2007

REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM

PAPER– III (MOD-7 & 8)

Full Marks : 100

Time :'4 hours

The figures in the right-hand margin indicate full marks.

Candidates ***are required*** *to give their* answers in their *own words* as *far as practicable.*

Illustrate the answers *wherever necessary.*

Write the answers *of* questions *for* each *modules in* separate books.

MODULE - 7

(Full Marks 40)

(Foundation of Remote Sensing)

Answer *four* questions selecting *two* from each group.

Group-A

Answer any *two* questions.

1. Define Remote Sensing. Briefly discuss the scope of Remote sensing and schematically illustrate the generalised process and elements involved in Electron Magnetic Remote Sensing of Earth's Resources. 2+4+4

2. Calculate the orbital period, speed of ground coverage and separation between two consecutive passes of a satellite orbiting a spherical earth of radius 6378 kms at a height of 1000 kms above the earth's surface.
(g = 980 cm/sec2 ; GM, = 3.99x105 km3/sect) 10

3. How the peak radiation wavelength and the absolute temperature of a body are related ? How the energy of a photon is related to the frequency and wavelength of EMR. What role it plays in Remote Sensing ? 3+4+3

4. Describe briefly the different types of resolutions in **remote sensing.** **10**

Group-B

Answer any *two* questions.

5. What are the orbital characteristic and spectral bands of different IRS satellites ? 10

6. What is meant by Modular Transfer Function (MTF), Instant Field of Vision (IFOV) ? What are sun-synchronous and geo-stationery orbits ? 5+5

7. What are the different platform & Launch Vehicles of Satellite used in . Remote Sensing ? What are the advantages and disadvantages of Pushbroom and Whiskbroom sensing ? 4+6

8. Write short notes on : 5+5

(**a**) **False colour composites** (FCC) and its use.

(b) IKONOS and Quickbird **satellites.**

MODULE - 8

(Full Marks 60)

(Foundation of Remote Sensing and GIS)

Answer *four* questions selecting *two* from each group.

Group -A

Answer any two questions.

1. What is digital image? What are the types of digital image? Describe the advantages of digital image processing. Describe about the radiometric errors encountered in a digital remote sensing data? 2+2+3+8

2. What are the advantages of Microwave remote sensing ? Briefly describe about the Range and Azimuth resolution of a SLR system. Solve following numerical problem-
   (a) A SLR system transmits pulses for a period of 0.25 usec. Find out the Range Resolution of the system at a depression angle of 40°.
   (b) A SAR system has a 1.5m antenna length. Find out the Azimuth Resolution. 2+8+3+2

3. **Describe the utility of thermal infrared band in remote sensing. What is the spatial and spectral resolution of Landsat-5 TM Band-6? Why the spatial resolution of TM Band-6 is different from the other band? What are Kinetic and radiant temperature?**

   Solve the following problem

   The kinetic temperature of a moist fallow land measured as 250°K. Find out the radiant temperatures, where the **Emissivities of moist fallow land is 0**.90. 3+3+2+3+4

4: Write short note on *any five (Not exceeding 50* words) 3x5

(a) Lay over.
(b) Slant range and ground range.
(c) Image restoration
(d) Spatial interpolation.
(e) Intensity interpolation.
(f) Black body Radiation.
(g) Thermal Scanner.
(h) Hyper spectral sensors.
(i) Polynomial order and GCPs.

Group-B

Answer any *three* questions.

5. What is collateral data? What is the utility of IRS LISS-III data to prepare district wise land use/ land cover map. Describe with. a suitable flowchart for. preparation of district wise land use / land cover ' map using IRS satellite data. 2+2+6

6. Explain how remote sensing is applicable for water resource mapping and helpful for fishermen? 10

7. What is the basic difference between raster and vector data format? Describe about Agricultural application of remote sensing and GIS. 4+6

8. Write short note on any *two* 5+5

(a) Ground truth.
(b) NDVI for vegetation mapping.
(c) Forest fire mapping.
(d) Geological mapping.
(e) Urban sprawl mapping.