuit switching	3	2	2
2.	Explain about the Packet Switching	3	2	2
3.	Difference between CSMA Collision detection and Collision Avoidance	3	1	2
4.	Define tunneling	3	1	2
5.	Differentiate between circuit switching and packet switching.	3	2	2
6.	What is switching in networking?	3	1	2
7.	List two key functions of IP.	3	1	2
8.	How many bits are there in an IPv4 address?	3	1	2
	PART B			
1.	Explain about packet switching with neat sketches.	3	5	16
2.	Explain the IPv4 packet format with a neat sketch .	3	5	16
3.	Describe about IPV4 frame format along with packet switching in details.	3	5	16
4.	Explain about ARP and RARP in detail.	3	5	16

UNIT IV

ROUTING

Routing and protocols: Unicast routing - Distance Vector Routing - RIP - Link State Routing – OSPF – Path-vector routing - BGP - Multicast Routing: DVMRP – PIM

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Circuit Switching.	4	1	2
2.	What are the important attributes for a good routing algorithm?	4	1	2
3.	Write any two difference between Connection oriented and Connection less service .	4	1	2
4.	List the services provided by Data link layer.	4	1	2
5.	What is unicast routing?	4	1	2
6.	What is the count-to-infinity problem in Distance Vector Routing?	4	2	2
7.	How does Link-State Routing differ from Distance Vector Routing?	4	2	2
8.	What is the role of Dijkstra's algorithm in Link-State Routing?	4	2	2
	PART B			
1.	Explain in detail about the ICMP with the neat diagram.	4	5	16
2.	Explain in detail about the DHCP with the neat diagram.	4	5	16
3.	Explain the working of link state routing in detail.	4	5	16
4.	Define BGP protocol. Describe its routing functionality in detail.	4	5	16

UNIT V

DATA LINK AND PHYSICAL LAYERS

Data Link Layer – Framing – Flow control – Error control – Data-Link Layer Protocols – HDLC – PPP - Media Access Control – Ethernet Basics – CSMA/CD – Virtual LAN – Wireless LAN (802.11) - Physical Layer: Data and Signals - Performance – Transmission media- Switching – Circuit Switching

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Define Bandwidth.	5	1	2
2.	What is Piggybacking?	5	1	2
3.	What is a Virtual LAN ?	5	1	2
4.	What parameters are used to measure the network performance?	5	1	2
5.	What is the function of the Data Link Layer?	5	1	2
6.	Define flow control.	5	1	2
7.	List any two framing techniques.	5	1	2
8.	Why is flow control necessary in a network?	5	2	2
	PART-B			
1.	Explain in details the design issues associating with framing in data link layer.	5	5	16
2.	Explain in detail about the access method and frame format used in Ethernet.	5	5	16
3.	List the responsibilities of data link layer in the Internet Models .	5	5	16
4.	Explain about the error detection and error correction technique.	5	5	16

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CCS341
DATA WAREHOUSING

UNIT I

INTRODUCTION TO DATA WAREHOUSE

Data warehouse Introduction - Data warehouse components- operational database Vs data warehouse – Data warehouse Architecture – Three-tier Data Warehouse Architecture - Autonomous Data Warehouse- Autonomous Data Warehouse Vs Snowflake - Modern Data Warehouse.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is a Data Warehouse?	1	1	2
2.	List the components of a Data Warehouse.	1	1	2
3.	What are the layers in Three-Tier Data Warehouse Architecture?	1	1	2
4.	What is the difference between an Operational Database and a Data Warehouse?	1	1	2
5.	Describe the difference between Autonomous Data Warehouse and Snowflake.	1	2	2
6.	How does the Three-Tier Data Warehouse Architecture enhance performance?	1	2	2
7.	Differentiate between Snowflake's architecture and traditional data warehouses.	1	2	2
8.	What is the difference between an Operational Database and a Data Warehouse?	1	1	2
	PART B			
1.	Analyze the key components of a data warehouse and explain how they contribute to efficient data management and decision-making.	1	4	16
2.	Analyze the significance of Three-Tier Data Warehouse Architecture and explain how it improves scalability, performance, and data security.	1	3	16
3.	Evaluate the advantages and challenges of implementing a modern cloud-based data warehouse compared to a traditional on-premises data warehouse.	1	5	16
4.	Evaluate the significance of Snowflake's architecture in modern data warehousing and justify whether it can fully replace traditional data warehouse solutions.	1	5	16

UNIT II

ETL AND OLAP TECHNOLOGY

What is ETL – ETL Vs ELT – Types of Data warehouses - Data warehouse Design and Modeling - Delivery Process - Online Analytical Processing (OLAP) - Characteristics of OLAP - Online Transaction Processing (OLTP) Vs OLAP - OLAP operations- Types of OLAP- ROLAP Vs MOLAP Vs HOLAP.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is ETL in Data Warehousing?	2	1	2
2.	List the types of Data Warehouses.	2	1	2
3.	What is Data Warehouse Design and Modeling?	2	1	2
4.	What is OLAP?	2	1	2
5.	What is the difference between OLTP and OLAP?	2	1	2
6.	Differentiate between ETL and ELT in terms of performance and data handling.	2	2	2
7.	Differentiate between MOLAP, ROLAP, and HOLAP.	2	2	2
8.	Explain the role of Delivery Process in a Data Warehouse.	2	2	2
	PART B			
1.	Analyze the ETL process in data warehousing and explain how each step (Extract, Transform, Load) impacts the efficiency and accuracy of the data warehouse.	2	4	16
2.	Analyze the different types of data warehouses and explain how they address various business needs.	2	4	16
3.	Compare ROLAP, MOLAP, and HOLAP architectures and analyze their advantages and disadvantages in OLAP systems.	2	4	16
4.	Evaluate the effectiveness of various data warehouse design and modeling approaches, including star schema, snowflake schema, and fact constellation.	2	5	16

UNIT III

META DATA, DATA MART AND PARTITION STRATEGY

Meta Data – Categories of Metadata – Role of Metadata – Metadata Repository – Challenges forMeta Management – Data Mart – Need of Data Mart- Cost Effective Data Mart- Designing DataMarts- Cost of Data Marts- Partitioning Strategy – Vertical partition – Normalization – Row Splitting– Horizontal Partition

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is Metadata in data warehousing?	3	1	2
2.	List the main categories of Metadata.	3	1	2
3.	What is a Data Mart?	3	1	2
4.	List the different partitioning strategies used in data marts.	3	1	2
5.	Define Normalization in the context of data warehouses.	3	2	2
6.	Explain the difference between Business Metadata and Technical Metadata.	3	2	2
7.	Explain how cost-effective data marts can be designed.	3	2	2
8.	What is Vertical Partitioning in data warehousing?	3	1	2
	PART B			
1.	Analyze the categories of metadata and explain how each category plays a role in enhancing the efficiency of data warehouse operations.	3	4	16
2.	Compare and analyze vertical and horizontal partitioning strategies in data warehouses and explain their impact on query performance and data management.	3	4	16
3.	Evaluate the need for cost-effective data marts and suggest strategies for designing low-cost, scalable data marts.	3	5	16
4.	Evaluate the process of designing data marts and assess how schema design (e.g., star schema vs. snowflake schema) impacts data mart performance and usability.	3	5	16

UNIT IV

DIMENSIONAL MODELING AND SCHEMA

Dimensional Modeling- Multi-Dimensional Data Modeling – Data Cube- Star Schema- Snowflake schema- Star Vs Snowflake schema- Fact constellation Schema- Schema Definition - Process Architecture- Types of Data Base Parallelism – Datawarehouse Tools

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is Dimensional Modeling?	4	1	2
2.	What is a Data Cube in data warehousing?	4	1	2
3.	What is the difference between Star Schema and Snowflake Schema?	4	1	2
4.	List the types of Database Parallelism.	4	1	2
5.	Name some common Data Warehouse Tools.	4	1	2
6.	Differentiate between Intra-query Parallelism and Inter-query Parallelism.	4	2	2
7.	Explain the purpose of OLAP tools in data warehouses.	4	2	2
8.	Why is Snowflake Schema more normalized than Star Schema?	4	2	2
	PART B			
1.	Analyze the importance of Dimensional Modeling in a data warehouse and explain how facts and dimensions improve data analysis.	4	4	16
2.	Compare and analyze Star Schema and Snowflake Schema in terms of structure, performance, and usability.	4	4	16
3.	Analyze the concept of Database Parallelism and explain how different types of parallelism enhance data warehouse performance.	4	5	16
4.	Evaluate the role of Fact Constellation Schema in modern data warehouse design and its effectiveness in handling large-scale business data.	4	5	16

UNIT V

SYSTEM & PROCESS MANAGERS

Data Warehousing System Managers: System Configuration Manager- System Scheduling Manager - System Event Manager - System Database Manager - System Backup Recovery Manager - Data Warehousing Process Managers: Load Manager – Warehouse Manager- Query Manager – Tuning – Testing

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is the role of a System Configuration Manager in a data warehousing system?	5	1	2
2.	Define System Event Manager.	5	1	2
3.	What is the function of a System Backup and Recovery Manager?	5	1	2
4.	What is the role of a Warehouse Manager in data warehousing?	5	1	2
5.	What is the function of a Query Manager?	5	1	2
6.	What is Testing in a data warehousing system?	5	1	2
7.	Differentiate between Load Manager and Warehouse Manager in a data warehouse process.	5	2	2
8.	How does a System Database Manager enhance query efficiency?	5	2	2
	PART B			
1.	Analyze the roles and responsibilities of various Data Warehousing System Managers in ensuring the efficient functioning of a data warehouse.	5	4	16
2.	Compare and analyze the roles of Query Manager, Tuning, and Testing in enhancing query performance and ensuring data warehouse reliability.	5	4	16
3.	Evaluate the importance of System Managers (Configuration, Scheduling, Event, Database, and Backup Recovery Managers) in maintaining the performance, security, and scalability of a data warehouse.	5	5	16
4.	Evaluate the role of process automation through Scheduling Manager and Event Manager in improving data warehouse operational efficiency and reducing manual intervention.	5	5	16

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CS3691

Embedded Systems And IOT

UNIT I

8-Bit Embedded Processor

8-Bit Microcontroller – Architecture – Instruction Set and Programming – Programming Parallel Ports – Timers and Serial Port – Interrupt Handling.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Compare pooling and interrupts. How a microcontroller perform upon activation of interrupts ?	1	2	2
2.	Differentiate microprocessor and microcontroller.	1	1	2
3.	List interpret Embedded Systems and its components.	1	1	2
4.	List Embedded Systems addressing modes.	1	1	2
5.	Which register has the SMOD bit, and what is its status when the 8051 is powered up?	1	1	2
6.	List the 8051 interrupts with its priority?	1	1	2
7.	Define the operating mode 0 of 8051 serial ports.?	1	1	2
8.	Give the format of the register PSW of 8051 and name each it.	1	1	2
	PART B			
1.	Explain the Block diagram of 8051 ? or Explain the architecture of 8051.	1	4	16
2.	For microcontroller discuss the following : (i)How RAM is organized and addressed ? (ii)How many register banks are present in RAM and how is bank switching executed ?	1	4	16
3.	List the various instructions available in 8051 Microcontroller.	1	2	16
4.	Describe the different modes of operation of Timer/Counter in 8051 with its associated registers (or)Explain the timer modes of 8051 microcontroller ?	1	2	16

UNIT II

Embedded C Programming

Memory And I/O Devices Interfacing – Programming Embedded Systems in C – Need ForRTOS – Multiple Tasks and Processes – Context Switching – Priority Based SchedulingPolicies.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is embedded C Programming?	2	1	2
2.	Define memory and I/O device interfacing?	2	1	2
3.	List the advantages and limitations of Priority based process scheduling.	2	1	2
4.	Define context switching in RTOS ?	2	2	2
5.	Bring out the difference between multiple process and multiple task ?	2	1	2
6.	What is RTOS ?	2	1	2
7.	List the bitwise operators in Embedded C language.	2	2	2
8.	Compare a compiler and cross compiler .	2	2	2
	PART B			
1.	Write Embedded C program for generating LED output sequence as shown below 00000001,00000010,00000100,00001000 so on till 10000000.	2	4	16
2.	Explain the context switching mechanism for moving the CPU from one executing process to another with an example.	2	4	16
3.	Briefly explain the Multiple Tasks and Processes.	2	2	16
4.	Explain priority scheduling and its types with example also explain its characteristics.	2	4	16

UNIT III

IOT and Arduino Programming

Introduction to the Concept of IOT Devices – IOT Devices Versus Computers – IOT Configurations – Basic Components – Introduction to Arduino – Types of Arduino – ArduinoToolchain – Arduino Programming Structure – Sketches – Pins –Input/Output From Pins Using Sketches – Introduction to Arduino Shields – Integration of Sensors and Actuators with Arduino.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Draw the logic design of IOT and describe its Components.	3	1	2
2.	What are the different protocols of IoT?	3	1	2
3.	Define IOT.	3	1	2
4.	Point out the challenges faced by the Internet of Things.	3	1	2
5.	What are the types of shields?	3	1	2
6.	Define I2C.	3	1	2
7.	List various Libraries in Arduino.	3	1	2
8.	How does debugging work in Arduino?	3	1	2
	PART B			
1.	Briefly explain the Technical Building Blocks of IOT.	3	4	16
2.	Describe the communication Technologies of IOT .	3	5	16
3.	Explain in detail about Arduino Programming Structures with Examples.	3	5	16
4.	Define Arduino Shields and explain integration of Sensors and Actuators with Arduino.	3	5	16

UNIT IV

IOT Communication And Open Platforms

IOT Communication Models and APIs – IOT Communication Protocols – Bluetooth – WiFi – ZigBee – GPS – GSM modules – Open Platform (like Raspberry Pi) – Architecture– Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is Zigbee?	4	1	2
2.	What is Piconet?	4	1	2
3.	What is GSM/GPRS module?	4	1	2
4.	Define NFC.	4	1	2
5.	Define Home Location Register (HLR).	4	1	2
6.	What is SMS Gateway (SMS-G)?	4	1	2
7.	What is Operation and Support Subsystem (OSS)?	4	1	2
8.	Define Equipment Identity Register (EIR).	4	1	2
	PART B			
1.	Explain GSM services and its architecture in detail.	4	4	16
2.	Explain Raspberry Pi architecture and discuss how RPI used for IOT application.	4	4	16
3.	Brief about Bluetooth architecture.	4	5	16
4.	Explain GPS in detail.	4	4	16

UNIT V

Applications Development

Complete Design of Embedded Systems – Development of IOT Applications – Home Automation – Smart Agriculture – Smart Cities – Smart Healthcare.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is an Embedded System Design?	5	1	2
2.	Write the Types of Embedded Systems.	5	1	2
3.	What are the challenges of Embedded Systems?	5	1	2
4.	What are sensors and Actuators.	5	1	2
5.	What is MQTT Protocol?	5	1	2
6.	Define Signal Conditioning Unit.	5	1	2
7.	Write the applications of IOT in Smart Supply Chain.	5	1	2
8.	Write the Disadvantages of Embedded System.	5	1	2
	PART B			
1.	Explain the Complete Design of Embedded Systems and development of IOT applications.	5	4	16
2.	Write a program for Home Automation and explain.	5	4	16
3.	Explain the above design process for Agriculture and explain with relevant diagram.	5	4	16
4.	Explain Embedded system that enhance Smart city.	5	4	16

IT3501

Full Stack Web Development

UNIT I

BASICS OF FULL STACK

Understanding the Basic Web Developement Framework-User -Browser-Web Server-Backend Services-MVC Architecture -Understanding the different stacks -The role of Express -ANGULAR -Node -MongoDB -React.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	What is meant by full stack development?	1	1	2
2.	Outline the roles of Backend Services .	1	2	2
3.	List any five front end languages.	1	1	2
4.	List any five backend programming languages.	1	1	2
5.	What is a Web Development Framework?	1	1	2
6.	What is Express in Full Stack?	1	1	2
7.	List any five database tools.	1	1	2
8.	Difference between angular and React .JS.	1	2	2
	PART B			
1.	Explain the components of a Web Development Stack?	1	5	16
2.	Explain the major components of MVC architecture and also summarize the benefits and disadvantages of MVC model in application development .	1	5	16
3.	What is MVC architecture ?Explain the components of MVC and how data flow takes place in MVC architecture with suitable example .	1	5	16
4.	Discuss the major functions of Web Browser ,Web Server and outline the working of web server.	1	6	16

UNIT II

NODE JS

Basics of Node JS-Installation-Working with Node Packages-Using Node Package Manager-CreatingasimpleNodeJSapplication-UsingEvents-Listeners-Timers-Callbacks-Handling DataI/O -Implementing HTTP services in Node JS.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	List the Primitive types in Node .JS.	2	1	2
2.	What are the callbacks in Node JS.	2	1	2
3.	What are call Backs and events in Node JS.	2	1	2
4.	List and mention the purpose of any four timer methods in Node JS.	2	1	2
5.	Compare between SQL and NoSQL.	2	2	2
6.	What is angular js?	2	1	2
7.	What is react js?	2	1	2
8.	Write a simple html snippet to create a sign in page.	2	1	2
	PART B			
1.	Explain event -driven ,non -blocking I\O model in Node JS with suitable example.	2	5	16
2.	Elaborate creating ,publishing ,and installing Node.JS packaged modules with suitable examples.	2	6	16
3.	Explain the components of Node.JS application. Develop a simple web application to get user profile and display it.	2	5	16
4.	Explain event-driven, blocking and non- blocking I\O model in node.JS.	2	5	16

UNIT III

MONGO DB

Understanding NoSQL and MongoDB-Building MongoDB Environment -User accounts-Access Control-Administration databases-Managing collections-Connecting to MongoDB from Node.JS -Simple application.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Why MongoDB is called schema less database ?	3	1	2
2.	What is Database collection and document in MongoDB ?	3	1	2
3.	Summarize the advantages of MongoDB over traditional relational Databases.	3	2	2
4.	What are the roles and permissions in MongoDB ?	3	1	2
5.	What is servers?	3	1	2
6.	What are the advantages of MongoDB?	3	1	2
7.	What is meant by JDBC connections?	3	1	2
8.	What are embedded documents in MongoDB?	3	1	2
	PART B			
1.	Explain how to connect a Node.JS application to a MongoDB database with suitable code.	3	5	16
2.	Explain various ways to perform standard CRUD operation via the Mongo shell with suitable example.	3	5	16
3.	Design a signup form using Node.JS and MongoDB. The form should capture name,email,password and mobile no from the user and the captured information are stored in MongoDB .	3	6	16
4.	Explain the following operation with suitable examples i) Create MongoDB database . ii) Create collection . iii) Insert documents into a MongoDB database . iv)Find and select data from a MongoDB collection . v) Update Document .	3	5	16

UNIT IV

EXPRESS AND ANGULAR

Implementing Express in Node .JS -Configuring routes-Using Request and response objects-Angular-Typescript -Angular Components -Expressions -Data Binding -Built -in-Directives.

Q.No	Question	CO	BTL	Marks
	PART A			
1.	Difference between React and Angular .	4	2	2
2.	What is Data Binding in Angular and what is the use data binding in Angular ?	4	1	2
3.	What is Express JS.	4	1	2
4.	What is one way binding and two way binding in angular ?	4	1	2
5.	Define a component in Angular.	4	1	2
6.	What is a module in AngularJS	4	1	2
7.	What is JSX in React?	4	1	2
8.	Define Angular routing.	4	1	2
	PART B			
1.	What is data binding in angular?Explain types of Data binding in Angular each with suitable example.	4	5	16
2.	What is routing in Express.JS?Explain configuring of dynamic routing in Angular Application with suitable code example.	4	5	16
3.	What is Express JS routing ?Explain how to set a express routes with suitable examples.	4	5	16
4.	What is type script and what are the features of type script?Develop Type script code to validate email address and password .	4	6	16

UNIT V

REACT

MERN STACK -Basics React applications -React Components -React State -Express REST API -Modularization and Webpack -Routing with React Router -Server -side rendering .

Q.No	Question	CO	BTL	Marks
	PART A			
1.	LIst the three different packages in react for Routing.	5	1	2
2.	What is MERN stack?	5	1	2
3.	What are the benefits of React JS?	5	1	2
4.	What are the drawbacks of the MERN stack?	5	1	2
5.	What does props mean in reactJS?	5	1	2
6.	Define useEffect in React.	5	1	2
7.	Explain conditional rendering in ReactJS.	5	2	2
8.	What is state management in React?	5	1	2
	PART B			
1.	What is state and props in React ?With suitable code example ,Explain how to build dynamic forms in React ?	5	5	16
2.	What is REST API and how to create an REST API with Node.JS and explain.	5	5	16
3.	Explain the different phases of ReactJS component lifecycle. Also illustrate how to change the state of the component on click.	5	5	16
4.	Develop REST API to perform CRUD operations for customer entity with attributes of your choice .	5	6	16