# MASENO UNIVERSITY

## UNIVERSITY EXAMINATIONS 2013/2014

### FIRST YEAR SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE IN EARTH SCIENCES WITH INFORMATION TECHNOLOGY

### (MAIN CAMPUS)

## NGA 104: INTRODUCTION TO PHOTOGRAMMETRY

*Date:* 16th July 2014                    *Time:* 2.30 – 4.30 p.m

**INSTRUCTIONS:**

- Answer Question ONE (1) and any other TWO (2) questions
- Illustrations should be used where appropriate

## NGA 104: INTRODUCTION TO PHOTOGRAMMETRY

1. a) Describe types of air photos. (6 marks)

   b) Explain the fundamental photogrammetric problems. (8 marks)

   c) Calculate the flight height above a flat terrain that is required to obtain vertical photographs given the scale and camera focal length as follows:
   - (i) S =1: 8000, f = 152.4mm (3 marks)
   - (ii) S = 1: 6000, f = 88.9mm (3 marks)

   d) A photo was taken at a flying height of 5000m above sea level. The focal length of the camera is 152mm. Points A and B lie at elevations of 600m and 800m above sea level respectively. Compute the scale at point A and B. (6 marks)

   e) The area of a dam is 52.2cm² on a 1:7500 vertical photograph. Find the ground area of the dam. (4 marks)

2. Discuss merits and demerits of photogrammetry. (20 marks)

3. a) Examine the distortions in air photography. (14 marks)

   b) Assume that the relief displacement for a tower at point A is 20.1mm and the radial distance from the center of the photo to the top of the tower is 56.43mm. If the flying height is 1220m above the base of the tower, find the height of the tower. (6 marks)

4. Examine the main types of stereoplotting instruments. (20 marks)

5. a) Discuss three methods of determining objects' heights from a photo (12 marks)

   b) If the length of the shadow measured on the photograph is equal to 2.8mm the scale of the photograph is 15,000 and angle of elevation of the sun is equal to 36°. Determine the height of the object casting this shadow. (4 marks)

c) Suppose flying height for overlapping photos is 1600m above the ground and the average photo base length is 75.60mm. Find the height of the tree if parallax at the top and bottom is 58.55mm and 59.75mm respectively. . (4 marks)

6. a) Discuss devices for measuring areas from an aerial photograph.
(20marks)