TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY

Department of BUILDING & Civil engineering

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECV 4425 : ENGINEERING SURVEY - IV

END OF SEMESTER EXAMINATION

SERIES: APRIL 2025

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (30 Marks)

a) Discuss ANY five types of resolutions of the sensor **(10 Marks).**

b) A vertical photograph contains images of three ground contains 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	15.51	90.60	350
b	89.32	52.32	75
c	92.21	-55.21	200

The focal length of the taking camera was 100 mm and the flying height was 2820 m above the sea. Determine the lengths of the ground lines AB, BC and CA (**10 Marks).**

c) Describe the following as discussed in Photogrammetry

i). F - number

ii). Shutter speed **(4 Marks).**

d) Discuss the six elements of interior orientation of camera calibration **(6 Marks).**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO

a). In a pair of overlapping photographs (mean photo base length of 89.84 mm), the mean ground 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	7.34 mm
Y	?	9.46 mm

If the flying height was 2300 m above the datum, and the focal length of the taking camera was 152.4 mm, determine the height of point Y above the datum, assume a direct reading stereo meter (**6 Marks)**.

b). Dicuss the processes of the aerial camera film development **(12 Marks).**

c). Define photogrammetry **(2 Marks).**

QUESTION THREE

a) In a pair of overlapping vertical photographs, the mean distance between the principal points is 95.90 mm. At the time of photography, the aircraft was 3000m above the terrain which was at datum level and the camera had a focal length of 250mm. A tower was observed and the difference in parallax measurements of its top and base was found to be 3.50mm, determine the height of the tower **(6 Marks).** b).

Describe how one can achieve stereoscopic vision using a pair of photos **(8 Marks).**

c). Explain factors that will tend to make stereoscopic vision difficuilt **(4 Marks).**

d). What is non - photogrammetry? **(2 Marks).**

QUESTION FOUR

a). Describe the vertical and oblique photographs and their applications **(6 Marks).**

b). What is relief displacement? With an aid of a sketch , derive its equation **(10 Marks).**

c). Discuss application of photogrammetry in the following field

i). Forestry

Ii). Geological Mapping **(4 Marks).**

QUESTION FIVE

a) Discuss the importance of hydrographic survey **(12 Marks).**

b). A vertical photograph over a variable terrain. The minimum average and maximum heights of area were 500 m, 6000 m and 800 m respectively and that the flying height was 4000 m above sea level and the focal length of 152.4 mm. Determine the mean, minimum and maximum scale **(3 Marks)**.

c). Wth an of a sketch, discuss the **parallactic angle** **(5 Marks).**