PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2023

Semester : Semester III - 2021
Course Code : PET2013
Course Name : Sem III - PET2013 - Introduction to Geoinformatics
Program : B.Tech. Petroleum Engineering

Date : 16-JAN-2023
Time : 1.00PM - 4.00PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE TEN QUESTIONS   **10 X 2 = 20M**

1. State the difference between analog and digital images.

(CO1) [Knowledge]

2. List out the 4 applications of remote sensing

(CO1) [Knowledge]

3. List out any 4 factors that causes the microwaves to scatter a portion of energy when it strikes a surface.

(CO2) [Knowledge]

4. Describe the difference between Rayleigh scattering and Mie scattering.

(CO2) [Knowledge]

5. Tabulate the electromagnetic wave bands with their utility in remote sensing (Any 2).

(CO2) [Knowledge]

6. Define the characteristics of various sensing systems.

(CO3) [Knowledge]

7. Describe Satellite system parameters.

(CO3) [Knowledge]

8. State the difference between Spatial and Spectral resolution.

(CO3) [Knowledge]

9. List out the general procedure for photo interpretation.

(CO3) [Knowledge]

10. Describe three importanat stages of working with geographic data.

(CO4) [Knowledge]

PART B

ANSWER ALL THE FOUR QUESTIONS   **4 X 10 = 40M**

11. SAR Remote Sensing and GIS capitalizes on the motion of the space craft to emulate a large antenna. Substantiate it with the help of illustration.

(CO2) [Comprehension]

12. "Large scale variations in the surface (for example, terrain slopes), affect the backscattering properties. Using the statement given, describe the various geometrical characteristics which are observed in radar images.

    (CO2) [Comprehension]

13. It is difficult to view stereo photographs stereoscopically without the aid of optical devices. The difficulties can be overcome by an instrument called stereoscope. Identify and Explain various types of stereoscopes used. Also, explain the advantages of one over other.   (CO3) [Comprehension]

14. The spectral characteristics are not always fully evaluated because of the limited ability of the eye to discern tonal values and analyse the spectral changes. If the data are in digital mode, the remote sensing data can be analysed using digital image processing techniques and such a database can be used in raster GIS. Virtually, all the procedures may be grouped into one or more broad types of operations. Describe the above mentioned digital image processing techniques to compile maps with high accuracy.

    (CO3) [Comprehension]

PART C

ANSWER ALL THE TWO QUESTIONS   2 X 20 = 40M

15. GIS are decision support computer-based systems for collecting, storing, presenting and analyzing geographical spatial information. These systems are spatially referenced databases giving users the potentiality to control queries over space, and usually through time.
    a) Spatial analysis is a technology which typically requires two types of information about spatial objects. Identify and Explain.
    b) Also, Prepare a note on the geometric relationship between spatial entities and corresponding attributes as they are very crucial for spatial analysis and integration in GIS.

    (CO4) [Application]

16. (a) The term land use refers to the human activity associated with a specific piece of land whereas the term land cover is related to the type of feature present on the surface of the earth. Categorize the followings under "Land Use" and "Land Cover".

i. Roads / Railways,	v. Agricultural Land	ix. Mining Blocks
ii. Soil	vi. River	x. Mountain Range
iii. Industrial Area	vii. Natural Forest	
iv. Desert	viii. Parks	

 (b) Remotely sensed raw data, received from imaging sensors mounted on satellite platforms generally contain flaws and deficiencies. The correction of deficiencies and removal offlaws present in the data data through some methods are termed as pre-processing methods. This correction model involves the initial processing of raw image data to correct geometric distortions, to calibrate the data radio metrically and to eliminate the noise present in the data. All pre-processing methods are considered under three heads. List out all the three heads considered as pre-processing methods for Digital Image Processing. Illustrate any one of the three heads mentioned above.

  (c) Image classification is a procedure to automatically categorize all pixels in an image of a terrain in to land cover classes. Normally,multi spectral data are used to perform the classification of the spectral pattern present within the data for each pixel is used as the numerical basis for categorization This concept is dealt under the broad subject,namely, Pattern Recognition. Spectral pattern recognition refers to the family of classification procedures that utilizes this pixel-by-pixel spectral information as the basis for automated land cover classification. Spatial pattern recognition involves the categorization of image pixels on the basis of the spatial relationship with the pixels surrounding them. Image classification techniques are grouped into two types,namely supervised and unsupervised. The classification process may also include features, such as, land surface elevation and the soil type that are not derived from the image. A pattern is thus a set of measurements on the chosen features for the individual to be classified. Explain the process of deciding when to go for supervised or unsupervised classification with a suitable example.

    (CO3) [Application]

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