



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKE-UP EXAMINATION, JAN 2023

Course Code: PET 320

Course Name: Remote Sensing and GIS

Program & Semester: B.Tech. - PET

Date: 23-JAN-2023

Time: 09:30 AM to 12:30 PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) All the questions are compulsory.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries FIVE marks.

(5Qx 5M= 25M)

1. Write TRUE or FALSE.

- i. Transverse Mercator projection is used for navigation purpose.
- ii. Map projection is a basic principle of map making in that when projected on to a flat map, objects on the earth's surface are distorted in some way, either in size, shape or in relative location
- iii. Spatial objects in the real world can be thought of as occurring in four easily identifiable types namely, points, lines, areas and surfaces
- iv. Mercator Projection is used to show regions along a great circle other than the equator or a meridian.
- v. To transfer the image of the earth and its irregularities on to the plane surface of a map, three factors are involved, namely, a geoid, an ellipsoid or a datum with ellipsoid, and a projection.

(C.O.No.1) [Knowledge]

2. Explain any 5 among the followings:

- i. Geographical Entities
- ii. Attributes
- iii. Topology
- iv. Components of GIS
- v. Theoretical models of GIS
- vi. Four M's of GIS

(C.O.No.4) [Knowledge]

3. Describe the followings:

- i. SLAR
- ii SAR

(C.O.No.2) [Knowledge]

4. Describe the reason

i. 'Scattering is a function of roughness'

ii. 'SAR capitalizes on the motion of the space craft to emulate a large antenna'

(C.O.No.2) [Knowledge]

5. Write full form of the followings:

i. SLAR

ii. RADAR

iii. IFOV

iv. FCC

(C.O.No.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

6. The drainage pattern and texture seen on aerial and space images are indicators of landform and bedrock type and suggest soil characteristics and site drainage conditions.

a) Identify the different types of pattern from the Figure 1 provided. [2 Marks]

b) Explain how these patterns aids in visual image interpretation process of aerial photos. [6 Marks]

c) Identify other parameters which helps in visual interpretation. [2 Marks]

(C.O.No.3) [Comprehension]

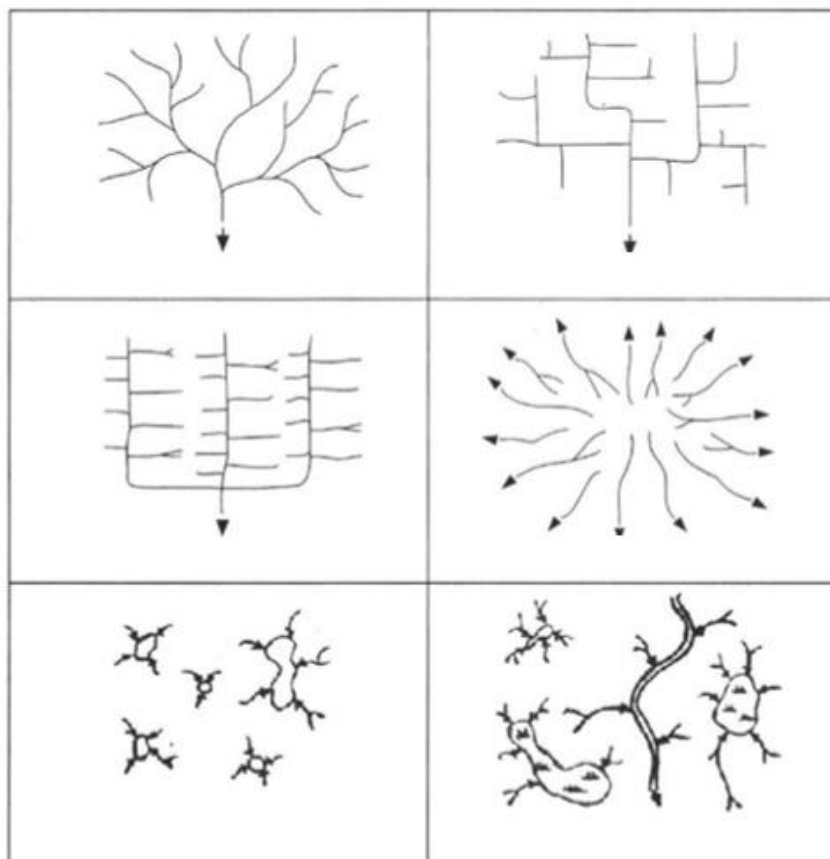


Figure 1

7. The two overlapping photos are laid on a table and viewed in such a way that left eye see only left photo and right eye sees only right photo. The brain judges the heights (3-D model) of each overlapping identical object, by associating the depth with their corresponding parallactic angles.
- Explain the statement given above using Figure 2 provided.
 - Explain how to overcome the difficulty of viewing stereo photographs.

(C.O.No.3) [Comprehension]

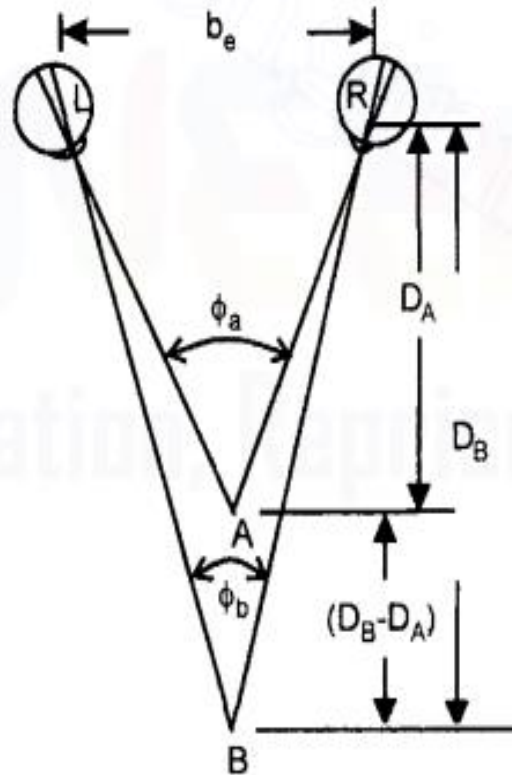


Figure 2

8. There are several characteristics associated with the image remote sensing instrument operating in visible and IR spectral bands. Because, detectors are sensitive to a particular region in which the sensor is designed to operate and produce outputs which are representative of the observed area.
- Explain how these characteristics are capable of detecting the energy reflected from earth surface features. [2 Marks]
 - Our eyes inform us that the atmosphere is essentially transparent to light, and we tend to assume that this condition exists for all Electromagnetic radiation. Explain how these particles and gases in the atmosphere can affect the incoming light and radiation. [6 Marks]
 - Radiation is absorbed through electron or molecular reactions within the medium encountered. Justify this statement. [2 Marks]
- (C.O.No.2) [Comprehension]
9. There are five essential elements contained in the workflow. They are data acquisition, preprocessing, data management, manipulation and analysis, and product generation. For any application, it is important to view these elements as a continuing process. Workflow process of GIS in procedural perception is provided below (Figure: 3). Using the workflow provided, explain how final products are generated.
- (C.O.No.4) [Comprehension]

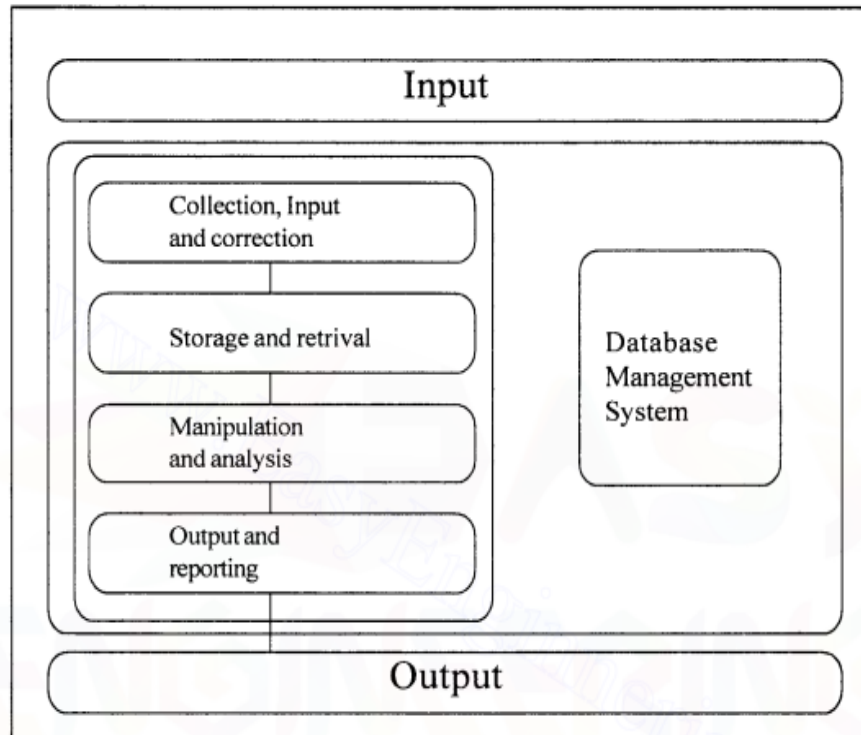


Figure 3

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries SEVEN marks.

(5Qx7M=35M)

10. Regions of electromagnetic spectrum in which the atmosphere is transparent are called atmospheric window.

- Illustrate the atmospheric window with the diagram. [2 Marks]
- Demonstrate the importance of the diagram. [3 Marks]
- What happens when particles or large gas molecules present in the atmosphere interact with and cause the electromagnetic radiation to be redirected from its original path? [2 Marks]

(C.O.No.2) [Application]

11. Visual image interpretation of satellite imagery, in general, and False Colour Composite (FCC) in particular is extensively used for generation of thematic maps/ layers, based on a systematic observation and evaluation of certain key elements.

- Prepare the list of factors which causes change in reflection characteristics. [3 Marks]
- Explain how the visual interpretation of topographic features are done based on reflection characteristics of images. [4 Marks]

(C.O.No.3) [Application]

12. Interpret Figure 4 provided below.

- Using Figure 4 given, illustrate the radar geometry. [3 Marks]
- SAR Remote Sensing and GIS capitalizes on the motion of the space craft to emulate a large antenna. Dramatize it. [4 Marks]

(C.O.No.3) [Application]

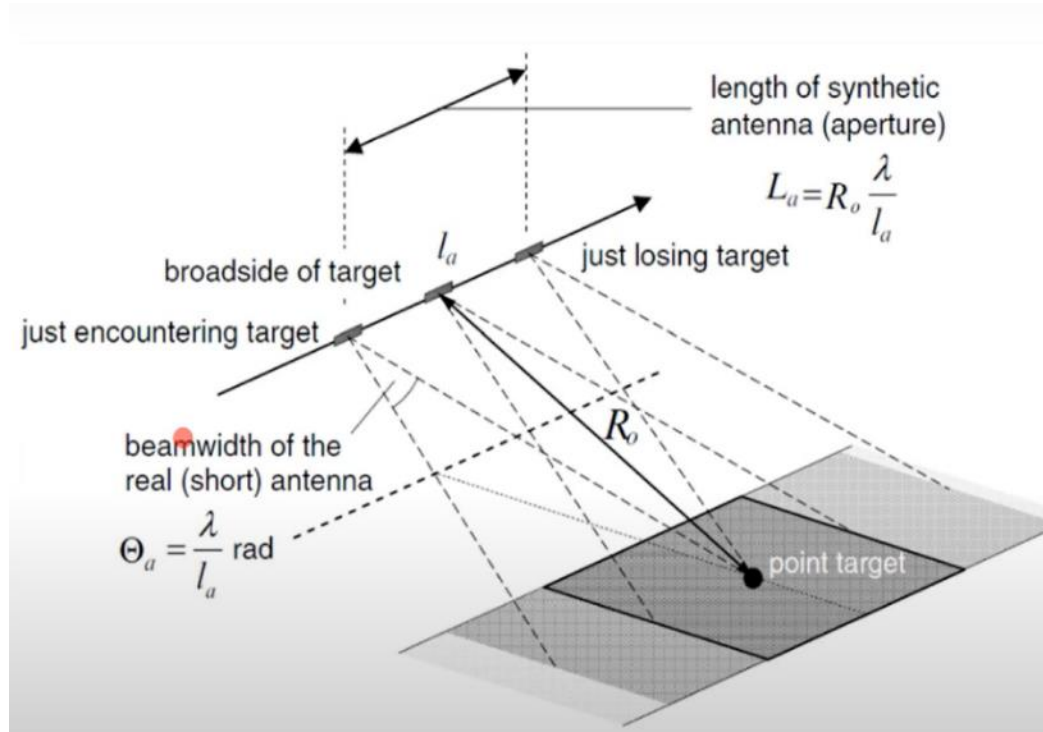


Figure 4

13. GIS are decision support computer-based systems for collecting, storing, presenting and analyzing geographical spatial information.
- Spatial analysis is a technology that typically requires two types of information about spatial objects. Identify and explain. [3 Marks]
 - 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. [4 Marks]
(C.O.No.4) [Application]
14. El Niño is an aberrant pattern in weather and sea water temperature that occurs with some frequency (every 4-9 years) in Pacific Ocean along the equator. It is characterized by less strong western winds across the ocean, less upwelling of cold, nutrient rich, deep-sea water near the South American Coast, and therefore by substantially higher sea surface temperature. It is generally believed that El Niño has considerable impact on global weather systems and that it is the main cause for droughts in Wallace and Australia, as well as for excessive rains in Peru and the southern U.S.A.
- Fundamental problem in GIS is understanding the phenomena, which has geographic and temporal dimension. From the explanation provided, choose the phenomena and demonstrate whether it is a geographic or temporal dimension. [3 Marks]
 - After studying this phenomenon, professionals will prepare all sorts of products, such as maps for better understanding. Dramatize the three important stages of working with GIS. [4 Marks]
(C.O.No.4) [Application]