SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF ARTIFICIAL INTELLIGENCE& DATA SCIENCE

QUESTION BANK

V SEMESTER

1922505 – ADVANCED CONCEPTS OF DATABASES

Regulation – 2019

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Prepared by

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATA SCIENCE

QUESTION BANK

SUBJECT   : 1922505- ADVANCED CONCEPTS OF DATABASES

SEM / YEAR : V Sem / III Year

UNIT I - PARALLEL AND DISTRIBUTED DATABASES		

SYLLABUS : Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design of Parallel Systems- Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Case Studies .

PART-A		
Q.No.	**Question**	**Level**	**Competence**
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1	List the two main measures of performance of a database system.	BTL1	Remembering
2	Examine the contents of shared memory.	BTL1	Remembering
3	Distinguish single user system and multi user system.	BTL2	Understanding
4	Tell the three basic data partitioning strategies.	BTL1	Remembering
5	Differentiate coarse granularity parallelism and fine granularity parallelism.	BTL4	Analyzing
6	Identify the need of concurrency control in distributed database.	BTL2	Understanding
7	State the different models of parallel database architectures.	BTL1	Remembering
8	Define Inter query parallelism and Intra query parallelism.	BTL1	Remembering
9	Compare Homogeneous Distributed DBMS and Heterogeneous Distributed DBMS.	BTL4	Analyzing
10	Recall the two different schemes for fragmentation.	BTL1	Remembering
11	Report the implementation issues in distributed system.	BTL3	Applying
12	Analyze the various approaches for evaluation of other relational operations.	BTL4	Analyzing
13	Indicate the two approaches of storing the relation in the distributed database.	BTL2	Understanding
14	Summarize the two phases of 2PC protocol.	BTL2	Understanding
15	Interpret the 3 tier architecture.	BTL3	Applying
16	Illustrate how the global coordinator controls distributed transactions in a distributed database	BTL3	Applying
17	Formulate the roles of a transaction manager.	BTL6	Creating
18	Summarize the important characteristics of Distributed DBMS	BTL5	Evaluating
19	Generalize the roles and responsibility of a transaction coordinator.	BTL6	Creating
20	Assess the messages used by 2 Phase Commit protocol.	BTL5	Evaluating
21	Interpret the reason for designing the multiuser system.	BTL2	Understanding
22	Point out the front end tools of database system.	BTL4	Analyzing
23	Sketch the general structure of a client–server system.	BTL3	Applying
24	Discriminate the parallel systems and distributed systems.	BTL5	Evaluating

PART-B

Q.No.	Question	Level	Competence
1	Describe Centralized and client server architecture with neat diagram.(13)	BTL2	Understanding
2	Explain about transaction servers and data servers with suitable example.(13)	BTL4	Analyzing
3	Explain in detail about the Three Tier Client Server Architecture with proper illustrations.(13)	BTL4	Analyzing
4	Examine in detail about the commit protocol implemented in distributed database systems.(13)	BTL1	Remembering
5	With a neat diagram, generalize the types of Parallel Database architecture.(13)	BTL6	Creating
6	Explain the architecture of distributed database system and point out the reasons for building distributed database system.(13)	BTL4	Analyzing
7	Enumerate in detail about the Distributed Data Storage.(13)	BTL1	Remembering
8	Describe about Deadlock handling and deadlock Management in distributed system.(13)	BTL1	Remembering
9	(i) Mention the ACID properties.(3) (ii)Discuss about the concurrency control schemes used in Distributed Database.(10)	BTL2	Understanding
10	Illustrate the Distributed system in detail and interpret the implementation issues.(13)	BTL3	Applying
11	Tabulate the difference between pipelined parallelism and independent parallelism.(13)	BTL1	Remembering
12	Summarize in detail about Server System Architecture and its types.(13)	BTL5	Evaluating
13	Discuss the three basic data partitioning strategies and compare them.(13)	BTL1	Understand
14	Demonstrate the difference in Interquery parallelism and Intraquery parallelism with suitable example.(13)	BTL3	Applying
15	(i)Interpret the various locking protocols used in a distributed system.(8) (ii) Identify the advantages of Single lock manager and Distributed lock Manager.(5)	BTL2	Understanding
16	Demonstrate the system architecture and show how distributed transactions plays a vital role in a distributed system.(13)	BTL3	Applying
17	(i)Write a short note on 2PC? (3) (ii)Evaluate how 2Phase Commit protocol handles failure and how it carries out recovery and concurrency control.(10)	BTL5	Evaluating

PART-C

Q.No.	Question	Level	Competence
1	Is two phase locking appropriate for serializing access to the data structures in shared memory. Evaluate your answer.(15)	BTL5	Evaluating
2	(i)Generalize the speedup and scaleup issues recognized in achieving parallelism.(10) (ii)Organize the commonly used types of interconnection networks.(5)	BTL6	Creating
3	Consider a failure that occurs during 2PC for a transaction. For each possible failure, estimate how 2PC ensures transaction atomicity despite the failure.(15)	BTL5	Evaluating
4	Consider a bank that has a collection of sites, each running a database system. Suppose the only way the databases interact is by electronic transfer of money between one another. Would such a system qualify as a distributed database? Why?(15)	BTL6	Creating

5	Assess the factors that can work against linear scaleup in a transaction processing system? Which of the factors are likely to be the most important in each of the following architectures: shared memory, shared disk, and shared nothing?(15)	BTL4	Evaluating

UNIT II -OBJECT AND OBJECT RELATIONAL DATABASES			
SYLLABUS: 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.			

	PART-A		
Q.No.	**Question**	**Level**	**Competence**
1.	Define an Object.	BTL1	Remembering
2.	Illustrate the object model of ODMG.	BTL3	Applying
3.	Discriminate Ownership semantics and reference semantics.	BTL5	Evaluating
4	Show the use of unstructured complex object facility provided by DBMS.	BTL3	Applying
5.	Recite the characteristics of objects.	BTL1	Remembering
6.	Analyze the object relational features available in oracle.	BTL4	Analyzing
7.	Generalize the need of creating the object identity.	BTL6	Creating
8.	Assess the property of reachability in OODB.	BTL5	Evaluating
9.	Differentiate ODL and OQL.	BTL4	Analyzing
10.	Express how an operation is defined in order to encourage encapsulation.	BTL2	Understanding
11.	How will you specify object behavior via class operations?	BTL2	Understanding
12.	Tell the goals of OODB.	BTL1	Remembering
13.	Distinguish Transient objects and persistent objects.	BTL4	Analyzing
14.	List the constructors that are commonly used in OODB.	BTL1	Remembering
15.	Develop a graphical object database schema for University database.	BTL6	Creating
16.	Summarize the components in SQL standard.	BTL2	Understanding
17.	List the features supported by OQL.	BTL1	Remembering
18.	Recall a literal and identify the types of literal.	BTL1	Remembering
19.	Identify the data types used by Oracle for storing extremely large objects.	BTL2	Understanding
20.	Correlate object constructor, destructor and object modifier.	BTL3	Applying
21.	Distinguish persistent collection and transient collection.	BTL4	Analyzing
22.	Indicate the properties of OID?	BTL2	Understanding
23.	Compare identical objects and equal objects.	BTL5	Evaluating

24.	Interpret the methods for creating persistent objects?	BTL3	Applying

PART-B

Q.No.	Question	Level	Competence
1	Examine the object oriented databases and its approaches.(13)	BTL1	Remembering
2	Explain the components of object model of ODMG.(13)	BTL4	Analyzing
3	Demonstrate the features of OQL and explain the syntax for queries with suitable example.(13)	BTL3	Applying
4	(i)Generalize the way of specifying Object behavior via class Operations.(7) (ii)Formulate the method of specifying Object persistence via Naming and Reachability in OODBMS.(6)	BTL6	Creating
5	Discuss about the object relational and extended relational systems and its application in SQL with suitable example.(13)	BTL2	Understanding
6	Describe briefly about the following (i)Built in interfaces of the ODMG model (8) (ii) Interfaces, classes and inheritance.(5)	BTL2	Understanding
7	Illustrate the concept of Encapsulation of Operations, Methods and Persistence with relevant examples.(13)	BTL3	Applying
8	Give an overview of SQL and its Object –Relational features.(13)	BTL1	Remembering
9	Describe about the SQL standard and its components and explain the object relational support in SQL.(13)	BTL1	Remembering
10	Describe the Object relational features of Oracle.(13)	BTL1	Remembering
11	Interpret the usage of (i)Objects and literals in ODMG (7) (ii)Atomic objects(6)	BTL4	Analyzing
12	Explain the methods of creating an object database schema using the object definition language (ODL).(13)	BTL2	Understanding
13	Analyze the method of representing complex objects and explain its types.(13)	BTL4	Analyzing
14	Compare and Contrast Unstructured complex objects and structured complex objects.(13)	BTL5	Evaluating
15	Summarize (i)Object Identity (7) (ii)Object structure (6)	BTL5	Evaluating
16	Demonstrate the difference between Conceptual design of ODB and RDB.(13)	BTL2	Understanding
17	Interpret the need of (i)ODL(7) (ii)OQL (6)	BTL3	Applying

PART-C

Q.No.	Question	Level	Competence
1	Summarize the reason behind the development ORDBMS.. Assess the advantages, disadvantages and the characteristics of ORDBMS.(15)	BTL5	Evaluating
2	Formulate your own example explaining the role of various type constructors.(15)	BTL6	Creating
3	Construct the OQL queries that apply to Company database.(15)	BTL6	Creating

4	Evaluate the various types of constructors and assess how they are used to create complex object structures.(15)	BTL5	Evaluating
5	Summarize the rules associated with inheritance and overloading of function implementation in SQL with an example of your choice.(15)	BTL5	Evaluating

UNIT III - INTELLIGENT DATABASES

SYLLABUS: Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- Taxonomy- Applications-Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Data log- Recursive Rules-Syntax and Semantics of Datalog Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data Types- Spatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.

PART-A			
Q.No.	Question	Level	Competence
1	Define Active Database.	BTL1	Remembering
2	Tabulate the features of Active Database.	BTL1	Remembering
3	What is starburst in DBMS?	BTL1	Remembering
4	Analyze how do temporal database differ from regular database.	BTL4	Analyzing
5	Identify the advantages of active database.	BTL2	Understanding
6	Interpret the main types of specifications of deductive database.	BTL2	Understanding
7	Prepare an example showing the Active rules using statement-level semantics in STARBURST notation.	BTL6	Creating
8	What are active rules in Database?	BTL1	Remembering
9	Compare spatial and non spatial data types in DBMS.	BTL5	Evaluating
10	Distinguish fact table and dimension table.	BTL4	Analyzing
11	Formulate the idea of using predicate in DBMS.	BTL6	Creating
12	Identify the need of spatial data structure in DBMS.	BTL1	Remembering
13	Illustrate the meaning of Temporal Database.	BTL3	Applying
14	Discover the use of Deductive Database.	BTL3	Applying
15	Indicate why spatial access methods are needed.	BTL2	Understanding
16	Tell about facts in DBMS.	BTL1	Remembering
17	Identify the types of spatial queries in DBMS.	BTL2	Understanding
18	Evaluate the meaning of Knowledge Database in DBMS.	BTL5	Evaluating
19	Discover the purpose of spatial database.	BTL3	Applying
20	Point out the type of Knowledge-based systems	BTL4	Analyzing
21	Differentiate Oracle Database and DB 2.	BTL2	Understanding
22	What are k-d trees used for?Analyze	BTL4	Analyzing
23	Demonstrate the syntax and semantics of Data log languages.	BTL3	Applying
24	Assess how to write a recursive query in SQL.	BTL5	Evaluating

PART-B

Q.No.	Question	Level	Competence
1	Describe the design and implementation issues in Active Database.(13)	BTL4	Analyzing
2	Suggest a database for knowledge management and explain the concept of knowledge retrieval with suitable example.(13)	BTL6	Creating
3	Discuss about the syntax and semantics in Starburst, Oracle and DB2 with suitable example.(13)	BTL2	Understanding
4	Describe about triggers, their types, creation and dropping of the triggers in DB2.(13)	BTL2	Understanding
5	Demonstrate the operation of Starburst Active database rule system with relevant example.(13)	BTL3	Applying
6	Summarize the purpose of spatial access methods in object selection.(13)	BTL5	Evaluating
7	Examine the features, need and usage of Active Database with example.(13)	BTL1	Remembering
8	Interpret the Temporal Database concepts and provide a good example to illustrate the need for developing a set of unifying concepts for application developers to use.(13)	BTL2	Understanding
9	Compare and contrast active database with deductive database.(13)	BTL4	Analyzing
10	Explain the characteristic and features of spatial Database and also write a short note on various types of spatial data.(13)	BTL4	Analyzing
11	Enumerate the generalized model for Active Database.(13)	BTL1	Remembering
12	(i)Examine the operation of Temporal Join(7) (ii)Describe about TSQL2.(6)	BTL1	Remembering
13	Describe the various applications of commercial Deductive Database System.(13)	BTL1	Remembering
14	Illustrate the purpose of spatial Data Structures with suitable example.(13)	BTL3	Applying
15	Summarize the important features of SQL.(13)	BTL2	Understanding
16	Demonstrate the usage of Recursive queries in SQL.(13)	BTL3	Applying
17	Assess the various log based recovery in DBMS.(13)	BTL5	Evaluating

PART-C

Q.No.	Question	Level	Competence
1	Evaluate the applications where implementation of Deductive database can be seen in Logic Data Language.(15)	BTL5	Evaluating
2	Given the relational schema: EMPLOYEE(Name,Salary,DeptNum) DEPARTMENT(DeptNUM,ManagerName) Define the following active rules in Oracle and DB2. (i)A rule that deletes all the employees belonging to a department when that department is deleted.(5) (ii)A rule that reacts to the deletion of the employees who is manager in a department by deleting that department and all its employees.(5) (iii)A rule that,each time the salary of an employee becomes higher than that of his or her manager,makes that salary equal to that of the manager.(5)	BTL6	Creating

3	Given the relational schema: EMPLOYEE(Name,Salary,DeptNum) DEPARTMENT(DeptNUM,ManagerName) Define the following active rules in Oracle and DB2. (i)A rule that,each time the salaries are modified,verifies that there are no departments in which the average salary increases more that hree percent,and in this case cancels the modification.(5) (ii)a rule that,each time the salaries are modified,verifies their average and if it is higher than 50 thousand,deletes all the employees whose salary has been modified and are higher than 80 thousands.(10)	BTL6	Creating
4	Evaluate in detail about spatial database and multimedia query with complex types.(15)	BTL5	Evaluating
5	Summarize the insertion, deletion, search and range query operation in k-d tree.(15)	BTL5	Evaluating

UNIT IV - ADVANCED DATA MODELS			
SYLLABUS: Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining- Text Mining			
PART-A			
Q.No.	Question	Level	Competence
1	Identify the properties of mobile Database.	BTL2	Understanding
2	Summarize on Location dependent Data.	BTL2	Understanding
3	Demonstrate how concurrency is handled in Mobile Database.	BTL3	Applying
4	What do you mean by mobility?	BTL1	Remembering
5	Define Handoff.	BTL1	Remembering
6	Point Out the types of Data Warehouse.	BTL4	Analyzing
7	Tabulate the applications of Dataware housing.	BTL1	Remembering
8	Formulate the ways to represent knowledge extracted during data mining.	BTL6	Creating
9	Examine about Data Warehouse.	BTL1	Remembering
10	Demonstrate how the node failure and timeout actions are performed in commit protocols.	BTL2	Understanding
11	Assess the challenges in Mobility Data Management.	BTL5	Evaluating
12	Define Text Mining.	BTL1	Remembering
13	Examine the need for Data Mining.	BTL1	Remembering
14	Interpret the role of Information Retrieval system.	BTL3	Applying
15	Identify the issues in Distributed Data Management.	BTL2	Understanding
16	Point out the Hand off detection strategies	BTL4	Analyzing
17	Analyze the various approaches to data Mining Problems.	BTL3	Applying
18	Generalize your view on intermittent connectivity.	BTL6	Creating
19	Assess the need for maintaining consistency in mobile application data management.	BTL5	Evaluating
20	Differentiate Hard handoff and soft handoff.	BTL4	Analyzing
21	Distinguish the shared lock and exclusive lock modes.	BTL2	Understanding
22	Infer the relationship between Data Warehousing and Data Mining.	BTL4	Analyzing

23	Why Is Data Warehouse Important For Data Mining?-Interpret.	BTL3	Applying
24	Discriminate Text Mining and Data Mining.	BTL5	Evaluating

PART-B

Q.No.	Question	Level	Competence
1	(i)Examine the components of Data Warehouse.(7) (ii)Examine the different Warehouse Schemas.(6)	BTL2	Understanding
2	Describe about Mobile Database with appropriate example.(13)	BTL1	Remembering
3	Discuss about how Concurrency control is maintained in DBMS.(13)	BTL2	Understanding
4	Explain in detail about data warehouse, its need and application.(13)	BTL2	Understanding
5	Illustrate about decision tree in the process of data mining.(13)	BTL4	Analyzing
6	Analyze in detail about the mobile transaction model with suitable example.(13)	BTL4	Analyzing
7	Describe about decision tree in the process of data mining.(13)	BTL2	Remembering
8	Generalize about the transaction commit protocol in mobile database system.(13)	BTL6	Creating
9	Give an account on Data Management issues in Mobile Database.(13)	BTL1	Remembering
10	Summarize how the location and Handoff management can be performed in mobile databases.(13)	BTL5	Evaluating
11	Describe about the architecture of Data Warehouse with a neat diagram.(13)	BTL1	Remembering
12	Analyze the effect of mobility on Data Management.(13)	BTL4	Analyzing
13	(i)Discover the role of Lock based protocol in concurrency control.(7) (ii) Discover the role of Time based protocol in concurrency control.(6)	BTL3	Applying
14	Demonstrate how text Mining plays a major role in Data Mining.(13)	BTL3	Applying
15	(i)Summarize the steps involved in Data Mining Process.(7) (ii)Assess the various Data Mining Tools.(6)	BTL5	Evaluating
16	Explain Information Retrieval and describe the components of IR Model.(13)	BTL2	Understanding
17	Demonstrate the usage and types of multimedia database in DBMS.(13)	BTL3	Applying

PART-C

Q.No.	Question	Level	Competence
1	Formulate the difference between Text Mining and Data Mining.(15)	BTL6	Creating
2	(i)Assess the functionality required of Mobile DBMs(8) (ii)Evaluate how mobile database support the mobile worker.(7)	BTL5	Evaluating
3	Assess the main problems in concurrency control(DBMS).(15)	BTL5	Evaluating

4	Generalize the challenges in IR system and give your suggestions to overcome it.(15)	BTL6	Creating
5	(i)Summarize the contents of Multimedia Database.(5) (ii)Challenges to Multimedia Database(5) (iii)Multimedia Database Application.(5)	BTL5	Evaluating

UNIT V - EMERGING TECHNOLOGIES
SYLLABUS: XML Databases: XML-Related Technologies-XML Schema- XML Query Languages- Storing XML in Databases-XML and SQL- Native XML Databases- Web Databases- Geographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data Models- Query Languages- Introduction to Big Data-Storage-Analysis.

<div align="center">PART-A</div>

Q.No.	Question	Level	Competence
1	Tell about XML document.	BTL1	Remembering
2	Indicate the goal of XML database.	BTL2	Understanding
3	Interpret the use of XML schema	BTL2	Understanding
4	Illustrate the role of XML namespace.	BTL3	Applying
5	List the XML related technologies.	BTL1	Remembering
6	Is XML a database-Assess.	BTL5	Evaluating
7	What is DTD?	BTL1	Remembering
8	Formulate the steps needed to extract a particular XML document from a database.	BTL6	Creating
9	Discover where XQuery is used.	BTL2	Understanding
10	What is GIS?	BTL1	Remembering
11	Interpret the meaning of well formed XML document.	BTL3	Applying
12	Tell about XML.	BTL1	Remembering
13	Distinguish XML and HTML.	BTL4	Analyzing
14	Illustrate the three main types of XML documents.	BTL4	Analyzing
15	Distinguish XPath and XQuery.	BTL3	Applying
16	Generalize why XML models is called hierarchical model?	BTL6	Creating
17	Express the role of Web databases.	BTL2	Understanding
18	Point out the approaches for storing XML documents.	BTL4	Analyzing
19	Summarize the advantages of XML.	BTL5	Evaluating
20	What is XQuery?	BTL1	Remembering
21	Differentiate public cloud and private cloud.	BTL2	Understanding
22	Analyze Biological Data Management.	BTL4	Analyzing
23	Demonstrate the benefits of cloud storage architecture.	BTL3	Applying
24	Estimate the benefits of Geographic Information System.	BTL5	Evaluating

<div align="center">PART-B</div>

Q.No.	Question	Level	Competence
1	Examine the XML databases with suitable example.(13)	BTL5	Evaluating

2	Describe the XML Hierarchical Data Model.(13)	BTL2	Understanding
3	Explain different XML related Technologies.(13)	BTL4	Analyzing
4	Describe about the following in detail (i)Well formed XML Document.(7) (ii)XML Schema.(6)	BTL2	Understanding
5	Enumerate about XML Databases.(13)	BTL1	Remembering
6	Analyze the role of DTD and XML schema in formation of XML documents.(13)	BTL4	Analyzing
7	(i)Interpret the approaches for storing XML Documents(7) (ii)Analyze the extraction of XML Documents.(6)	BTL3	Applying
8	Describe how to store XML in Database.(13)	BTL1	Remembering
9	Examine an item –by- item description of the features and facilities of an XML Schema.(13)	BTL1	Remembering
10	Formulate a sample XML DTD file and generalize the concepts of elements and their nested structure.(13)	BTL6	Creating
11	Examine the Cloud Storage architecture with a neat diagram.(13)	BTL1	Remembering
12	(i)Summarize the working of Big Data Analytics.(8) (ii)Mention about Big Data Analytics tools(5)	BTL2	Understanding
13	Explain about the various Data Storage systems available on the Cloud.(13)	BTL4	Analyzing
14	Illustrate about XML Querying with suitable example.(13)	BTL3	Applying
15	Evaluate the need and usage of (i)Private and Public Cloud Storage (7) (ii)Hybrid Cloud Storage(3) (iii)Community Cloud Storage(3)	BTL5	Evaluating
16	Describe about Biological Data Management and its role in recent times.(13)	BTL2	Understanding
17	(i)Illustrate the characteristics of data in GIS(10) (ii)Interpret the components of GIS system.(3)	BTL3	Applying

PART-C

Q.No.	Question	Level	Competence
1	Evaluate the fact that XML follows the syntactic guidelines of the tree model.(15)	BTL5	Evaluating
2	Assess the typical syntactic structure of a DTD document with suitable example.(15)	BTL5	Evaluating
3	Crate an XML schema document to hold the employee details of a company.(15)	BTL 6	Creating
4	Create a list of top ten Cloud Storage services and mentions its advantages and disadvantages.(15)	BTL 6	Creating
5	Summarize the role of Geographic Information System in day to day life with suitable example.(15)	BTL5	Evaluating