16/11/13

Roll No. | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

GEOINFORMATICS ENGINEERING BRANCH

Seventh Semester

GI 9401 THERMAL & HYPER SPECTRAL REMOTE SENSING

(Regulation 2008)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. State Stephen Boltzmann law and write it's significant to thermal remote sensing.
2. List the three thermal infrared detector with spectral sensitivity
3. State the inverse square law.
4. Define emissivity.
5. Define hyper spectral remote sensing.
6. Differentiate radiance from reflectance.
7. Why calibration is important in hyper spectral data?
8. What is Pixel Purity Index?
9. List any five data compression techniques.
10. List any two hyper spectral sensors with specifications

Part – B (5 x 16 = 80 marks)

11. i) Explain the relationship between emissivity and temperature of the object using Kirchoffs radiation Law. (10)

    ii) Describe the thermal properties of terrain.(6)

12. a) i) Explain the radiometric calibration of thermal scanners. (10)

    ii) Write notes on thermal scanners and their specifications. (6)

    OR

    b) Discuss the any one application of thermal remote sensing with case studies. (16)

13. a) i) Explain the experimental design and instrumentation of field spectrometry. (8)

    ii) Describe the factors affecting field spectrum.(8)

    OR

    b) i) Discuss the Block based maximum likely hood classification method. (8)

    ii) Explain the library searching and matching by spectral coding technique. (8)

13. a) Describe various methods of contouring.

OR

13. b) The area enclosed by various contours of a proposed reservoir are given below:

Contour (m)	100	105	110	115	120	125
Area (ha)	3	8	10	15	20	25

Determine : a) The capacity of the reservoir if the full reservoir level is 125 m
b) The elevation of the water surface when the reservoir is half full. Ignore the volume below RL of 100m.

14. a) (i) State the corrections that are to be applied during the Baseline measurement using Total station equipment and discuss. (6)

(ii)The following observations were made at a satellite station S, the direction of the true station V was 00°00'00". The direction of E,L, and A was found to be 70°36' 00", 145°24'20" and 212°42'10" respectively. The distance VS was measured as 25.24m and the distances VE, VL and VA were computed from adjacent triangle to be 7567m, 8435 m and 6694m respectively. Reduce the observed angles to the true station V. (10)

OR

14. b) (i) What is trigonometrical levelling? In what context, it is used in triangulation survey.(4)
(ii) The top of a chimney was sighted from two stations P and R at very different levels, The stations P and R being in line with the top of the chimney, The angle of elevation from P to the top of chimney was 36°32' and that from R to the top of chimney was 16°38', The angle of elevation from R to a vane 1m above the foot of the staff held at P was 8°24'. The height of the instrument at P and R were 1.850m and 1.650m respectively. The horizontal distance between P and R was 100m and the reduce level of R was 248.260m. Find the reduced level of the top of the chimney and the horizontal distance from P to the chimney. (12)

15. a) The following is an extra meridian observation on sun to compute the Azimuth.

Greenwich mean time of observation	$= 3^h\ 32^m\ 55^s$
Average observed attitude of sun	= 36°11'30"
Declination of sun at 3 hour GMT	=7°55.7' S
Declination of sun at 4 hour GMT	=7°54.7' S
Equation of Time at 0 hour GMT	$=12^m\ 38^s$
Equation of Time at 12 hour GMT	$=12^m\ 33^s$
Meridian passage	$=12^h\ 12^m$
Longitude of the place of observation	= 80°14' 10" E

OR

15. b) The following is an extra meridian observation on sun to compute the watch error

Greenwich mean time of observation	$= 3^h\ 46^m\ 42.5^s$
Average observed attitude of sun	= 39°51' 00"
Latitude of the place of observation	= 13°00' 30" N
Longitude of the place of observation	= 80°14' 10" E
Declination of sun at 3 hour GMT	= 5°14.40' S
Declination of sun at 4 hour GMT	= 5°13.42' S
Equation of Time at 0 hour GMT	$=11^m\ 07^s$
Equation of Time at 12 hour GMT	$=11^m\ 00^s$
Meridian passage	$=12^h\ 11^m$

Compute the watch error.