



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2314 : ENGINEERING SURVEY IV

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE:

Instructions to Candidates

You should have the following for this examination

-*Answer Booklet, examination pass and student ID*

-*Drawing instruments.*

This paper consists of five questions.

Attempt any THREE questions.

Do not write on the question paper.



Question ONE (Compulsory)

- a). Define the term relief displacement. With an aid of a sketch, derive the expression of the same given by the following formula **(8 Marks)**

$$d = \frac{rh}{H}$$

where : d = length of the displaced object on the photograph

H = is the flying height above the datum of the area in question

r = is the radial distance from the principal point to the top of the displaced object

- b). A vertical photograph contains images of three ground control points A, B, and C at a, b and c respectively. The elevations of these points and their coordinates measured on the photograph by using a micro rule and corrected for film shrinkage were recorded as follows:

Point	x (mm)	y (mm)	Elevation (M)
a	-61.64	-100.95	1500
b	-80.89	+60.25	600
c	+56.56	+73.55	800

Given that the flying of the area was 4000 m and the focal length of the taking camera was 152.00 mm. Determine the horizontal distances AB, BC and CA in Kilometers **(14 Marks)**.

- c). Discuss the importance of hydrographic survey **(8 Marks)**

Question TWO

- a). Make short notes on the following elements of flight planning:
- i). Tilt
 - ii). Crab and drift
 - iii). Flying height
 - iv). Relief displacement **(10 Marks)**.
- b). Discuss the principle of the floating mark **(10 Marks)**.



Question THREE

- a). Discuss six elements of interior orientation of a camera which are useful for the calibration process
(6 Marks).
- b). Discuss characteristics of photogrammetric images that are important for its interpretation
(14 Marks).

Question FOUR

- a). Differentiate between vertical and oblique photographs **(6 Marks).**
- b). Derive a scale for a vertical photography taken over a variable terrain. To determine the average scale of an aerial photograph, three points A, B, and C were selected. Their elevations were determined from a contour map as 1500m, 800m and 1200m, if the flying height of the aircraft above mean sea level was 4000 m and the focal length of the camera lens was given as 160 mm, determine the average scale and the scales for points A, B and C **(14 Marks).**

Question FIVE

- a). In a pair of overlapping photographs(mean photo base length 90.84 mm) the mean ground level was given as 70 m above the datum. Two nearby points were observed and the following information obtained:

Point	Height above datum	Parallax bar reading
X	55 m	7.84 mm
Y	?	10.46 mm

If the flying height was 2200 m above datum and the focal length of the camera was 152.2mm, determine the height of point Y above the datum (Assume a direct reading stereo meter) **(6**

Marks).

- b). Differentiate between close range and aerial photogrammetry **(4 Marks).**
- c). With an aid of a sketch, describe the basic parts of an aerial camera **(6 Marks).**



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