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**TECHNICAL UNIVERSITY OF MOMBASA**

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF BUILDING & CIVIL ENGINEERING**

**UNIVERSITY EXAMINATION FOR:**

**BSC IN CIVIL ENGINEERING**

**ECE 2314 : SURVEYING IV**

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: 18 May 2016**

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

**Do not write on the question paper.**

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**QUESTION ONE [30 Marks]**

- a) Briefly using a neat sketch explain the operation of an aerial camera. **[5 marks]**
- b) Briefly discuss the requirements of aerial cameras. **[5 marks]**
- c) i. Explain the role of a shutter  
ii. Briefly describe the three types of shutters. **[10 marks]**

iii. Explain the role of the following parts of a camera:

i. Diaphragm.

ii. Magazine.

iii. Drive mechanism.

**[6 marks]**

iv. A camera having focal length of 20 cm is used to take a vertical photograph to a terrain having an average elevation of 1400 metres. What is the height above sea level at which an aircraft must fly in order to get the scale of 1:800?

**[4 marks]**

### **QUESTION TWO [20 Marks]**

a) With the aid of a sketch derive a scale of a vertical photograph when:

i. The ground is horizontal.

ii. The ground not having the same elevation.

**[7 marks]**

b) Explain the following scales:

i. Datum scale.

ii. Average scale.

**[4 marks]**

c) A vertical photograph was taken at an altitude of 1200 metres above sea level; determine the scale of the photograph for terrain lying at elevations of 100 metres and 320 metres if the focal length of the camera is 15 cm.

**[9 marks]**

### **QUESTION THREE [20 Marks]**

a) Explain the term parallax.

**[3 marks]**

b) Explain the use and working of parallax bar.

**[5 marks]**

c) Explain the principle of stereoscopic depth perception.

**[5 marks]**

- d) The elevations of three points A, B and C were determined from a contoured map as 1500 m, 1000 m, and 1200 m. If flying height of the aircraft above sea level is 3500 m and the focal length of the camera lens is 160 mm, calculate the average scale of the aerial photograph.

[7 marks]

**QUESTION FOUR [20 Marks]**

- a) Describe geometric aspects of the task of flight planning.
- b) What are the different types of overlaps? What is the purpose of providing them in aerial photographs?
- c) Discuss the data required for computation of flight plan.
- d) The scale of an aerial photograph is 1 cm = 100 m. the photograph size is 20 cm x 20 cm. determine the number of photographs required to cover an area of 100 square kilometre if the longitudinal lap is 60 per cent and the side lap is 30 per cent.

[4 marks]

[6 marks]

[4 marks]

[6 marks]

**QUESTION FIVE [20 Marks]**

- a) Describe the characteristics of photographic images.
- b) Discuss the application of aerial photographic interpretation.
- c) Discuss briefly an ideal remote sensing system.

[4 marks]

[6 marks]

[10 marks]