UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December, 2021

Course: Digital Image Processing | **Semester: V**
Program: B. Tech. GIE | **Time 03 hrs.**
Course Code: PEAU 3026 | **Max. Marks: 100**
Nos. of pages: 2
Instructions: Attempt questions from all sections

	SECTION A		
S. No.	**Attempt all questions and each question carry 4 marks; Total marks – 20**	**Marks**	**CO**
Q 1	Why Co-variance statistical parameter is importance in digital analysis of multispectral remote sensing data? Write the empirical formula use for the computation of Co-variance.	**4**	**CO1**
Q 2	Write short note on Optimum Index Factor and Sheffield Index.	**4**	**CO1**
Q 3	What are the advantages and disadvantages of linear and nonlinear contrast enhancement of digital satellite data?	**4**	**CO3**
Q 4	Write empirical formula of one each spectral vegetation index commonly use in quantification of vegetation stress and photosynthesis.	**4**	**CO3**
Q 5	Explain principle of one colour based image fusion technique.	**4**	**CO4**
	SECTION B		
	Attempt four questions; Questions nos. 6, 7 & 8 are compulsory; Each question carry 10 marks, Total marks – 40		
Q 6	Discuss relative atmospheric correction techniques of satellite remote sensing data.	**10**	**CO2**
Q 7	In a given remote sensing image analysis project, two sets of data are provided - one a digital land use/land cover map with 30m raster grid size of one period and other period non-rectified multispectral digital satellite data of same area with 20m pixel size. You are asked to prepare digital LULC change map of the area. Explain the principle and analysis steps with flow diagram the methodology is to be adopted in this project.	**10**	**CO5**
Q 8	An agricultural area cultivated with different types of crops with varying biophysical parameters. How you will use hyperspectral remote sensing (HRS) satellite data - what are the digital analysis approaches of HRS data to be use for discrimination different crop types and quantification of biophysical parameters? Discuss briefly the both analysis approaches.	**5 + 5**	**CO5**
Q 9	Describe various radiometric correction methods use in satellite remote sensing data of a hilly terrain in addition to atmospheric correction.	**10**	**CO2**
	OR		
	Discuss various methods of satellite image intensity interpolation.	**10**	**CO2**

SECTION C			
	Attempt two questions; Questions no. 10 is compulsory; Each question carry 20 marks, Total marks – 40		
Q 10	Two digital multi-spectral satellite data sets are provided in a remote sensing project- one MODIS and on IKONOS satellite data. Using one data set, you have to prepare fractional thematic information classes using appropriate digital classification technique. While one data set, you have to use suitable image classification technique for detail thematic mapping. Select appropriate data set in each problem and explain in details theory and steps of analysis of each applicable image classification method to be adopted.	**10 + 10**	**CO3**
Q 11	Discuss in details advantages and limitations of Decision Tree and ANN digital classifiers. Describe the differences between ART MAP and MLP BP ANN approaches of digital classification with methodology flow diagrams.	**8 + 12**	**CO 4**
	OR		
	Describe in details concept and applications of Fourier Transform with case examples in digital processing of satellite remote sensing data. Discuss the EPSS and spatial auto- correlation methods of image texture analysis.	**10 + 10**	**CO 4**