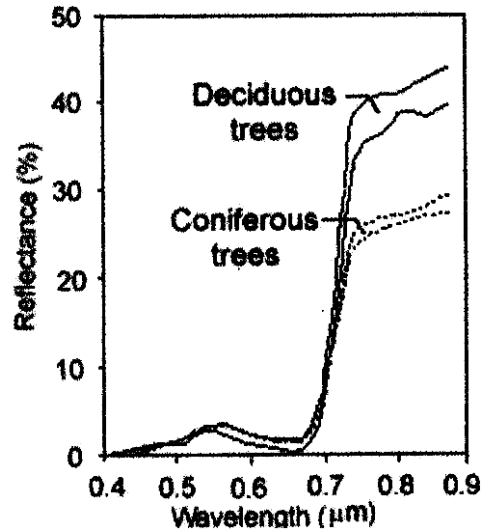


illustrate the spectral response patterns of these two categories to help explain your answer.



- b) Describe the different types of data used in GIS studies. What are the advantages and disadvantages of each data type, and how are they used in GIS applications? 2.5+2.5

## B. SC. GEOLOGICAL SCIENCES EXAMINATION, 2023

( 3rd Year, 2nd Semester )

### GEOMORPHOLOGY, REMOTE SENSING AND GIS

#### PAPER – CORE/TH/13

Time : Two hours

Full Marks : 40

(Use a separate Answer script for each Part)

#### PART – I (Marks: 20)

Answer question 1 and *any two* from the rest.

- Write short notes on (any two) :  $2 \times 2 = 4$ 
  - Horst-and-graben structure
  - Stalagmites
- What do you mean by 'Landform' and 'Geomorphology'? What are the different crustal orders of relief in landforms? Describe different types of damage patterns under a watershed body.  $3+2+3=8$
- Describe the landforms created by erosional and depositional activities in glacial environment. Explain floodplain landscape and related features.  $5+3=8$
- Describe the landforms created by erosional activities in a desert condition. Describe different types of dunes.  $4+4=8$

#### PART – II (Marks: 20)

Answer question no. 1 and *any three* from the rest.

[ 2 ]

1. Write whether these statements are True or False : 1×5
  - a) The spatial resolution of a remote sensing image determines the level of details that can be seen in the image, but has no impact on the accuracy or quality of the data.
  - b) Remote sensing data cannot be used to monitor changes in atmospheric pollution, such as the concentration of greenhouse gases.
  - c) Geostationary satellites orbit the Earth at a fixed position above the equator, and they are used primarily for weather forecasting and monitoring.
  - d) Histogram equalization is a process of adjusting the brightness levels in an image to improve the contrast.
  - e) Remote sensing data from multiple sensors and satellites can be combined to create composite images with improved spatial and spectral resolutions and greater accuracy and details.  
2.5+2.5
2.
  - a) Suppose you have a digital image with a radiometric resolution of 6 bits. What is the maximum value of the digital number that could be represented in that image?
  - b) What is the difference between passive and active remote sensing techniques?

[ 3 ]

- c) Briefly describe some common image classification methods. What are the advantages and disadvantages of each method, and how do they differ in terms of accuracy? 1+1+3
3.
  - a) Briefly explain the difference between absorption and scattering in the context of remote sensing. Provide an example of each process and its impact on remote sensing data.
  - b) Describe the concept of atmospheric windows in remote sensing. How do they relate to the electromagnetic spectrum, and what are the key characteristics of these windows? 2.5+2.5
4.
  - a) Describe the difference between a geostationary orbit and a polar orbit. How does the choice of orbit affect the characteristics and capabilities of a satellite?
  - b) Explain the concept of a swath in remote sensing and how it is related to the spatial resolution and coverage of a satellite image: 2.5+2.5
5.
  - a) Had you attempted to map the deciduous (e.g. maple, birch) and the coniferous (e.g. pine, fir, spruce) trees in a forest in summer using remote sensing data? What would be the best way to do this, Explain the answer. Use the reflectance curves to

[ Turn over