

Name: Key

FO-4313/6313  
First Hour Exam, 2008

Formulae:

$$(1) \quad RF = \frac{1}{S} = \frac{d}{D} = \frac{f}{(H-h)} \quad (2) \quad \frac{\delta h}{(H-h)} = \frac{d}{r} \quad (3) \quad \frac{\delta h}{(H-h)} = \frac{dp}{AP_b + dp}$$

$dp = |X-X'| \quad AP_b = |Z-Z'|$

1. Scale is defined as: a ratio of image distance to ground distance (10)

The two primary characteristics of an RF are:

a. unitless (6)

b. 1 in numerator (6)

2. Rayleigh scattering of the visible spectrum wavelengths results in haze (5)

The human eye is the most sensitive to green wavelengths of the visible spectrum. (5)

3. If the RF scale is 1:6,000 and the human eye can detect an image that is 0.01 inches in length;

the object size on the ground would be: 5.0 ft in size. (5)

$$\frac{1}{6,000} = \frac{0.01''}{D} \quad D = 60'' = 5 \text{ ft}$$

4. If the image distance on an aerial photograph is 175/60 inches and the ground distance is 262.5/60 inches on a 1:24,000 quad sheet,

the calculated RF is: 1:36,000  $RF = \frac{1}{3} = \frac{(175/60) / 12}{(262.5/60) (2000)}$  (5)  
 $= \frac{0.243056}{8750}$

5. GIS is an information system with data referenced to geographic coordinates. The two kinds of data in a GIS are:

A. Spatial

B. Attribute (10)

6. Your boss wants to know the smallest possible scale for some new aerial photography in order for gopher tortoise burrow openings or surrounding dirt apron of size approximately 3 ft to be seen on an image where the human eye can detect objects that at 0.024 inches in size with minimal magnification: -

the minimum calculated RF is :  $\frac{1}{11500}$  (10)

$$\frac{1}{5} = \frac{0.024 \text{ in} / 12}{3 \text{ ft}}$$

7. In image analysis, the seven object attributes that are interpreted, measured, or observed to identify an unknown object are:

4 S's: Size  
Shape  
Shadow  
Site

2 T's: Tone  
Texture

Then: P pattern  
L location (8)

8. What are the differences/similarities between **d** in formula (2) and **dp** in formula (3)?

Differences:  $d$  is radial displacement of image from PP on single photo (5)  
 $dp$  is X - displacement of image from PP on stereo pair

Similarities: Both are image displacement from PP (5)

9. On a single photograph taken at a platform altitude of 3,000 ft, the displaced image of a tower is 90/60 inches in length and the base of the tower image is located 110/60 inches from the principal point.

The height of the tower is calculated to be:  $\frac{1}{350}$  ft (10)

$$\frac{\Delta h}{3000} = \frac{90}{110490}$$

10. On a stereo pair of photographs taken at a platform height of 500 ft, one image has a displaced length of -90/60 in. at an x-distance of -30/60 in. from the principal point and the other image has a displaced length of +45/60 in. at an x-distance of +60/60 in. from the principal point.

The height of the object is calculated to be:  $\frac{300}{904135}$  ft. (10)

$$dp = |-90/60 - +45/60| = |-135/60| = 135/60$$

$$AP_B = |-30/60 - 60/60| = |-90/60| = 90/60$$

$$\frac{\Delta h}{500} = \frac{135}{904135} \quad \Delta h = 300 \text{ ft}$$