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School of Environmental Technology
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SVG412: Photogrammetry and Remote Sensing I
First Semester Examination, 2018/2019 Session
DURATION: 2 Hours.

Instructions: Answer Question 1 and any other Two

1 (a) In order to generate a mosaic, a camera lens of 30 cm focal length is to be used for image data acquisition of an area measuring 24 km along the East-west direction and 30 km along the North-south direction. The size of each of the photographs is 20 cm x 20 cm with at least 60% endlap and 30% sidelap while the average scale is 1:12,000 effective at an elevation of 400 m above datum. The Aerial Vehicle will also be programmed to maintain a ground speed of 200 km per hour while the flight lines are to be laid out in a north-south direction on an existing map having a scale of 1:60,000 and the two outer flight lines are to coincide with the east and west boundaries of the area. As a photogrammetrist, determine the data required to effectively plan your flight mission.

(20 marks)

1 (b) You have been approached by the Commissioner of Lands and Housing of your State on the need to map a portion of the state using photogrammetric means. Discuss in details how you will execute this job.

(10 marks)

2 (a) Write short notes on the following:

i. Image preprocessing

ii. Supervised and Unsupervised classification

(5 marks)

2 (b) What is camera calibration? Highlight the 3 basic classes of camera calibration methods (4 marks)

2 (bii). State Abbe's rule. 2 marks

2c. What are the intrinsic and extrinsic parameters of a camera. 4 marks

3a. How can comparator coordinates be transformed to photo coordinates?

3b. Differentiate between Mono-comparators and stereo-comparators

(5 marks)

Write short notes on the following equations as used in mathematical photogrammetry:

i. Coplanarity condition equation

ii. Collinearity condition equation

iii. Scale restraint equation

iv. Linear feature equation

3bi. Highlight 2 methods of establishing ground controls for photogrammetric survey (2 marks)

3bii. List 3 factors that determines the number of ground control points required for a photogrammetric project.

(5 marks)

- 4a. The scale of an aerial photograph is 1 cm = 100 m and the photograph size is 20cm x 20cm. Determine the number of photographs required to cover an area of 100 sq.km if the longitudinal lap and the side lap is 60% and 30% respectively. (6 marks)
- 4b. Write short notes on the following classification algorithms
1. Random forest (RF)
 2. Support Vector Machines (SVM)
 3. Relevance Vector Machine
 4. Artificial Neural Network (ANN)
- 4ci. List three methods of block adjustment.
- 4cii. Write short notes on image pre-processing techniques.

Examiner: O. G. Ajayi