

Name: _____

FO-4313/6313 Spatial Technologies for Forest Resource Management
Second Hour Exam, 2002

Formulas:

1. You are scheduling helicopter spraying in an area where a large tower is located and the pilot wants to know the tower height. Your photos have a nominal scale of 1:15,000 at m.s.l. and were taken with a camera focal length of 152.4mm. The base of the tower is located at 500 ft. above m.s.l. according to the local quad sheet.

You can only find a **single, vertical photo**; the other photo of the stereo pair is lost in your truck or your dog ate it? The base of the tower is located 4.37 inches from the photo principal point. If the displaced tower image is 0.23 inches in length,

The computed tower height is _____ ft. (10)

2. You are using the parallax bar (floating dot) instrument on a **stereo pair** of photographs taken with a 76.2 mm focal length to measure the height of a lookout tower. The photo scale is 1:15,840 at the base of the tower that is located at 540 ft. elevation. If the average distance between the principal and conjugate principal points on the stereo pair was 7.9989 **cm** and the following parallax measurements were obtained:

Reading at top of object = 13.51 mm

Reading at bottom of object = 9.30 mm

The height of the lookout tower is calculated to be _____ ft. (10)

3. Explain the differences between latitudes/longitudes, the UTM and/or state plane coordinate system and the G.L.O. survey system: (12)

Latitudes/Longitudes: _____

UTM/State Plane Coordinates: _____

G.L.O. survey system: _____

4. You are planning to contract for stereo coverage (60% endlap) photography at a scale of 1:18,000 at an average elevation of 580 ft.. If the contractor has an airplane that cruises at 160 knots per hour and an aerial camera with a 76.2mm focal length that uses a 9 by 9 inch film format, your calculations show:
- a. Single photo ground coverage is _____ by _____ ft. (5)
 - b. The acreage covered by one photo is _____ acres. (5)
 - c. In order to obtain 60% **endlap**, the distance between photo centers (on each flight line) should be _____ ft. (5)
 - d. In order to obtain a 30% photo (safety) **overhang** on the target area boundary, the first and last flight lines should be located _____ ft. inside the target area boundary. (5)
 - e. In order to obtain a 25% **sidelap**, interior flight lines (except for first and last) should be theoretically spaced a maximum of _____ ft. apart. (5)
5. GPS will provide relative 3-D positions in terms of x, y, and z locations; the x and y locations are expressed as _____ and _____ and the z location as _____ (3)
6. Control Point X is located on a **7.5 minute quadrangle** where the scale is **1:24,000**. If Point X is located X= **-30/60** inch from the **3₂₅** grid line and Y= **-40/60** inch from the **36₂₆** UTM grid lines, calculate the UTM coordinates of Control Point X. (give distance, unit of measure, direction)

a. Easting = _____ (5)

b. Northing = _____ (5)

7. Remote Sensing is defined as _____ (6)

8. Distinguish between Passive and Active sensors:

Passive: _____ (4)

Active: _____ (4)

9. The most appropriate uses of aerial photographs with conventional ground cruises are:

a. _____ (2)

b. _____ (2)

c. _____ (2)

10. Describe two (2) methods of differential correction of GPS signals that have been degraded by atmospheric and multipath errors:

a. _____ (5)

b. _____ (5)

Bonus: 5 points; all or none.

If a second point from question 6 above is located at UTM coordinates 325,041.61 m E and 3,626,193.6 m N and the magnetic declination in the area is 3° East;

What is the distance from point 1 to point 2 in chains? _____ chains

What is the magnetic bearing from point 1 to point 2? _____ (decimal degrees)