



Answer the following questions

Question 1 (15 marks)

(a) (5 marks)

Using sketches describe the difference between vertical, low oblique, and high oblique aerial photos.

(b) (5 marks)

The distance between two points on a vertical photograph is  $ab$  and the corresponding ground distance is  $AB$ . For the following data, compute the average photographic scale along the line  $ab$ .

- $ab = 2.41$  in.;  $AB = 4820$  ft
- $ab = 107.389$  mm;  $AB = 536.943$  m

(c) (5 marks)

On a vertical photograph of flat terrain, section corners appear a distance  $d$  apart. If the camera focal length is  $f$  compute flying height above average ground in feet for the following data:

- $d = 1.85$  in.;  $f = 3.5$  in.
- $d = 82.184$  mm;  $f = 153.20$  mm

Question 2 (15 marks)

(a) (5 marks)

Discuss the advantages of softcopy stereoplotters over optical stereoplotters.

(b) (5 marks)

On a vertical photograph of flat terrain, the scaled distance between two points is  $ab$ . Find the average photographic scale along  $ab$  if the measured length between the same line is  $AB$  on a map plotted at a scale of  $S_{map}$  for the following data.

- $ab = 1.47$  in.;  $AB = 3.52$  in.;  $S_{map} = 1:6000$
- $ab = 41.53$  mm;  $AB = 6.23$  mm;  $S_{map} = 1:20,000$

(c) (5 marks)

The length of a football field from goal post to goal post scales  $49.15$  mm on a vertical photograph. Find the approximate dimensions (in meters) of a large rectangular building that also appears on this photo and whose sides measure  $20.5$  mm by  $6.8$  mm. (Hint: football goal posts are 120 yards apart.)

Question 3 (15 marks)

(a) (4 marks)

Describe briefly how a digital camera operates.

(b) (4 marks)

Calculate the flight height above average terrain that is required to obtain vertical photographs at an average scale of  $S$  if the camera focal length is  $f$  for the following data:

- i.  $S = 1:8000$ ;  $f = 152.4$  mm.
- ii.  $S = 1:6000$ ;  $f = 88.9$  mm

(c) (7 marks)

Compute the area in hectares of a triangular parcel of land whose sides measure 48.78 mm, 84.05 mm, and 69.36 mm on a vertical photograph taken from 6050 ft above average ground with a 152.4 mm focal length camera.

**Question 4 (15 marks)**

(a)(5 marks)

List and briefly describe the four different categories of stereoscopic plotting instruments.

(b)(10 marks)

Determine the horizontal distance between two points A and B whose elevations above datum are  $h_A=1560$  ft and  $h_B=1425$  ft and whose images a and b on a vertical photograph have photo coordinates  $x_a=2.95$  in, and  $y_a=2.32$  in,  $x_b=-1.64$  in and  $y_b=2.66$  in. The camera focal length was 152.4 mm and the flying height above datum was 7500 ft.

**Question 5 (20 marks)**

(a)(5 marks)

Compare an orthophoto with a conventional line and symbol map.

(b)(15 marks)

The length of line AB and elevations of points A and B, whose images appear on two overlapping vertical photographs, are needed. The flying height above datum was 4050 ft and the air base was 2410 ft. The camera had a 6-in. focal length. Measured photographic coordinates (in inches) on the left-hand image are coordinates  $x_a=2.10$  in, and  $y_a=2.00$  in,  $x_b=3.50$  in and  $y_b=-1.05$  in and on the right-hand image,  $x_{1a} = -2.25$  and  $x_{1b} = -1.17$ .

**Question 6 (20 marks)**

(a)(5 marks)

Describe a system that employs GPS and which can reduce or eliminate ground control surveys in photogrammetry.

(b) (15 marks)

A flight plan for an area 10 mi wide and 15 mi long is required. The average terrain in the area is 1500 ft above datum. The camera has a 6 in. focal length with 9.0 in by 9.0 in format. Endlap is to be 60%, sidelap 25%. The required scale of the photography is 1:12,000 (1000 ft/in.).

With our best wishes

This exam measures the following ILOs												
Question Number	Q1-a	Q2-c			Q2-d	Q3-a				Q3-b	Q4-c	
	a2-1	a5-2			b4-1	b5-2				c4-1	c8-1	
Skills	Knowledge & Understanding Skills				Intellectual Skills				Professional Skills			