NATIONAL INSTITUTE OF RURAL DEVELOPMENT & PANCHAYATI RAJ
RAJENDRANAGAR, HYDERABAD – 500 030
POST GRADUATE DIPLOMA IN GEO SPATIAL TECHNOLOGY APPLICATIONS
IN RURAL DEVELOPMENT (PGD-GARD)
7th Batch (2022-23), 2nd Semester
Course GARD–507: Satellite Remote Sensing –II

## ASSIGNMENT QUESTIONS

**Total Marks: 30**

### INSTRUCTIONS:

❖ Answer any five questions at least one from each Block.
❖ Each question carries six marks
❖ Write neatly & legibly in your own handwriting,
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## Block-1: Optical Remote Sensing

1. What is the resolution in remote sensing and explain various types with a proper example as Indian satellite data sets?
2. Write a brief note on Satellite Orbit in Remote Sensing.
3. What is the FCC and True Colour Composite? Explain and write band combination of any 2 Indian Satellite Datasets.
4. Differentiates supervise and un-supervise classifications and explain with one algorithm of each classification.
5. Expand following terminologies and useful in the appropriate applications
   (a) CAPE        (b) NDVI        (c) NWIP        (d) SST        (e) NUO

## Block-2: Thermal Remote Sensing

1. How do you can calculate the thermal properties on Terrain? Explain on the EMR Spectral.
2. Where and how the thermal radiation laws are useful in remote sensing?
3. Write a brief note on Reflected and Thermal IR
4. What do you mean by emissivity? What are the factor are influenced by the emissivity in remote sensing?
5. How the thermal remote sensing is useful in forest applications? Explain with appropriate satellite data examples.

## Block-3: Hyper spectral Remote Sensing

1. Explain about various 3 main causes for absorption in the EMP range 400 – 2500nm
2. What is the difference between multispectral and Hyperspectral remote sensing? Explain with any Indian Remote Sensing satellite data.
3. What is Image Spectrometer? How it is useful in spectral analysis?
4. Expand and discuss on following terminologies
   (b) ACORN    (b) FLAASH    (c) TOA    (d) PCA    (e) MNF
5. What do you mean RED-EDGE? How it will be useful for agricultural?
6. How Hyper spectral remote sensing is useful to identify various crops? Explain with suitable examples.

## Block-4: Micro Wave Remote Sensing

1. Discuss about Slant Range distortions in RADAR images
2. Write a brief note on System parameters of microwave remote sensing
3. How the microwave remote sensing useful in crop identification? Explain with suitable examples using Indian satellite data.
4. What are the different polarisation in SAR images? Explain their importance as applications specific.
5. What is the difference between Active and Passive Microwave Remote Sensing?

## Block-5: Geostationary and Navigational Satellites

1. What is the principle of GPS to obtain the position?
2. What is the DOP? Explain various DOP and importance in GPS surveying
3. Write a brief note on GNSS of various counties as examples
4. What is GAGAN? How will be useful for various applications as accuracy aspect?
5. Discuss on various segment of IRNSS

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**7<sup>th</sup> Batch (2022-23), 2nd Semester**

### Course GARD–508: Spatial Data Analysis and Modeling

## ASSIGNMENT QUESTIONS

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## Block-1: Spatial Analysis and Modelling

1. Explain about the spatial analysis and Levels of Spatial Analysis?
2. What are the types of data used in Spatial Analysis?
3. Explain the role of GIS in spatial analysis and various types of reclassification with suitable examples?
4. Explain in detail the measurement of length/distance & perimeter and area in Raster & Vector Data?
5. Brief about the buffer function in GIS? Various types of buffering operations with neat diagrams?

## Block-2: Network Analysis

1. Explain the basic elements of network data model and Tools of Transportation Network Analysis?
2. (a) Explain the Networks and Network Characteristics?
   (b) List the data sources for network analysis?
3. (a) Explain the Best path analysis?
   (b) Route tracing and layers required for route tracking?
4. How to Create a Road Network Dataset & Discuss Route Tracing &VRP.
5. (a) List the areas of use of location-allocation modeling
   (b) Explain the closest facility analysis.

**Block-3: Surface Analysis**

1. (a) What is Surface Analysis? What are the benefits of terrain datasets?
   (b) Discuss various data source used for generating surfaces?
2. Describe the derivatives products from DEM and also uses of DEM?
3. (a) What is interpolation and Explain different interpolation methods?
   (b) Describe Slope, Hill shade and Profile Generation?
4. Describe about Watershed Delineation using ArcGIS and Suitable sites for Watershed Activities?

**Block-4: Modelling**

1. What is a spatial model and how to build a spatial model?
2. Write in details about different types of models.
3. Describe various stages in the process of modeling?
4. Explain the use of GIS in process modeling and How will you model physical/environmental process?
5. Explain the concept of multi criteria evaluation and what are the advantages and disadvantages MCE?

**Block-5: Crowd Sourcing, Navigational and Location Based Services and Visualisation of Spatial Data Analysis and Modelling Output**

1. What is Crowd sourcing and List the advantages and disadvantages of Crowd sourcing?
2. (a) Explain about next generation Crowdsourcing and Major challenges in Crowd sourcing and Development?
   (b) Discuss various stages in Crowd sourcing.
3. (a) What is navigation and LBS?
   (b) List the areas of application of navigation and LBS/RTLS
4. (a) Explain in detail Mapping Techniques?
   (b) What is map design and layout?
   (c) Write a note on web based map services?

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POST GRADUATE DIPLOMA IN GEO SPATIAL TECHNOLOGY
APPLICATIONS IN RURAL DEVELOPMENT (PGD-GARD)
7th Batch (2022-23), 2nd Semester
Course GARD–509: Spatial Decision Support System (SDSS) for Rural
Development

## ASSIGNMENT QUESTIONS

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## Block-1: Spatial Decision Support System

1. What are the additional capabilities does SDSS have over GIS?
2. Explain in detail the procedure for the spatial database creation?
3. Describe the components of SDSS Architecture.

## Block -2: SDSS Architecture

1. Discuss Crop Models for Decision Making?
2. What are the functions of GIS for manipulation and analysis?
3. What is SDSS? What are the modules needed in SDSS?

## Block -3: SDSS based case studies of various applications

1. Relationship between SDSS and DSS?
2. Brief on Environment Modeling with GIS.
3. GIS implementation of MGNREGA? Explain.

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POST GRADUATE DIPLOMA IN GEO SPATIAL TECHNOLOGY
APPLICATIONS IN RURAL DEVELOPMENT (PGD-GARD)
7th Batch (2022-23), 2nd Semester
Course GARD–510: Natural Resource Management

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### Block-1: Water Resources

1. Write a short note on applications of Remote sensing in
   (a) Water Balance studies   (b) Water Quality studies.  (c) Rainfall Runoff Modelling?
2. (a) What are the parameters estimated for water quality?
   (b) What are the satellite / Sensors commonly used for snow mapping?
   (c) What is the role of RS for irrigated command area management?
3. (a) Discuss in detail Flood forecasting modelling.
   (b) Write detail note on Drought Monitoring using RS?
4. (a) What are the characteristics of sensors used in water quality estimation?
   (b) How you will map Water Logging and Soil Salinity in Irrigation Systems?
5. Discuss in brief the following
   (a) Quantification of Soil Erosion Using RUSLE (b) Rainfall-Runoff Erosivity Factor
   (c) Soil Erodibility Factor (d) Cover – Management Factor
6. Define (a) Hydrological cycle (b) Porosity (c) Permeability   (d) Specific yield and Specific Retention (e) Storativity

### Block-2: Agriculture & Allied Sectors

1. Write detail  note on  (a) Crop Acreage Estimation (b) Crop Monitoring and Condition Assessment (c) Different vegetative indices
2. Write in detail Role of Remote sensing in
   (a) Fisheries          (b) Aquaculture      (c) Coastal Zone Management
3. (a)  How you will assess infrastructure and potential created in irrigation area?
   (b)  Explain the Spectral behaviour of different soils.

4. (a) What are the main instruments/sensors that are being used for satellite oceanographic Observations?
   (b) Differentiate Fresh water and Brackish water aquaculture
   (c) Explain the Remote Sensing of Ocean colour
5. (a) What are the factors that affect the soil formation?
   (b) Explain Visual Interpretation Techniques in Soil Resource Mapping?
   (c) What is interpretative grouping of soils?
6. (a) What are the different techniques of hyperspectral remote sensing data processing?
   (b) What are the different methods of LST Estimatio?
   (c) How microwave remote sensing is useful to agricultural studies?

## Block-3: Forest

1. (a) Explain the difference between forest cover and forest type mapping.
   (b) Discuss in brief various methodological steps involved in digital image
       processing for forest type mapping.
2. (a) Explain conventional methods of biomass assessment of forests.
   (b) Give an account of the advantages of different remote sensing techniques in
       Quantification of spatial biomass
3. (a) What parameters of forest fire disturbance can be monitored and mapped using RS?
   (b) Explain different spatial and spatial components in Wildlife habitat analysis.
4. (a) What are invasive species and explain their ecological and economic effects.
   (b) Explain in brief how remote sensing and GIS can be used in mapping and
       management of invasive species
5. (a) Explain the need to biodiversity assessment at landscape level.
   (b) What are the different ecological, environmental geographical and spatial factors to
       be considered in biodiversity assessment at landscape level.
6. (a) Detail on the advantages and potential of hyperspectral, microwave and LiDAR
       Remote sensing of forests
   (b) Explain in detail on different criteria to be considered to develop a forest
       Management information system.

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