2018

M.Sc. 1st Seme. Examination

REMOTE SENSING & GIS

PAPER—RSG-101

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

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

Illustrate the answers wherever necessary.

RSG—101.1

Fundamental and Physics of Remote Sensing

[Marks : 20]

Answer any *two* questions :   2×2

1. Define Remote Sensing.

2. What is the process of Remote Sensing ?

3. Why remote sensing is important in present day ?

4. Define scattering of EMR in relation to Remote Sensing.

Answer any *two* questions : 2×4

5. Explain the characteristics of remote sensing.

6. Explain atmospheric windows and its' importance in remote sensing. 3+1

7. What do you know about Stefan-Bolhzman's law and Wien's law ?

8. What is the wavelength of electromagnetic radiation which has a frequency of 5×10^{10} Hz ? What type of EMR has this wavelength ?
Given, $C = 3 \times 10^8$ m/s.
The notation has its usual meaning.

Answer any *one* question : 1×8

9. Discuss briefly about your concept on spatial, spectral, radiometric and temporal resolution in relation to satellite image.

10. (a) Define "signature" in the light of remote sensing.

(b) Explain the interaction of the EMR with major earth's surface features. 2+6

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RSG—101.2

Platform and Sensors

[Marks : 20]

Answer any *two* questions :   2×2

1. "Objects moving in uniform circular motion will have a constant speed but does not have a constant velocity" — explain the statement.

2. Explain Absorption Spectra ?

3. What are active and passive Earth observation satellites ? Describe its typical orbital characteristics mentioning respective ascending and descending nodes.

4. Calculate escape velocity on surface of moon. Given, radius of moon = 1.74×10^6 km, $M_{moon} = 7.35 \times 10^{22}$ kg, $G = 6.67408 \times 10^{-11}$ $m^3/kg^2/s^2$.

Answer any *two* questions :   2×4

5. Describe Whisk-broom and Push-broom scanners mentioning number of bands and detectors used in LANDSAT-TM and IRS LISS-III.

6. What is meant by escape velocity ? What is the local time for satellites imaging with multispectral sensor ? Why this time is important in imaging ? Draw and describe Zenith angle.

7. Compare advantages and disadvantages of Multi-spectral and Hyperspectral images and imaging.

8. What is LIDAR system ? Describe concepts of Multiple Returns and Point Clouds in LIDAR.

Answer any *one* question :   1×8

9. (a) State Kepler's laws of planetary motion.

   (b) Suppose a small planet is discovered that is 14 times as far from the sun as the Earth's distance is from the sun. Use Kepler's law of harmonies to predict the orbital period of such a planet. Given : $T^2/R^3 = 9.89321\times10^{-14}$ s^2/m^3 (NOTE : The average distance value is given in astronomical units where 1 a.u. is equal to the distance from the earth to the sun ; 1.4957×10^{11} m. The orbital period is given in units of earth-years where 1 earth year is the time required for the earth to orbit the sun i.e. 3.156×10^7 seconds.)   5+3

10. (a) Discuss advantages of Synthetic Aperture Radar over Real Aperture Radar.

    (b) Write a note on factors that affect microwave backscattered signals upon interaction with ground ?   3+5