



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

THIRD YEAR SECOND SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL
ENGINEERING**

COURSE CODE: CSE 344

COURSE TITLE: ENGINEERING SURVEYING IV

DATE:

TIME:

INSTRUCTIONS:

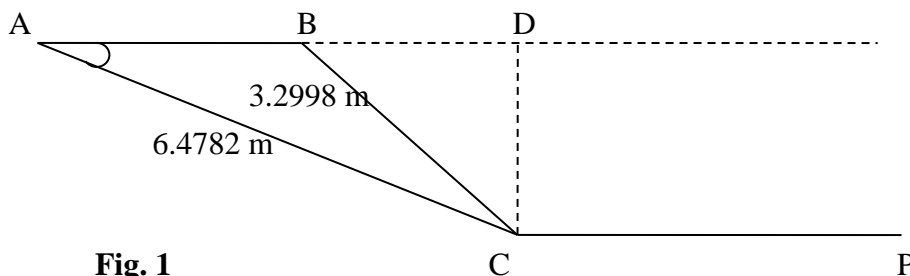
1. This paper contains **FOUR** questions
2. Answer any **THREE** questions
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is **2 Hours**

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION 1. (25 Marks)

- (a) Explain what you understand by the following terms
 (i) Underground surveying (ii) Hydrographic surveying
 (ii) Shaft (iii) Tunnel (6 Marks)
- (b) Define the term sounding and clearly outline its purpose with respect to hydrographic surveying (4 Marks)
- (c) Outline six examples of offshore operations where hydrographic surveying provides the position base for other information. (5 marks)
- (d) Two wires A and B hang in a shaft, the bearing of AB being $55^{\circ} 10' 30''$ (Fig. 1). A theodolite at C, to the right of the line AB produced, measured the angle ACB as $20' 25''$. The distances AC and BC were 6.4782 m and 3.2998 m respectively. Calculate the perpendicular distance from C to AB produced, the bearing of CA and the angle to set off from BC to establish CP parallel to AB produced.

**Fig. 1**

(10 marks)

QUESTION 2 (25 Marks)

- (a) Differentiate between the following terms as used in photogrammetry
- a vertical photograph and a tilted photograph
 - Stereopair and Neat model
 - Crab and Drift
 - Endlap and side lap
- (8 Marks)
- (b) Give step-by-step procedure for orienting photographs for stereoscopic Viewing. Use sketches where necessary (6 marks)
- (c) The airbase of a stereopair of photos is 1400m and flying height above average ground is 2440m. The camera has 152.4 mm focal length and 23cm x 23cm format. What is the overlap? Assuming the spacing between adjacent flight strips is 2500m. What is the side lap? (6 marks)
- (d) A building appears on vertical photograph that was taken from an elevation of 535m above mean sea level. The elevation at the base of the building is 260m above mean sea level. The

relief displacement of the chimney was measured as 54.1mm, and the radial distance to the top of the building was measured as 121.7mm. What is the height of the building?

(5 Marks)

QUESTION 3 (25 Marks)

- (a) Define orthophoto and state any two of their uses (4 Marks)
- (b) A proposed settlement scheme covering 220km² is to be mapped by use of aerial photographs. The scale of the photography is 1:8000 from air using a camera of focal length 150mm with a format of 230mm square. A longitudinal overlap of 60% and lateral overlap of 25% must be provided. If the operating speed of the aircraft is 225km/hr:
- (i) Sketch the outline of the flight line if the flying strip is 16km long, why do you recommend this flight plan? (4 Marks)
- (ii) Calculate the flying height above datum if the average terrain elevation is 1600m above sea level (3 Marks)
- (iii) The number of photographs required to cover the area, adding two to each end of the strip to ensure coverage (6 Marks)
- (iv) Calculate the spacing between flight lines on a flight map of scale 1:50,000 (4 Marks)
- (v) Calculate the time interval between successive exposures (2 Marks)
- (vi) If the terrain is hilly with many tall structures, what would be your choice of camera lens and why (2 Marks)

QUESTION 4 (25 Marks)

- (a) Explain what you understand by the terms “Remote Sensing” and “GIS”. (2 Marks)
- (b) Differentiate between three types of scattering which occur before radiation used for remote sensing reaches the Earth's surface (6 Marks)
- (c) Describe three main atmospheric constituents which absorb radiation (3 marks)
- (d) What are the disadvantages of thermal infra-red remote sensing (6 marks)
- (e) Data in a GIS may be represented in either “vector” or “Raster” format. Explain the difference between the two formats clearly specifying how feature primitives (points, lines, polygons) are represented in each format. (8 marks)