C

Reg. No. :

Question Paper Code: U1403

B.E. / B.Tech DEGREE EXAMINATION, NOV 2024

Professional Elective

Civil Engineering

21CEV403 SATELLITE IMAGE PROCESSING

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Adjusts for sensor noise and variations in illumination is known as…….. CO1- U

   (a) Geometric correction (b) Radiometric correction

   (c) Atmospheric correction (d) All the above

2. What does IFOV stand for in remote sensing? CO1-U

   (a) Instantaneous Field of View (b) Integrated Field of View

   (c) Instantaneous Field of View (d) Interpolated Field of View

3. Which transformation is primarily used for analysing frequency components of an image? CO1-U

   (a) Edge detection (b) Histogram equalization

   (c) Fourier Transform (d) Principal Component Analysis

4. Which unsupervised classifier uses iterative clustering based on mean values of clusters? CO1-U

   (a) Minimum Distance to Mean (b) Support Vector Machine

   (c) K-means (d) Maximum Likelihood Classification

5. What does sub-pixel classification primarily aim to address in remote sensing images? CO1-U

   (a) Noise reduction (b) Spectral resolution (c) Mixed pixels (d) Spatial resolution

PART – B (5 x 3= 15 Marks)

6. Identify the feature extraction in satellite image processing. CO1-U

7.	Demonstrate the necessary corrections involved in satellite image processing.	CO2-App	
8.	What are image histograms, and how are they used in image analysis?	CO3-App	
9.	Briefly explain the concept of pattern recognition in the context of image classification.	CO5-An	
10.	What is object-based classification, and how is it different from pixel-based classification?	CO6-An	

PART – C (5 x 16= 80 Marks)

11.	(a)	Organize the characteristics and applications of digital image processing in detail.	CO2-App	(16)
		Or		
	(b)	Discuss the most widely used satellite data formats, such as Geo TIFF, HDF, ENVI, and NITF. Explain their key characteristics, advantages, and limitations.	CO2-App	(16)
12.	(a)	Demonstrate the spectral response of the earth features such as vegetation, water and soil.	CO4-Ana	(16)
		Or		
	(b)	Explain the differences between multispectral and hyper spectral data. Discuss how spectral data is stored and accessed in various satellite data formats.	CO4-Ana	(16)
13.	(a)	Discuss the role of histograms in image processing. How do histogram equalization and histogram matching enhance image quality? Illustrate with examples.	CO3-App	(16)
		Or		
	(b)	Explain the process of image merging. Discuss how merging multiple images can improve resolution or extend the dynamic range, and provide examples of practical applications.	CO3-App	(16)
14.	(a)	Describe Bayes' approach to pattern recognition. How does Bayesian classification differ from other classification methods in remote sensing? Provide relevant examples.	CO5-Ana	(16)
		Or		
	(b)	Discuss the role of decision tree classifiers in remote sensing. How do tree-based classifiers like CART (Classification and Regression Trees) improve classification accuracy? Provide examples of their use.	CO5-Ana	(16)

15. (a) Explain the concept of fuzzy set classification. How does it handle uncertainty in classification, and what are its advantages over traditional classifiers? Provide examples of its application in remote sensing. CO6 -App (16)

Or

(b) Describe the structure and components of an expert system. How are expert systems applied in decision-making processes, and what are some examples of their use in various industries? CO6 - App (16)