

SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF AGRICULTURAL ENGINEERING

QUESTION BANK



VII SEMESTER

**AG3762 REMOTE SENSING AND GEOGRAPHICAL INFORMATION
SYSTEM**

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UNIT I - CONCEPTS OF REMOTE SENSING AND SATELLITES

Definition- Historical background - Components of remote sensing – Energy source, electromagnetic spectrum, radiation principle, platforms and sensors - Active and passive remote sensing interference - Atmospheric effects on remote sensing – Energy interaction with earth surface feature - Data acquisition - Reflectance, spectral signatures for water, soil and vegetation.- Satellites - Types - Sun synchronous – Geo synchronous remote sensing satellites - LANDSAT, SPOT & IRS - Resolution - Spectral, spatial, radiometric and Temporal resolution - Recent satellites with its applications.

PART - A

Q.No	Questions	BT	Competence
1.	What is remote sensing?	BT-1	Remember
2.	List out the application of remote sensing.	BT-2	Understand
3.	State the objectives of remote sensing.	BT-2	Understand
4.	What is electromagnetic radiation?	BT-1	Remember
5.	What are the components of remote sensing?	BT-1	Remember
6.	What is passive sensor?	BT-1	Remember
7.	List out the advantages of active sensor.	BT-2	Understand
8.	What are the types of platforms?	BT-1	Remember
9.	Find out where the low resolution and high-resolution cameras are used in remote sensing.	BT-2	Understand
10.	List out what determines the range resolution in radar.	BT-2	Understand
11.	Name the different type of electromagnetic radiation.	BT-2	Understand
12.	List out the primary absorbents of electromagnetic energy in the atmosphere	BT-2	Understand
13.	Differentiate geostationary orbit and polar sun synchronous orbit	BT-2	Understand
14.	Write short note on temporal resolution.	BT-2	Understand
15.	Write types of micro wave sensor.	BT-2	Understand
16.	Define spectral signature.	BT-1	Remember
17.	Differentiate the specular reflectors and diffuse reflectors.	BT-2	Understand
18.	Define Spectral reflectance.	BT-1	Remember
19.	Write short notes on spatial resolution.	BT-2	Understand
20.	What is SPOT?	BT-1	Remember
21.	Name any two recent remote sensing satellites and mention one application of each.	BT-2	Understand
22.	Write the difference between spectral and spatial resolution.	BT-2	Understand
23.	Write types of resolution.	BT-2	Understand
24.	What is active sensor?	BT-1	Remember
25.	List any four applications of remote sensing in agriculture, water resources, forestry, or environmental monitoring.	BT-2	Understand

PART – B

1.	Define remote sensing. Explain its historical background, principles, components, and major applications in agriculture and natural resource management.	BT-3	Apply
2.	Explain the components of a remote sensing system with a neat diagram.	BT-3	Apply

3.	Describe the electromagnetic spectrum (EMS) and explain the characteristics of different regions of the spectrum used in remote sensing with suitable diagrams.	BT-3	Apply
4.	Explain the principles of electromagnetic radiation.	BT-3	Apply
5.	Discuss active and passive remote sensing systems. Compare them with suitable examples, advantages, disadvantages, and applications.	BT-3	Apply
6.	Explain the atmospheric effects on remote sensing and their influence on remotely sensed data.	BT-3	Apply
7.	Describe the interaction of electromagnetic radiation with Earth surface features with suitable illustrations.	BT-3	Apply
8.	What is spectral reflectance? Explain the spectral signatures of water, soil, and healthy vegetation with neat spectral reflectance curves and their importance in feature identification.	BT-3	Apply
9.	Explain the process of data acquisition in remote sensing.	BT-3	Apply
10.	Describe the different platforms used in remote sensing with their advantages and applications.	BT-3	Apply
11.	Explain different types of sensors used in remote sensing and discuss their working principles.	BT-3	Apply
12.	Explain the different types of remote sensing satellites and also their characteristics, advantages, and applications.	BT-3	Apply
13.	Write detailed notes on LANDSAT, SPOT, and IRS satellite series. Discuss their characteristics, sensors, resolutions, and applications in agriculture and environmental monitoring.	BT-3	Apply
14.	Explain the different types of resolution in remote sensing with suitable examples and their importance in image interpretation.	BT-3	Apply
15.	Explain the features of recent Earth observation satellites (Cartosat, Resourcesat, RISAT, Sentinel, EOS, and WorldView) and their applications in agriculture, disaster management, and environmental monitoring.	BT-3	Apply
16.	Explain the applications of remote sensing in agriculture. Discuss crop acreage estimation, crop health monitoring, precision farming, drought assessment, irrigation management, and yield prediction.	BT-3	Apply
17.	Discuss the role of remote sensing in natural resource management. Explain its applications in water resources, forestry, land-use mapping, soil conservation, urban planning, and disaster management.	BT-3	Apply
18.	Explain the complete remote sensing process from energy generation to data interpretation with a neat flow diagram. Discuss each stage involved in acquiring and analyzing remote sensing data.	BT-3	Apply

UNIT II - DATA PRODUCTS AND IMAGE ANALYSIS

Data products –based on level of processing- o/p – scale – area/coverage – data availability – data ordering- data price - Image interpretation – Visual interpretation elements – interpretation key. Digital image processing – Image enhancement – image classification – Supervised and unsupervised – Vegetation Indices.

PART - A

Q.No	Questions	BT	Competence
1.	What is image interpretation?	BT-1	Remember
2.	What are all the types of image interpretation?	BT-1	Remember
3.	What is visual image interpretation?	BT-1	Remember
4.	List out the elements of Visual image processing.	BT-2	Understand
5.	What is mean by Ancillary information?	BT-1	Remember
6.	What are Digital images in Remote sensing?	BT-1	Remember
7.	Write the characteristics of Radiometric Image Data	BT-2	Understand
8.	Differentiate FOV and IFOV.	BT-2	Understand
9.	What is training sites?	BT-1	Remember
10.	Write short note on Geometric correction.	BT-2	Understand
11.	What is NDVI?	BT-1	Remember
12.	What is data ordering?	BT-1	Remember
13.	Difference vector data and raster data.	BT-2	Understand
14.	List the elements of visual image interpretation.	BT-2	Understand
15.	What is an interpretation key?	BT-1	Remember
16.	Write the characteristics of Geometric Image Data.	BT-2	Understand
17.	Write short note on Radiometric correction.	BT-2	Understand
18.	List out the general steps of image processing.	BT-2	Understand
19.	Write down the Characteristics of Digital Satellite Image	BT-2	Understand
20.	Define Track number.	BT-1	Remember
21.	What do you understand about Spatial filtering.	BT-1	Remember
22.	Write the formula for NDVI.	BT-2	Understand
23.	What are the different types of data products in remote sensing?	BT-1	Remember
24.	Define CAN Data.	BT-1	Remember
25.	Define Vegetation Index (VI).	BT-1	Remember

PART-B

1.	Explain remote sensing data products based on different levels of processing.	BT-3	Apply
2.	Discuss the characteristics of remote sensing data products	BT-3	Apply
3.	Explain the different types of remote sensing data products and discuss their applications in agriculture, forestry, water resources, and environmental management.	BT-3	Apply
4.	Describe the process of image interpretation. Explain the principles and importance of image interpretation in remote sensing with suitable examples.	BT-3	Apply
5.	Discuss the visual image interpretation elements with suitable illustrations.	BT-3	Apply
6.	Explain the different types of interpretation keys and their importance in visual image interpretation.	BT-3	Apply

7.	Explain digital image processing (DIP) with a neat flow chart. Discuss the various stages involved from image acquisition to information extraction.	BT-3	Apply
8.	Discuss various image enhancement techniques used in digital image processing.	BT-3	Apply
9.	Explain the importance of image enhancement in remote sensing and also compare different spatial and spectral enhancement techniques with suitable examples.	BT-3	Apply
10.	Describe the process of image classification. Explain the objectives, steps involved, and applications of image classification in remote sensing.	BT-3	Apply
11.	Explain the principles, methodology, advantages, and disadvantages of supervised and unsupervised image classification techniques used in remote sensing.	BT-3	Apply
12.	Explain the concept of image segmentation in digital image processing.	BT-3	Apply
13.	Describe the post-classification processing techniques in remote sensing.	BT-3	Apply
14.	Compare visual image interpretation and digital image processing.	BT-3	Apply
15.	Explain different vegetation indices used in remote sensing.	BT-3	Apply
16.	Describe the Normalized Difference Vegetation Index (NDVI).	BT-3	Apply
17.	Discuss the applications of digital image processing and vegetation indices	BT-3	Apply
18.	Explain the complete workflow of remote sensing data analysis	BT-3	Apply

UNIT III - CONCEPTS OF GIS

Definition – Map and their influences – Characteristics of Maps – Elements – Map scale, Projection, Coordinate systems – Sources of spatial data.

History and development of GIS – Definition – Components – Hardware and Software.

PART A

Q.No	Questions	BT	Competence
1.	Define a map.	BT-1	Remember
2.	State the importance of maps in GIS.	BT-2	Understand
3.	List any four characteristics of a good map.	BT-2	Understand
4.	What are the essential elements of a map?	BT-1	Remember
5.	Define map scale.	BT-1	Remember
6.	Differentiate between large-scale and small-scale maps.	BT-2	Understand
7.	Mention the different methods of expressing map scale.	BT-2	Understand
8.	Define map projection.	BT-1	Remember
9.	Why are map projections necessary?	BT-1	Remember
10.	What is a coordinate system?	BT-1	Remember
11.	Differentiate between Geographic Coordinate System (GCS) and Projected Coordinate System (PCS).	BT-2	Understand
12.	List any four sources of spatial data.	BT-2	Understand
13.	Distinguish between primary and secondary sources of spatial data.	BT-2	Understand
14.	Find the ground distance for 6 cm on the map.	BT-2	Understand
15.	Define Geographic Information System (GIS).	BT-1	Remember
16.	State the objectives of GIS.	BT-2	Understand
17.	Briefly explain the history of GIS.	BT-2	Understand
18.	List the major milestones in the development of GIS.	BT-2	Understand
19.	What are the five basic components of a GIS?	BT-1	Remember
20.	Define GIS hardware.	BT-1	Remember
21.	List the hardware components required for a GIS.	BT-2	Understand

22.	What is GIS software?	BT-1	Remember
23.	Differentiate between proprietary GIS software and open-source GIS software.	BT-2	Remember
24.	Name any four commonly used GIS software packages.	BT-2	Remember
25.	Mention any four applications of GIS in agriculture and natural resource management.	BT-2	Remember

PART B

1.	Define a map. Explain the characteristics, functions, and importance of maps in Geographic Information Systems with suitable examples.	BT-3	Apply
2.	Describe the essential elements of a map with suitable illustrations.	BT-3	Apply
3.	Explain map scale in detail.	BT-3	Apply
4.	Explain the concept of map projection. Discuss the need for map projections, their classification, advantages, limitations, and applications.	BT-3	Apply
5.	Describe different types of map projections.	BT-3	Apply
6.	Compare cylindrical, conical, and azimuthal projections with suitable diagrams and applications.	BT-3	Apply
7.	Explain coordinate systems used in GIS.	BT-3	Apply
8.	Discuss the various sources of spatial data used in GIS with their advantages, limitations, and applications.	BT-3	Apply
9.	Discuss the methods of spatial data collection for GIS with suitable examples.	BT-3	Apply
10.	Define Geographic Information System (GIS). Explain its objectives, characteristics, and applications in agriculture, natural resource management, and environmental monitoring.	BT-3	Apply
11.	Describe the history and development of GIS. Discuss the major milestones and technological advancements in the evolution of GIS.	BT-3	Apply
12.	Explain the components of a GIS with a neat diagram.	BT-3	Apply
13.	Discuss the hardware components of a GIS.	BT-3	Apply
14.	Explain the software components of GIS.	BT-3	Apply
15.	Compare proprietary GIS software and open-source GIS software.	BT-3	Apply
16.	Discuss the functional components of a GIS with suitable examples.	BT-3	Apply
17.	Discuss the criteria for selecting appropriate GIS hardware and software for different applications.	BT-3	Apply
18.	Discuss the applications of GIS.	BT-3	Apply

UNIT IV - DATA INPUT AND ANALYSIS

Data – Spatial, Non-Spatial – Database models – Hierarchical network, Relational and Object-Oriented Data Models – Raster and Vector – Methods of Data input – Data Editing – Files and formats – Data structure – Data compression. Introduction to analysis – Measurements – Queries-Reclassification – Simple spatial analysis – Buffering – Neighboring functions – Map overlay – Vector and raster – Spatial interpolation – Modelling in GIS – Digital Elevation Modelling – Expert systems.

PART A

Q.No	Questions	BT	Competence
1.	Define spatial data.	BT-1	Remember
2.	Define non-spatial data.	BT-1	Remember
3.	Differentiate between spatial data and non-spatial data.	BT-2	Understand

4.	What is a GIS database?	BT-1	Remember
5.	Define a database model.	BT-1	Remember
6.	List the different types of database models used in GIS.	BT-2	Understand
7.	What is a hierarchical database model?	BT-1	Remember
8.	What is a network database model?	BT-1	Remember
9.	Define the relational database model (RDBMS).	BT-1	Remember
10.	What is an object-oriented database model (OODBMS)?	BT-1	Remember
11.	Differentiate between raster and vector data models.	BT-2	Understand
12.	Mention the advantages of the raster data model.	BT-2	Understand
13.	State the advantages of the vector data model.	BT-2	Understand
14.	List the different methods of spatial data input in GIS.	BT-2	Understand
15.	What is data editing in GIS?	BT-1	Remember
16.	Name any four GIS file formats.	BT-2	Understand
17.	Define data structure.	BT-1	Remember
18.	What is data compression?	BT-1	Remember
19.	Differentiate between lossless and lossy data compression.	BT-2	Understand
20.	What is a spatial query?	BT-1	Remember
21.	Define reclassification in GIS.	BT-1	Remember
22.	What is buffer analysis?	BT-1	Remember
23.	What is map overlay analysis?	BT-1	Remember
24.	Define Digital Elevation Model (DEM).	BT-1	Remember
25.	What is an expert system in GIS?	BT-1	Remember

PART B

1.	Explain spatial and non-spatial data in GIS.	BT-3	Apply
2.	Discuss the various database models used in GIS.	BT-3	Apply
3.	Compare hierarchical, network, relational, and object-oriented database models and also their advantages, limitations, and applications in GIS.	BT-3	Apply
4.	Explain raster and vector data models in GIS with suitable illustrations.	BT-3	Apply
5.	Discuss the various methods of data input in GIS.	BT-3	Apply
6.	Explain the process of data editing in GIS.	BT-3	Apply
7.	Describe various GIS file formats.	BT-3	Apply
8.	Explain GIS data structures in detail.	BT-3	Apply
9.	Discuss data compression techniques in GIS.	BT-3	Apply
10.	Explain the concept of spatial analysis in GIS.	BT-3	Apply
11.	Describe measurement functions in GIS.	BT-3	Apply
12.	Explain query and reclassification operations in GIS.	BT-3	Apply
13.	Discuss buffering and neighborhood analysis in GIS.	BT-3	Apply
14.	Explain map overlay analysis in GIS.	BT-3	Apply
15.	Describe spatial interpolation techniques in GIS.	BT-3	Apply
16.	Explain GIS modelling in detail.	BT-3	Apply
17.	Explain the concept of Digital Elevation Model (DEM).	BT-3	Apply
18.	Discuss the role of expert systems in GIS.	BT-3	Apply

UNIT V - APPLICATION OF RS AND GIS

Crop Acreage estimation - Estimation of Crop Water Requirement – Crop condition – Soil mapping-classification of soil with digital numbers – soil erosion mapping reservoir sedimentation using image processing - Inventory of water resources – water quality assessment - Application of Remote Sensing and GIS in Precision Agriculture – Monitor Crop Health - Management Decision Support Systems.

PART A

1.	Define crop acreage estimation.	BT-1	Remember
2.	What is the importance of crop acreage estimation?	BT-1	Remember
3.	List the methods used for crop acreage estimation using remote sensing.	BT-2	Understand
4.	Define Crop Water Requirement (CWR).	BT-1	Remember
5.	Mention the factors affecting crop water requirement.	BT-2	Understand
6.	How is remote sensing used in estimating crop water requirement?	BT-1	Remember
7.	Define crop condition assessment.	BT-1	Remember
8.	List the parameters used to assess crop condition through remote sensing.	BT-2	Understand
9.	Define soil mapping.	BT-1	Remember
10.	What is digital number (DN) in remote sensing?	BT-1	Remember
11.	Explain the role of digital numbers in soil classification.	BT-1	Remember
12.	What is soil erosion mapping?	BT-1	Remember
13.	Mention any four causes of soil erosion.	BT-2	Understand
14.	Define reservoir sedimentation.	BT-1	Remember
15.	How is remote sensing used to estimate reservoir sedimentation?	BT-1	Remember
16.	What is water resources inventory?	BT-1	Remember
17.	Define water quality assessment.	BT-1	Remember
18.	Mention any four water quality parameters monitored using remote sensing.	BT-2	Understand
19.	State the applications of GIS in water resources management.	BT-2	Understand
20.	Define Precision Agriculture.	BT-1	Remember
21.	List the components of Precision Agriculture.	BT-1	Remember
22.	How is remote sensing used to monitor crop health?	BT-1	Remember
23.	What is a Management Decision Support System (MDSS)?	BT-1	Remember
24.	Mention any four applications of Remote Sensing and GIS in agriculture.	BT-2	Understand
25.	State the advantages of integrating Remote Sensing and GIS in agricultural management.	BT-2	Understand

PART B

1.	Explain the concept of crop acreage estimation using remote sensing.	BT-3	Apply
2.	Describe the methods of estimating crop water requirement using Remote Sensing and GIS.	BT-3	Apply
3.	Explain crop condition assessment using Remote Sensing.	BT-3	Apply
4.	Discuss the role of Remote Sensing and GIS in crop monitoring.	BT-3	Apply
5.	Explain soil mapping using Remote Sensing and GIS.	BT-3	Apply
6.	Describe the classification of soils using digital numbers (DN). Explain the concept of spectral response and image classification techniques used in soil mapping.	BT-3	Apply

7.	Explain soil erosion mapping using Remote Sensing and GIS. Discuss the causes of soil erosion, mapping techniques, and applications in watershed management.	BT-3	Apply
8.	Discuss the estimation of reservoir sedimentation using image processing techniques.	BT-3	Apply
9.	Explain the role of Remote Sensing and GIS in the inventory of water resources and also their applications.	BT-3	Apply
10.	Describe water quality assessment using Remote Sensing. Discuss the parameters measured, satellite sensors used, advantages, and limitations.	BT-3	Apply
11.	Explain the concept of Precision Agriculture. Discuss its components, technologies, advantages, limitations, and applications.	BT-3	Apply
12.	Discuss the applications of Remote Sensing and GIS in Precision Agriculture.	BT-3	Apply
13.	Explain how Remote Sensing is used to monitor crop health.	BT-3	Apply
14.	Describe the role of GIS in agricultural decision-making.	BT-3	Apply
15.	Explain the concept of Management Decision Support Systems (MDSS).	BT-3	Apply
16.	Discuss the integration of Remote Sensing, GIS, GPS, and Decision Support Systems for sustainable agricultural resource management.	BT-3	Apply
17.	Explain the applications of Remote Sensing and GIS in agriculture, water resources, soil conservation, drought monitoring, flood assessment, and environmental management with suitable examples.	BT-3	Apply
18.	Explain the complete workflow of Remote Sensing and GIS in Precision Agriculture, from data acquisition to decision-making. Discuss data collection, image processing, GIS analysis, crop monitoring, and management recommendations with a neat flow chart.	BT-3	Apply