Motilal Nehru National Institute of Technology Allahabad
GIS Cell
End Semester Odd Examination 2018
Session 2018-19
Programme: B. Tech.
Semester: 7th

Course Code: GI1783

Course: Introduction to Remote Sensing

Max Marks: 60

Time: 03 hrs

Instructions:
1. All the subparts of the question should be answered at one place.
2. Answers should be brief and to the point.
3. Any missing data may be suitably assumed and mentioned.

Q.1: Answer the following questions.   (5+5)

(a) Explain the generalized process of image acquisition by satellite-based imaging. Mathematically quantify the energy received at satellite on-board sensor from a ground resolution cell (GRC).

(b) Explain the atmospheric effects in energy transmission through atmosphere. Draw diagram of transmission versus wavelength and explain?

Q.2: Answer the following questions.   (5+4)

(a) Explain the working of pushbroom scanner. Why pushbroom scanning/imaging is advantageous over whiskbroom scanning.

(b) Define the spatial and spectral resolutions? How spatial resolution affect the image quality?

Q.3: Explain why most of the bands in multi-band image acquisition are chosen in reflective spectrum. Why water body mapping cannot be done in near-infra red band.   (5)

40	40	40	40
40	40	90	90
90	90	90	90
90	90	90	90

(a)

50	50	50	50
50	50	120	120
120	120	120	120
120	120	120	120

(b)

10	10	10	10
10	10	50	50
50	50	50	50
50	50	50	50

(c)

5	5	5	5
5	5	250	250
250	250	250	250
250	250	250	250

(d)

Figure 4. DN pattern of an image segment in (a) Blue band (B1), (b) Green band (B2), (c) Red band (B3) and (d) Infrared band (B4)

Q4: Answer the following questions based on Figure 4.   (2+3+5+6+6)

(a) What is the radiometric resolution?

(b) How many objects present in the image segment. What are the names of probable natural Earth objects, which would be parts of image segment?

(c) Apply linear image stretching (Histogram manipulation) for contrast enhancement in band B1 DN pattern and write new set of DN pattern.

(d) Design variance-covariance matrix

(e) Compute the optimum index factor and find the best three band combination to portray maximum information of image segment scene with least duplicacy.

Q5: Answer the following questions   (5+4+5)

(a) List different components of laser scanner? How the measured target distance is converted into a 3D point coordinate in 3D laser scanner coordinate system. What is the additional unit required along with 2D scanner (line scanner) to compute a point ED coordinate once scanner is in motion.

(b) Explain thermal remote sensing and discuss its applications?

(c) How global navigation satellite systems (GNSS) works. List all GNSS programmes worldwide and explain their key points?