

**III B. Tech I Semester Supplementary Examinations, April/May -2025**  
**REMOTE SENSING AND GIS**  
(CIVIL ENGINEERING)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

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<b>UNIT-I</b>			
1.	a)	i) A remote sensing image of a Hostel Campus shows Hostel-1 Gate at pixel location (300,300) and Hostel-2 Gate at location (400,250). The aerial distance measured between the two locations from an old map was found out to be 350 m. Estimate the pixel spacing / spatial resolution of the image data.	[4M]
		ii) Two satellites have been launched into two different circular orbits around the earth. Orbital radius of satellite-1 is 2000 km and for satellite-2 it is 2100. Comparing their orbital periods, how much longer does it take satellite-2 to make one complete revolution in its orbit?	[3M]
	b)	i) “Many remote sensing platforms are designed to follow an orbit (basically north-south) which, in conjunction with the Earth's rotation (west-east), allows them to cover most of the Earth's surface over a certain period of time”. Elaborate the statement with reference to the orbital characteristics of a remote sensing satellite?	[3M]
		ii) Differentiate Rayleigh and Mie Scattering with illustration.	[4M]
(OR)			
2.	a)	i) “An important consequence for RS is that it is more difficult to measure the energy emitted in longer wavelengths than in shorter wavelengths.” Do you agree with this statement? Explain.	[2M]
		ii) Explain the wavelength that corresponds to the Infrared (IR) region of Electromagnetic spectrum. Why the region between 22μm- 1mm is called “no transmission” band?	[4M]
		iii) Define “Spectral Signature”.	[1M]
	b)	i) Define “sensor resolutions” in Remote sensing.	[3M]
		ii) Differentiate Spectral and Radiometric Resolution with illustration.	[4M]
<b>UNIT-II</b>			
3.	a)	i) Differentiate between Georeferencing and Image Rectification with suitable examples.	[4M]
		ii) State “True” or “False” ( provide 1-2 lines of reasoning and valid justification)	[3M]
		A) Missing scan lines are considered to be a “systematic noise” and it is also termed as “Line dropout”.	
		B) Density slicing method works best on a multi band	

		image and it is known as level slice. C) High pass filter sharpen the original image and Low pass filter smoothen the original image.	
	b)	i) Differentiate between Supervised and Unsupervised Classification with suitable examples. ii) Explain in detail the non-systematic geometric correction of remotely sensed data.	[4M] [3M]
		(OR)	
4.	a)	i) Differentiate between Across track and Along track scanning with suitable examples. ii) “Designing a standard interpretation keys is one of the important steps in Visual Image Interpretation”. Why there is need for an interpretation keys? Provide a suitable example on the visual LULC mapping with a 4 band images (Blue, Green, Red, NIR).	[4M] [3M]
	b)	i) Differentiate between Visual Image Interpretation and Digital Image Processing with suitable examples. ii) Explain the difference between “Low pass”, “High pass” and “Directional” filter.	[4M] [3M]
		<b><u>UNIT-III</u></b>	
5.	a)	i) Explain the role of Remote sensing and GPS in GIS based modeling. ii) Explain the methods for computation of slope in smooth terrain and rough terrain with example.	[3M] [4M]
	b)	i) Differentiate between OLS and GWR model with examples. ii) “Defining GIS is not simple and there are 3 “S” of GIS”. Explain the statement.	[4M] [3M]
		(OR)	
6.	a)	i) Differentiate between IDW and Ordinary Kriging method of Interpolation with examples. ii) Why acquisition of terrain data is considered as a sampling procedure? What are the factors that influence the choice between DEM and TIN as an input data for a particular application?	[4M] [3M]
	b)	i) Differentiate between Conditional function and Relational function in Map Algebra with examples. ii) Differentiate between Spatial and Non-Spatial data? Why there is need of topology in GIS based Modeling? Explain “topological relationship” used in Vector data model and illustrate a simple arc-node data model.	[3M] [4M]
		<b><u>UNIT-IV</u></b>	
7.	a)	i) Differentiate between TIN DEM and GRID DEM with examples. ii) Explain the Local and Focal functions of Map Algebra with an example for each.	[4M] [3M]
	b)	i) “Computation of Slope is not easy....”. Do you agree with this statement? Explain. ii) What are the parameters that defined the “Standard Deviation Ellipse”? iii) Explain the Zonal and Global functions of Map Algebra with an example for each.	[2M] [2M] [3M]

		(OR)	
8.	a)	i) Explain the difference between “IDW” and “Global Polynomial” method of Interpolation. ii) Which method will you prefer (with justification) to interpolate and generate a continuous surface using- a) Land surface temperature data measured from dense stations located in valley region b) Land surface temperature data observed from limited ground stations, for a hilly and undulated topography?	[4M] [3M]
	b)	i) Discuss the following with examples: A) MAUP and Ecological Fallacy B) Moran'I and LISA ii) Why is spatial autocorrelation important in the context of spatial analysis? Give suitable examples.	[4M] [3M]
		<b>UNIT-V</b>	
9.	a)	Explain the process of extracting the watershed of an area using terrain data. Which is the most important step and provide justifications?	[7M]
	b)	If you wanted to monitor the general health of all vegetation cover over Vizianagaram area for several months, what type of platform and sensor characteristics (spatial, spectral, and temporal resolution) would be best for this and why? Which GIS data model will you prefer – Vector or Raster data model when developing the model?	[7M]
		(OR)	
10.	a)	i) How do we assess the quality of terrain data for any hydrological application studies? ii) Explain the hydrological terrain parameters - <i>concept of flow direction and flow accumulation</i> - in extracting the watershed from an elevation data.	[3M] [4M]
	b)	Explain the applications of Remote Sensing and GIS in flood zoning and mapping. Discuss how the integration of these technologies can assist in flood risk management, particularly in the identification of potential flood-prone areas. Use relevant case studies to support your explanation.	[7M]

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