2013

M.Sc.

1st Semester Examination

REMOTE SENSING & GIS

PAPER—RSG-103

Full Marks : 40

Time : 2 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.

Group—A

[Fundamentals & Physics of RS/GIS]

(Marks—20)

Answer any *two* questions from the following :

1. (a) What is an atmospheric window ?

(b) What is the relation between energy and wavelength of EMR ?

(c) What are the reactions of EMR with atmosphere ?

(d) What is meant by spectral reflectance ?

2. (a) Discuss very briefly about the recent Indian space program.

(b) Discuss about the radiant intensity of the Sun.

(c) What is atmospheric refraction (transmission)?

(d) Write down Snell's law.

3+3+2+2

3. (a) State the Kepler's second law. Show that the satellite moves faster at the perigee compared to the apogee.

(b) What is the difference between geosynchronous orbit and geostationary orbit.

(c) A satellite is moving around the Earth orbit with perigee altitude of 400 km and apogee altitude of 15000 km.

(i) Calculate the eccentricity of this orbit.

(ii) Calculate the period of this orbit.

(1+3)+2+(2+2)

4. Write Short Notes (any *two*) : 5+5

(a) False colour composites;

(b) atmospheric Windows;

(c) Imaging & Non imaging sensor;

(d) Active and passive sensor.

Group—B

[*Thermal, Hyperspectral Remote Sensing*]

(Marks—20)

Answer any *two* questions from the following.

1. Mention some distinct advantages and disadvantages of microwave domain vis-a-vis optical remote sensing.

Describe how the geometrical and electrical properties of the target influence the RADAR return.

What are the basic components of a typical RADAR system.

3+3+4

2. Write down the parameters which control the ground resolution cell size of a SLR system and how they affect the range and azimuth resolution. Discuss the role of microwave data in disaster management. What is 'speckle' in RADAR image ?

5+3+2

3. (a) Explain Band Spacing and Band Width with suitable sketch.

(b) How Lidar Works ?

(c) What are main three components of airborne LiDAR system ?

(d) If the spectral range of the 288 channels of the CASI (Compact Airborne Spectrographic Imager) is exactly 0.40 mm to 0.90 mm and each band covers a wavelength of 1.8 nm (nanometres, 10^{-9} m), will there be any overlap between the bands ?

3+2+2+3

4. (a) What is the concept of a Perfect Blackbody (BB) ?

(b) What do you mean by the Wien Displacement Law ?

(c) What is the peak wavelength for a lamp that glows at 1800° C ?

(d) Explain multiple returns in LiDAR technology.

(e) Find the distance to an object whose two way time of LiDAR pulse is 3 micro second (Speed of light ≈ 30,00,00,000 m/s).

2+2+2+2+2

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