SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603203

DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

QUESTION BANK

V SEMESTER

1904504 - GEOGRAPHIC INFORMATION SYSTEM

(Open Elective)

Regulation – 2019

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QUESTION BANK

SUBJECT: 1904504 -Geographic Information System

SEM / YEAR: V/ III

UNIT I – FUNDAMENTALS OF GIS
Introduction to GIS – Basic spatial concepts – Coordinate Systems – GIS and Information Systems – Definitions – History of GIS – Components of a GIS – Hardware, Software, Data, People, Methods – Proprietary and open source Software – Geographical data types – Spatial, Attribute data – types of attributes – scales/ levels of measurements.

PART A

S. No.	Question	BTL	Competence
1	**What** is datum**?**	BTL -1	Remember
2	**Define** GIS.	BTL -1	Remember
3	**Describe** the key components of a GIS.	BTL -5	Evaluate
4	**What** is data model?	BTL -1	Remember
5	**State** the characteristics of GIS.	BTL -1	Remember
6	**Illustrate** geographic coordinate system?	BTL -4	Analyze
7	**Summarize** the main characteristics of spatial data.	BTL -2	Understand
8	**Define** topology.	BTL -1	Remember
9	**Evaluate** the outcome of map projection and define what a Map projection is.	BTL -2	Understand
10	**Pointout** the difference between data and information.	BTL -4	Analyze
11	**Illustrate** the azimuthal projection**.**	BTL -3	Apply
12	**Compose how** GIS handles the attribute data**.**	BTL -6	Create
13	**Discover** with example the Commercial and Free and Open Source GIS Packages.	BTL -3	Apply
14	**Examine** the commonly used Map Projections.	BTL -3	Apply
15	**Generalize** Datum Accuracy.	BTL -6	Create
16	**Differentiate** between plan and map.	BTL -2	Understand
17	**Differentiate** raster and vector data.	BTL -2	Evaluate
18	**Explain** the difference between the spatial and non spatial data.	BTL -5	Evaluate
19	**Tabulate** few applications of GIS.	BTL -1	Remember
20	**Discuss** the difference between the georelational data model and the object-based data model.	BTL -2	Understand
21	**Summarize** a short note on UTM.	BTL -2	Understand

22	**Discover** the spatial data types.	BTL -3	Apply
23	**Illustrate** ArcGIS software.	BTL -4	Analyze
24	**Judge** the following values in degrees-minutes-seconds and decimal degrees. 45°52"30'	BTL -5	Evaluate

PART B

1	i) **Describe** in detail the various components of GIS. (7) ii) **Define** Map projection. Discuss the various types of map projection. (6)	BTL -1	Remember
2	i) Briefly **discuss** about the geographic coordinate systems. (7) ii) **Describe** about datum and datum accuracy. (6)	BTL -2	Understand
3	i) **Illustrate** with an example the spatial and attribute data type.(7) ii) **Examine** the influence of maps on the character of spatial.(6)	BTL -3	Apply
4	**Summarize** NAD27 and NAD83 datum. (13)	BTL -2	Understand
5	**i) Describe** in detail the various applications of GIS. (7) **ii) Describe** in detail the history of GIS.(6)	BTL -1	Remember
6	**Discuss** the elements of GIS. (13)	BTL -2	Understand
7	**Illustrate** the various types of attribute data. (13)	BTL-3	Apply
8	**Analyze** the following i) Spatial Data.(7) ii) Attribute Data.(6)	BTL -4	Analyze
9	i) **Define** BLOB. (7) ii) **Identify** few FOSS packages. (6)	BTL -1	Remember
10	**Develop** a Projected coordinate systems. (13)	BTL -6	Create
11	**Explain** in detail about Local and Global Datum with an example. (13)	BTL -5	Evaluate
12	**Analyze** the following (i) Scale(5) (ii) Lines (4) (iii) Areas (4)	BTL -4	Analyze
13	i) **Examine** how to Measure Distances on the Earth's Surface. (7) ii) **Describe** three stages of GIS. (6)	BTL -1	Remember
14	**Explain** the various levels of measurement in GIS. (13)	BTL -4	Analyze

15	**Classify** the GIS Process with the help of diagram. (13)	BTL -2	Understand
16	**Sketch** how to represent spatial features in vector data model? Explain with diagram. (13)	BTL -3	Apply
17	**Criticize** in detail about the basic spatial concepts. (13)	BTL -5	Evaluate

PART-C

1	**Compose** the working model of geographic information system in detail. (15)	BTL-6	Create
2	**Summarize** an example from your discipline in which a GIS can provide useful tools for building a model. (15)	BTL-5	Evaluate
2	(i)**Generalize** any two examples of vector data analysis.(8) (ii)**Generalize** any two examples of raster data analysis. (7)	BTL-6	Create
4	**Appraise** the Projection. List and explain types of Map Projections with an example.	BTL-5	Evaluate
5.	**Explain** how coordinate reference systems are useful in defining locations on the earth. (15)	BTL-5	Analyze

UNIT II - SPATIAL DATA MODELS

Database Structures – Relational, Object Oriented – ER diagram – Spatial data models – Raster Data Structures – Raster Data Compression – Vector Data Structures – Raster vs Vector Models – TIN and GRID data models – OGC standards – Data Quality.

PART A

S. No.	Question	BTL	Competence
1	**Define** Spatial Data Model.	BTL -1	Remember
2	**Define** georelational data model.	BTL -1	Remember
3	**Discriminate** the three basic topological relationships of georelational data models.	BTL -5	Evaluate
4	**What** is Digital Raster Graphics?	BTL -1	Remember
5	**Define** object-based data model.	BTL -1	Remember
6	**Compare** the raster and vector data structures.	BTL -4	Analyze
7	**Pointout** how objects are managed in GIS.	BTL -4	Analyze
8	**Define** Entity.	BTL -1	Remember
9	**Discuss** raster data compression.	BTL -2	Understand
10	**Differentiate** the three methods of raster data structures.	BTL -4	Analyze
11	**Show** the regional quad tree method that divides raster into a hierarchy of quadrants.	BTL -3	Apply
12	**Develop** the data structure for the line and point coverage.	BTL -6	Create
13	**Illustrate** surface entity.	BTL -3	Apply
14	**Show** the topological structuring of complex areas.	BTL -3	Apply
15	**Compose** the elements of the raster Data model.	BTL -6	Create
16	**Discuss** how the data structures are classified based on the data.	BTL -2	Understand

17	**Distinguish** georelational data model and the object-based data Model.	BTL -2	Understand
18	**Summarize** raster data model.	BTL -5	Evaluate
19	**Describe** Digital Orthophotos.	BTL -1	Remember
20	**Discuss** how all the geographical phenomenon can be represented by three main entities.	BTL -2	Understand
21	**Distinguish** Hierarchical Data Structure Model and the Network Data Structure Model.	BTL -2	Understand
22	**Illustrate** data compression.	BTL -3	Apply
23	**Compare** the Micro and Macro Level Components.	BTL -4	Analyze
24	**Criticize** the Sources of Possible Errors in data entry.	BTL -5	Evaluate

PART B

1	**i) Describe** the georelational data model.(7) **ii) Describe** the data structure for representing the data model such as geodatabase. (6)	BTL -1	Remember
2	**i) Explain** the object oriented data model. (7) **ii) Explain** how the software developers organize classes. (6)	BTL -4	Analyze
3	**i) Examine** how the raster data are divided.(7) **ii) Illustrate** with an example the elements of the Raster Data model. (6)	BTL -3	Apply
4	**Interpret** the various digital elevation models. (13)	BTL -2	Understand
5	**i) Define and describe** the triangulated irregular network (TIN) (7) **ii) Examine** how TIN is constructed.(6)	BTL -1	Remember
6	**Describe** the following raster data structure (i) Cell-by-Cell Encoding (5) (ii) Run-Length Encoding(4) (iii) Quadtree(4)	BTL -2	Understand
7	**Summarize** raster data compression. (13)	BTL -5	Evaluate
8	**Compare** the advantages and disadvantages of the raster data model versus the vector data model. (13)	BTL -4	Analyze
9	**i) Examine** the GIS data standards. (7) **ii) Describe the** GML proposed by OGC. (6)	BTL -1	Remember
10	**Demonstrate** the GRID model of GIS with necessary diagram. (13)	BTL -3	Apply
11	**Explain** how the spatial entities are used to create a data model. (13)	BTL -4	Analyze
12	**Describe** the following (i) Block Coding. (7) (ii) Chain coding. (6)	BTL -1	Remember
13	**Discuss** the methods for identifying surface significant points. (13)	BTL -2	Understand

14	**Design** the diagram of how geodatabase organizes vector data sets. (13)	BTL -6	Create
15	**Describe** about the map generalization. (13)	BTL -2	Understand
16	**Explain** spatial data types in detail. (13)	BTL -3	Apply
17	**Summarize** spatial data quality.	BTL -5	Analyze

PART-C

1	**Infer the** steps of the application of raster data model. (15)	BTL-5	Analyze
2	(i) **Create** a data structure of a region subclass .(8) (ii) **Create** a data structure of a route subclass. (7)	BTL-6	Create
3	**Deduce** the steps of the application of vector data model. (15)	BTL-5	Evaluate
4	**Generalize** how the raster and vector approaches are used to construct point, line and area entities for representation in the computer. (15)	BTL-6	Create
5	**Defend** Raster data structure in detail. (15)	BTL-5	Analyze

UNIT III - DATA INPUT AND TOPOLOGY
Scanner – Raster Data Input – Raster Data File Formats – Vector Data Input –Digitiser –Topology –Adjacency, connectivity and containment – Topological Consistency rules – Attribute Data linking – ODBC – GPS based mapping.

PART - A

S. No.	Question	BTL	Competence
1	**Define** scanning.	BTL -1	Remember
2	**Describe** the advantages of scanning using scanner	BTL -1	Remember
3	**Summarize** the few possible encoding methods for different data sources.	BTL -5	Evaluate
4	**Examine** the term topology**.**	BTL -1	Remember
5	**Classify** the topology in spatial data.	BTL -3	Apply
6	**Analyze** the thematic data of spatial data.	BTL -4	Analyze
7	**Pointout** the traditional methods of surveying techniques.	BTL -4	Analyze
8	**What** is topological errors?	BTL -1	Remember
9	**Differentiate** the point and stream mode digitizing	BTL -2	Understand
10	**Analyze** the classified vector data input.	BTL -4	Analyze
11	**Show** how the spatial and attribute data is linked in GIS.	BTL -3	Apply
12	**Generalize** common raster formats.	BTL -6	Create
13	**Examine** why the scanning method for digitizing involves both rasterization and vectorization.?	BTL -1	Remember
14	**Illustrate** pseudonode.	BTL -3	Apply
15	**Compose** the raster data input.	BTL -6	Create

16	**Differentiate** Bezier curves and splines.	BTL -2	Understand
17	**Discuss** the Criteria for Choosing Modes of Input.	BTL -2	Understand
18	**Explain** Dangling nodes.	BTL -5	Evaluate
19	**Define** ODBC.	BTL -1	Remember
20	**Describe** the difference between on-screen digitizing and tablet digitizing.	BTL -2	Understand
21	**Summarize** TIGER.	BTL -2	Understand
22	**Illustrate** the dilution of precision.	BTL -3	Apply
23	**Analyze** GPS based mapping.	BTL -4	Analyze
24	**Explain** Differential GPS (DGPS).	BTL -5	Evaluate

PART - B

1	**Define** ODBC .How applications are connected to the database through ODBC. (13)	BTL -1	Remember
2	**i) Explain** in detail the various methods of data input. (7) **ii) Explain** the possible encoding methods for different data sources. (6)	BTL -5	Evaluate
3	**i) Illustrate** what is a scanner. (3) **ii) Illustrate** with example the three different types of scanner. (10)	BTL -3	Apply
4	**Discuss** in detail (i)Topology(4) (ii)Adjacency(3) (iii)Containment(3) (iv)Connectivity(3)	BTL -2	Understand
5	**i)Describe** in detail the thematic characteristics of spatial data.(7) **ii)Describe** the scale of measurement with respect to spatial data(6)	BTL -1	Remember
6	**Describe** how data are collected using satellite navigation system or GPS. (13)	BTL -2	Understand
7	**Give** the standards of for spatial data with example.(13)	BTL -2	Understand
8	i)**Point out** the topological consistency rules.(7) ii)**Explain** the Criteria for Choosing Modes of Input.(6)	BTL -4	Analyze
9	**Describe** the three basic steps in using a topology rule. (13)	BTL -1	Remember
10	**Explain** how the spatial and attribute data are linked. (13)	BTL -4	Analyze
11	**Analyze** how GPS is used to collect Geospatial data. (13)	BTL -4	Analyze
12	**i)Describe** how to represent data using raster model and vector model. (7) **ii)Examine** the File Formats for Raster Spatial Data. (6)	BTL -1	Remember
13	**i)Show** the Rasterization of Digitized Data. (7) **ii) Demonstrate** the File Formats of Vector Spatial data.(6)	BTL -3	Apply

14	**Develop** Vectorization of Scanned Images. (13)	BTL -6	Create
15	**Describe** the Non Topological File Formats in detail. (13)	BTL -2	Understand
16	**Show and Explain** the basic structure of GPS. (13)	BTL -3	Apply
17	**Explain** with an example GPS based mapping. (13)	BTL -5	Analyze

PART-C

1	**Explain** Raster Data Input Techniques in details. (15)	BTL-5	Analyze
2	**Summarize** how topology consistency rules are used to solve the semantic errors. (15)	BTL-5	Evaluate
3	**Generalize** ArcGIS ODBC Database Environment. (15)	BTL-6	Create
4	**Develop** Raster File Formats. (15)	BTL-6	Create
5	**Collaborate** linking the attribute data to the spatial data. (15)	BTL-6	Create

UNIT IV – DATA ANALYSIS
Vector Data Analysis tools - Data Analysis tools - Network Analysis - Digital Education models - 3D data collection and utilization.

PART - A

S. No.	Question	BTL	Competence
1	**List** the tools for vector data analysis.	BTL -1	Remember
2	**Examine** how buffering creates area.	BTL -1	Remember
3	**Summarize** few applications of Buffering.	BTL -5	Understand
4	**List** out the overlay methods.	BTL -1	Remember
5	**Tabulate** the difference between the point-in-polygon overlay and line-in-polygon overlay.	BTL -1	Remember
6	**Pointout** what is vector data analysis.	BTL -4	Analyze
7	**Discuss** the four basic rules followed in overlay.	BTL -4	Understand
8	**Describe** the three variations in buffering	BTL -1	Remember
9	**Analyze** the nearest neighbour in point pattern analysis.	BTL -2	Analyze
10	**Explain** what is silver.	BTL -4	Analyze
11	**Illustrate** the buffer zone.	BTL -3	Apply
12	**Compose** Spatial Autocorrelation.	BTL -6	Create
13	**Demonstrate** RUSEL function.	BTL -3	Apply
14	**Show** with an example about least-cost path analysis and shortest path analysis.	BTL -3	Apply

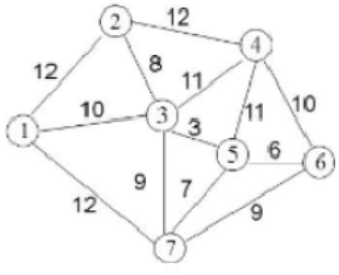
15	**Design** network and network analysis	BTL -6	Create
16	Compare and **Contrast** the dissolve, clip and eliminate.	BTL -2	Understand
17	**Discuss** the Applications of Pattern Analysis	BTL -2	Evaluate
18	**Explain** the update and erase in feature manipulation.	BTL -5	Evaluate
19	**Define** the three types of inlays	BTL -1	Remember
20	**Give** the restrictions in network analysis?	BTL -2	Understand
21	**Discuss** the process of Network analysis.	BTL -2	Understand
22	**Demonstrate** Feature Manipulation with a diagram.	BTL -3	Apply
23	**Explain** the vector data analysis tools.	BTL -4	Analyze
24	**Appraise** Coastal Modeling and Analysis.	BTL -5	Evaluate

PART - B

1	Briefly **describe** the following i) Buffering. (7) ii) Vector overlay. (6)	BTL -1	Remember
2	i) **Explain** the error propagation in overlay. (7)	BTL -5	Evaluate
	ii) **Explain** the application of Overlay. (6)		
3	**Illustrate** with an example the following i) Distance measurement. (7) ii) Pattern analysis. (6)	BTL -3	Apply
4	i) **Analysis** Random and Non-random Patterns. (7) ii) **Analyze** about the 3D views of terrain. (6)	BTL -4	Analyze
5	**Give** in detail about an application that uses basic tools of vector data analysis including Buffer, Overlay, and Select.(13)	BTL -2	Understand
6	**Describe** in detail about Digital elevation model (DEM). (13)	BTL -1	Remember
7	i) **Discuss the** pattern analysis. (7)	BTL -2	Understand
	ii) **Express** the feature manipulation. (6)		
8	State and **discover** overlay operation and overlay methods. (13)	BTL -3	Apply
9	**Analyz**e the following (i) Shortest path problem. (7) (ii)Travelling salesperson problem. (6)	BTL -4	Analyze
10	**Describe the following** i) Vehicle Routing Problem. (7) ii) Closest Facility. (6)	BTL -1	Remember
11	**Develop the** Allocation and Location–Allocation in network analysis. (13)	BTL -6	Create
12	**Describe** in detail local operation and Neighbourhood operation. (13)	BTL -2	Understand
13	i)Mention and **analyze** the 3D data collection. (7) ii)**Explain** what is 3D draping, show how DEMS and TINs provide surface for 3D views and 3D draping.(6)	BTL -4	Analyze
14	**Describe** in detail about 3D utilization. (13)	BTL -1	Remember

15	**Express** the process of Network analysis. (13)	BTL -2	Understand
16	**Illustrate** Feature Manipulation with neat diagram. (13)	BTL -3	Apply
17	**Summarise** the vector data analysis tools. (13)	BTL -5	Analyze

PART - C

1	**Summarise** a scenario in which Intersect is preferred over Union for an overlay operation. (15)	BTL-5	Analyze
2	Both Moran's I and the G-statistic have the global (general) and local versions. How do these two versions differ in terms of pattern analysis? **Conclude** your answer. (15)	BTL-5	Evaluate
3	**Design** the shortest path algorithm. The objective is to find the shortest route between two cities in *India* on the interstate network. The shortest route is defined by the link impedance (cost) of travel time. (15)	BTL-6	Create
4	**Create** and explain about Travelling Salesman Problem. (15)  *Source node=1*	BTL-6	Create
5.	**Appraise** 3D data collection and utilization in detail. (15)	BTL-5	Evaluate

UNIT V - APPLICATIONS
GIS Applicant - Natural Resource Management - Engineering - Navigation - Vehicle tracking and fleet management - Marketing and Business applications - Case studies

PART - A

S. No.	Question	BTL	Competence
1	**Tabulate** the three categories of GIS applications.	BTL -1	Remember
2	**Describe** the business application of GIS.	BTL -1	Remember
3	**Assess** Location-Based Services.	BTL -5	Understand
4	**Define** GIS applicant.	BTL -1	Remember
5	**What** are the four trends in marketing?	BTL -1	Remember
6	**Analyze** how to create route.	BTL -4	Analyze
7	**Pointout** how did we navigate before using GPS.	BTL -4	Understand

8	**Give** the four types of route.	BTL -1	Remember
9	**Express** how we navigate using GPS.	BTL -2	Analyze
10	**Point out** few Current problems in natural resource management.	BTL -4	Analyze
11	**Illustrate the** software needed for tracking vehicle.	BTL -3	Apply
12	**Develop** how the GIS infiltrate the areas of IT.	BTL -6	Create
13	**Demonstrate** how does GIS fit into natural resource management?	BTL -3	Apply
14	**Discover** how Tracking system technology was made possible by the integration of three new technologies.	BTL -3	Apply
15	**Develop** corporate GIS.	BTL -6	Create
16	**Express** few application of GIS.	BTL -2	Understand
17	**Discuss** multidepartment GIS.	BTL -2	Evaluate
18	**Summarize** the market predications.	BTL -5	Evaluate
19	**Give** a diagram for the development of GIS application.	BTL -1	Remember
20	**Describe** NAVSTAR.	BTL -2	Understand
21	**List** the functions of GPS vehicle tracking system.	BTL -2	Understand
22	**Summarize** how GIS used in marketing.	BTL -3	Apply
23	**Point out** few current applications of GIS in business.	BTL -4	Analyze
24	**Judge** the GIS in IoT.	BTL -5	Evaluate

PART - B

1	Briefly **describe** the business application of GIS. (13)	BTL -2	Understand
2	**Describe** the following i) Simple route. (7) ii) Combined route. (6)	BTL -1	Remember
3	i) **Describe** about the marketing application. (7) ii) **Discuss** the four trends in marketing. (6)	BTL -2	Understand
4	i) **Illustrate** how GIS type functionality is useful in navigation .(7) ii) **Demonstrate** an example of GIS. (6)	BTL -3	Apply
5	**Analyze** in detail about natural resource management. (13)	BTL -4	Analyze
6	**i) Summarize** the Current problems in natural resource management. (7) **ii) Explain** why do institutions need an AVL (Automatic Vehicle Location) and/or Dispatch system. (6)	BTL -5	Evaluate
7	i)**Analyze** who needs AVL (Automatic Vehicle Location) . (7) ii) **Explain** how dynamic segmentation is used to manage the data in fleet management. (6)	BTL -4	Analyze
8	i) **Describe** in detail about Dispatching. (7) ii) **Describe** an example of how market production exist. (6)	BTL -1	Remember

9	i) **Generalize** Secondary Menu. (7) ii) **Develop** the components of modern AVL (Automatic Vehicle Location) system. (6)	BTL -6	Create
10	**Describe** the following i) Split route. (7) ii) Looping route. (6)	BTL -1	Remember
11	**i) Discuss** how GIS is useful in tracking the vehicle. (7) **ii)Discuss** real time example of traffic map. (6)	BTL -2	Understand
12	**Infer** the various market predications.(13)	BTL -4	Analyze
13	**Tabulate** Navistar in geographic information system.(13)	BTL -1	Remember
14	**Explain** and **illustrate** how GPS is useful in navigation and tracking devices. (13)	BTL -3	Apply
15	**Discuss** the Applications of GIS in Business environment. (13)	BTL -2	Understand
16	**Sketch** how GIS is useful in Vehicle Tracking Systems (13)	BTL -3	Apply
17	**Appraise** GIS navigation systems. (13)	BTL -5	Analyze

PART-C

1	**Develop** a case study for the business applications. What was the most important for the success of an application. (15)	BTL6	Create
2	**Summarise** in detail about the application of GIS in Waste Collection & Municipal Operations.(15)	BTL5	Evaluate
3	**Develop** AVL (Automatic Vehicle Location) for Courier Operations at Aramex .(15)	BTL6	Create
4	**Prepare** Fuel Distribution Auditing and Vehicle Tracking. (15)	BTL6	Create
5	Network Intelligence Portal a **Case study**. (15)	BTL5	Evaluate