

## Remote Sensing and Geographical Information Systems

### UNIT - I

#### INTRODUCTION TO PHOTOGRAMMETRY

1. What is meant by photogrammetry?
2. How many minimum number of photographs are required for Stereo photogrammetry?
3. Define drift in while taking aerial photographs.
4. What is meant by Focal length of lens in aerial photography?
5. What are fiducial marks on an image negative in aerial photogrammetry?
6. Define the Scale of a vertical aerial photograph?
7. What is stereoscope?
8. What is meant by Relief Displacement?
9. Define parallax?

#### Long answers

1. What is photo scale? Discuss with an example
2. If the distance of a line on the photograph known as 1 cm, what is its equivalent distance on the ground if the photographic scale is 1: 10,000
3. Elucidate the basic geometrical elements of a vertical aerial photograph with a neat sketch.
4. Distinguish the difference between a map and an ortho photo and describe the following terms: GCP, mosaic, Stereo pair, Fiducial marks, Scale
5. Discuss how the height of an object on the terrain can be determined using stereo parallax measurements.
6. Illustrate how the difference in elevation displaces the position of a photographic image.

#### Objectives

1. Which one of the following statements is correct ?
  - A. Snow albedo falls at all wave length with the increase of grain size
  - B. The effect of grain size on reflection is maximum in the near-IR region
  - C. The effect of grain size on reflection is low in the visible region of the spectrum
  - D. All of these
2. The refractive index of the ocean water:
  - A. increases with salinity
  - B. increases with temperature
  - C. decreases with salinity
  - D. decreases with temperature

3. The arrangement of terrain features which provides attributes: the shape, size and texture of objects, is called :
  - A. spectral variation
  - B. spatial variation
  - C. temporal variation
  - D. None of these .
  
4. Electromagnetic radiation :
  - A. produces a time varying magnetic field and vice versa
  - B. once generated, remains self-propagat-ing.
  - C. is capable to travel across space
  - D. consists of magnetic and electric fields
  - E. All of these
  
5. Pick up the important characteristic of a target which facilitates its identification from the following:
  - A. spectral variation
  - B. spatial variation
  - C. temporal variation
  - D. polarisation variation
  - E. All of these

## **Unit-II**

### **Remote sensing**

#### Short Answers

1. Define Remote Sensing.
2. Define Scattering
3. What is active remote sensing?
4. What is passive remote Sensing?
5. What is image Interpretation?
6. What is passive remote sensing?
7. Define Ground control points
8. How do you define Temporal Resolution?
9. Name the elements of image interpretation.

#### Long answers

1. Illustrate the Electromagnetic spectrum, with emphasis on optical visible

spectral bands

2. Discuss the difference between active and passive remote sensing and

explain about the energy sources used.

3. Scrutinize various applications and advantages of aerial and satellite remote sensing

4. Explain about two energy sources available for earth passive remote sensing and elucidate with their spectral characteristic curves.

5. Describe spectral properties of water bodies and how these can be used to differentiate pure and sediment water.

### Objectives

1. Which one of the following frequency regions is a part of sun's radiation?
  - A. Ultraviolet frequency region
  - B. Visible frequency region
  - C. Infrared frequency region
  - D. Radio frequency region
  - E. All of these
  
2. The instruments which provide electromagnetic radiation of specified wave length or a band of wave lengths to illuminate the earth surface, are called :
  - A. sensors
  - B. passive sensors
  - C. active sensors
  - D. None of these
  
3. Due to perturbation of the orbit, satellite orbit parameters are frequently updated on measurements carried out by its
  - A. six ground stations
  - B. five ground stations
  - C. four ground stations
  - D. three ground stations

4. Coherence of two electromagnetic waves takes place if their phase difference is :
- A. constant in time
  - B. constant in space
  - C. constant in time and space
  - D. None of these
5. The part radiation due to scattered/diffused radiation entering the field of view of a remote sensor other than that from the required target,
- A. reduces the contrast of the image and also its sharpness
  - B. increases the contrast of the image but reduces the sharpness
  - C. increases both the contrast and sharpness
  - D. reduces the contrast but increases the sharpness
6. The part radiation due to scattered/diffused radiation entering the field of view of a remote sensor other than that from the required target,
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7. Pick up the correct definition from the following with response to GIS.
- A. Common boundry between two areas of a locality is known as adjacency.
  - B. The area features which are wholly contained within another area feature, is known so containmentment.

C. The geometric property which describes the linkage between line features is defined as connectivity.

D. All of these.

### **Unit-III**

#### **Geographical information system**

##### Short answers

1. Define GIS
2. What are the 4Ms of GIS
3. Define Spatial data
4. Define Attribute data
5. Joining spatial and Attribute data
6. Define Coordinate system
7. What are the data used in ArcGIS
8. What is Map
9. Define Datum
10. Define projection

##### Long answers

1. Name the three basic types of map projections classified based on developable surfaces
2. Define map projection. Why is map projection necessary in map making
3. Define the following term in the context of geographic coordinate system of Earth : latitude, longitude, parallel, meridian
4. Define the following terms : a) georeferencing b) mean sea level, geodetic datum, vertical datum
5. Explain the meaning of map scale 1: 10,000. Is this a larger or smaller map scale than a map scale of 1: 1,000?

##### Objectives

1. Which one of the following errors is produced by platform characteristics of the sensor ?
  - A. altitude variation
  - B. altitude
  - C. orbit drift
  - D. All of these

2. The coherence length over which there is a strong relationship between amplitudes is;
  - A. directly proportional to the bandwidth
  - B. inversely proportional to the bandwidth
  - C. the square of the bandwidth
  - D. none of these
  
3. Which one of the following statements is correct regarding the GPS satellites ?
  - A. The nominal altitude is about 20, 200 km
  - B. The inclination of axis satellite is  $55^\circ$
  - C. The satellite transmits two L band signals (L1 with 1575.42 MHz and L2 with 1276.6 MHz)
  - D. All of these
  
4. Pick up the correct statement from the following:
  - A. Indian space effort started in 1962 with the establishment of a rocket.
  - B. Development of space (DOS) was established by the Government of India in 1972
  - C. Indian Space Research Organisation (ISRO) is responsible for the space technology and its application to various activities.
  - D. All of these

## Unit-IV

### Vector data model

#### Short answers

1. Define topographic map
2. What is the feature used for showing the location
3. Define Geographic Information System?
4. What are the major elements of Geographic Information System?
5. Define types of vector data.
6. Write any two uses of Geographic Information System?
7. What is Non- Spatial data
8. What is spatial data?

#### Long answers

1. What is shape file? What are the different types of features in vector data
2. model
3. Compare and contrast the raster and vector data model.
4. What are the advantages of raster data model
5. Discuss what is the overall goal of data base management system
6. Describe layers in GIS. Draw with a neat diagram
7. Name three basic file structures used in GIS?
8. What is the Difference between choropleth and Isopleth thematic maps
9. What purpose does the Grid or Cell serve in data representation?

#### Objectives

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2. Rayleigh's criteria for a rough surface is: (where letters carry their usual meanings).

- A.  $h > \lambda/\Delta \cos \theta$
- B.  $h = \lambda/8 \cos \theta$
- C.  $h > \lambda/8 \cos \theta$
- D.  $h < \lambda/8 \cos \theta$

3. Pick up the correct statement from the following :

- A. The distance between two successive crests or troughs of a wave, is called, the wave length
- B. The wave length is measured in metres and a fraction of a metre
- C. The wave length is generally denoted by  $\lambda$
- D. The length of the crest from the mid point, is called amplitude
- E. All of these

4. The basic requirement of any sensor system, is :

- A. radiometric resolution
- B. spatial resolution
- C. spectral resolution
- D. temporal resolution
- E. All of these

5. Which one of the following helps to identify the objects on the earth surface ?

- A. atmospheric window
- B. signature
- C. radiometric error
- D. None of these

## Unit-v

### Raster data model

#### Short answers

1. What is Digital remote sensing images.
2. What is DN number.
3. What is data conversion.
4. Define Adhoc data?
5. Digital aerial photographs are represented in in raster data form or vector data form? Why?
6. Give some examples of data that is stored in Vector form?
7. Name the methods used for conversion of data between raster and vector data forms.
8. Name three basic file structures used in GIS?
9. What is meant by Cleaning in data editing?

#### Long answers

1. Describe the data stream flow in GIS system with a block diagram.
2. Critically examine what is meant by Layer based GIS with examples.
3. What are Raster and Vector data forms. Compare Raster data and Vector data representations.
4. Explain about data capture, data input, and data output in Geographic Information System
5. What are the advantages of vector model data model
6. Explain with a neat diagram how real world data is converted into Raster format.

#### Objective

1. The spectral region of the electromagnetic radiation which passes through the atmosphere without much attenuation is known as:  
A. ozone hole

- B. atmospheric window
  - C. ozone window
  - D. black hole
2. Which one of the following statements is correct?
- A. During the day, earth reflects solar radiation
  - B. During the day earth reflects both solar radiation the emission from its surface
  - C. During the night, earth emits radiation from its surface
  - D. All of these
3. The value of energy quantum for radiation of any frequency is proportional to :
- A. the frequency
  - B. the reciprocal of the energy
  - C. the square of the frequency
  - D. the square root of the frequency
4. A perfectly black body :
- A. is a diffuse emitter
  - B. absorbs all the radiations of every wave lengths
  - C. emits power of every wave length
  - D. All the above
5. Which one of the following parameters is considered to determine the reflectance of a vegetation canopy
- A. Solar zenith angle
  - B. Azimuth angle
  - C. Look angle
  - D. Number and arrangement of leaves
  - E. All of these
6. Pick up the correct statement from the following
- A. The ratio of the up flux and down flux just above the snow surface, is called albedo
  - B. Spectral albedo of snow is calculated for the semi-infinite snow thickness

- C. Water equivalent height of snow is the height of water column obtained by melting snow.
- D. A homogeneous snow pack is one whose average grain size does not vary with depth.
- E. All of these