2017

M.Sc.

1st Semester Examination

REMOTE SENSING AND GIS

PAPER—RSG-101

Subject Code—34

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.

Use Separate answer book for each Group.

(Fundamentals and Physics of Remote Sensing)

Group–A

[Marks : 20]

Answer any *two* questions. 2×10

1. (a) Explain "Why under clear sky condition, the sky is blue ?

(b) Why sun looks red in rising or in sun set?

(c) Which spectral region should be used to observe water content in the atmosphere?

(d) What about water content in vegetation looks in the image? $4\times2\frac{1}{2}$

2. (a) Write Wien's displacement law. Deduce Wien's displacement law from Stefan-Boltzinan law.

(b) What is the difference between optical remote sensing and thermal remote sensing.

(c) Write the difference between kinetic temperature and radiant temperature.

(d) Find out the Peak wavelength at which a maximum radiation of lava flow will be exited. Given the temperature of molten lava – 1500°K. $4\times2\frac{1}{2}$

3. (a) Define thermal conductivity, thermal capacity and thermal inertia.

(b) Write the Kirehoff's law. What are the characteristics of black body radiation? 6+4

4. (a) Briefly discuss the effects of atmosphere in satellite remote sensing.

(b) What are 'Mie' and Royleigh scattering. 6+4

(Platforms and Sensors)

Group–B

[Marks : 20]

Answer any *two* questions from the following: 2×10

1. (a) Define Escape Velocity.

(b) Calculate escape velocity on surface of moon. Given radius of moon = 1.74×10^6 km, $M_{moon} = 7.35\times10^{22}$ kg ; $G = 6.67408\times10^{-11}$ $m^3/kg^2/s^2$.

(c) The period of the moon is appproximately 27.2 days (2.35×10^6 s). Determine the radius of the moon's orbit and the orbital speed of the moon.

Given, $M_{earth} = 5.98\times10^{24}$ kg. 2+2+6

2. Discuss in detail about four types of resolution. (Spatial, Spectral, Radiometric, Temporal) 4×2½

3. (a) What factors are responsible for microwave backscattered signals upon interaction with ground ?

(b) Describe different main technologies / components used in Lidar System.

(c) Compare satellite ground track of inclined geo-synchronous orbit and geosynchronous elliptical orbit on equator.

(d) "Objects moving in uniform circular motion will have a constant speed but does not have a constant velocity" — explain the statement. 3+3+2+2

4. Write short notes on : 5×2

(a) Path Row and Scene of a satellite image ;

(b) Ascending and descending nodes ;

(c) LIDAR data clouds.

(d) Synthetic aperture radar ;

(e) Advantage of microwave remote sensing over optical remote sensing.