

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, December, 2020

Course: Digital Image Processing
Program: B. Tech. GIE
Course Code: PEAU3026
No. of pages: 3

Semester: V
Time 03 hrs.
Max. Marks: 100

SECTION A

S. No.	Instruction: Each sub question under main question carry one mark.	Marks	CO
Q 1	<p>True or False</p> <p>a. Mie scattering contributes much in diffuse sky irradiance.</p> <p>b. SI technique is used for selection of best more than three bands of a multi-spectral image.</p> <p>c. Resampling methods used in geometric correction of RS image do not affect thematic classification.</p> <p>d. When an image is not Gaussian, histogram equalization stretching is used to improve image contrast.</p> <p>e. Salt and pepper effects of an image can be minimized using low pass filter.</p>	5	CO1
Q 2	<p>Fill in the blank</p> <p>a. High frequency components of an image appear _____ in FT transformed image.</p> <p>b. The _____ method is use to correct image spatial distortion due to satellite angular velocity and earth surface velocity.</p> <p>c. The _____ pigments absorb centered at 0.62 micrometer.</p> <p>d. The analysis method called _____ quantify spatial structure of neighboring data.</p> <p>e. The _____ atmospheric correction method of remote sensing data, take care the effect of cloud.</p>	5	CO2
Q 3	<p>Multiple choice with single answer</p> <p>a. Scale factor is critical for _____ digital image classification method. (i) MXL; (ii) OBIA; (iii) Parallelepiped; (iv) ISODATA</p> <p>b. MTMF is an algorithm used in _____ digital classification technique. (i) Fuzzy; (ii) Spectral unmixing; (iii) MNF; (iv) ANN</p> <p>c. Higher order components of PCA contain _____ information of image. (i) High variance; (ii) Noise; (iii) Major; (iv) Eigen</p> <p>d. The _____ is ML based digital classification technique without hidden layer. (i) Decision tree; (iii) Expert system; (iii) ARTMAP; (iv) SOM</p> <p>e. The first one or two images of temporal PCA is known as _____ components (i) Unstable; (ii) Stable; (iii) Variable; (iv) Noise</p>	5	CO4

Q 4	<p>True or False</p> <p>a. Cubist is a nonparametric classification software.</p> <p>b. ASM is an example of GLCM method of analysis</p> <p>c. Multi-modal training data is good for digital classification.</p> <p>d. MNF is useful for finding PPI.</p> <p>e. eCognition software used for rule based digital classification.</p>	5	CO3
Q 5	<p>True or False</p> <p>a. Digital change detection deals with discrete change only</p> <p>b. MNF is also one type of PCA analysis</p> <p>c. SVM classification is suitable for high spatial resolution RS data.</p> <p>d. n-dimensional spectral indices is used for multi-thematic information.</p> <p>e. CART is a digital classification technique.</p>	5	CO4
Q 6	<p>Fill in the blank</p> <p>a. The _____ is a digital change detection technique, which does not require atmospheric corrections of two periods RS data.</p> <p>b. The better characterization of absorption of a spectrum can be done by _____ analysis.</p> <p>c. The _____ is the modified NDVI which take care both soil background and atmospheric aerosol scattering.</p> <p>d. The _____ index is very effective for assessment vegetation stress using hyperspectral RS data.</p> <p>e. The one important vegetation parameter, _____ is to be consider for digital change detection of forest area.</p>	5	CO4
SECTION B			
	Instructions: Write short notes / Describe briefly		
Q 7	Explain the approach of ELC method of atmospheric correction of remote sensing. List various inputs require for radiometric correction based on radiative transfer modeling.	5 + 5	CO3
Q 8	Discuss the various methods of radiometric correction of terrain slope and aspect effects of remote sensing data.	10	CO2
Q 9	An agricultural area covers with different types of crops with varying biophysical parameters. How you will use hyperspectral satellite data - what are the digital analysis approaches of HRS data to be use for discrimination of different crop types and quantification of crop biophysical parameters. Discuss briefly the analysis processes.	5 + 5	CO5
Q 10	In a given remote sensing image analysis project, 2 sets of data are provided one is a digital land use/land cover map with 30m raster grid size of one time and other period non-rectified multispectral digital satellite data of same area with 20m pixel size. You are assigned the task of preparing digital change map of the area. Explain the theory and analysis steps with flow diagram to be followed in this project.	10	CO5

Q 11	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. While one dataset you have to use suitable image analysis technique for detail thematic mapping. Select appropriate data set in each problem and explain the concept of each applicable image analysis method to be adopted.	5 + 5	CO 3
SECTION-C			
	Instruction: Answer any one question		
Q12	Discuss in details advantages and limitations of Decision Tree and ANN classifiers. Describe the differences between ART MAP and MLP BP ANN approaches of digital classification with methodology flow diagrams.	8 + 12	CO 4
OR			
	What are the differences between PCA and MNF analysis. Describe in details analysis approach and application of MNF.	5 + 15	CO 4