



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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER
SUPPLIMENTARY/SPECIAL EXAMINATIONS**

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

COURSE CODE: CSE 344

COURSE TITLE: ENGINEERING SURVEYING III

DATE: 04/08/2022

TIME: 2.00 – 4.00PM

INSTRUCTIONS:

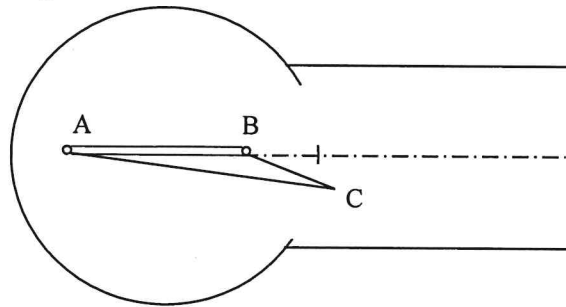
1. This paper contains **FOUR** questions
2. Answer any **THREE** questions
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is **2 Hours**

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

QUESTION 1. (25 Marks)

- (a) With regard to hydrographic surveying, discuss the FOUR major differences between determining the position on land and at sea. (12 marks)
- (b) In a mining area, access to the underground tunnel system is by two narrow and deep vertical shafts. Describe how you would use gyroscopic methods to correlate the underground surveys to the surface surveys. (5 marks)
- (c) The centre line of a tunnel is represented by two plumb bobs at A and B , 400 m apart, hanging vertically in a shaft (Figure 1). The bearing of line AB is $90^\circ 35' 40''$. A theodolite is set up at C in the tunnel, roughly east of the near plumbline at B and at a distance of 4.578 m. The observed value of angle ACB is $16' 30''$.

**Fig. 1**

Calculate the bearing of line AC and the perpendicular distance of C from the centre line of the tunnel.

(8 marks)

QUESTION 2 (25 Marks)

- (a) A and B are two points on a shoreline and are 2100 m apart. The bearing of the AB is $26^\circ 20' 45''$. The horizontal angles at the points A and B at the point of sounding P are $50^\circ 20' 40''$ and $55^\circ 20' 00''$ respectively. Calculate the coordinates of P , if those of point A are (500.00 m N, 200.00 m E). (10 marks)
- (b) What is photogrammetry? Distinguish between terrestrial photogrammetry and Aerial photogrammetry (6 Marks)
- (c) Give step-by-step procedure for orienting photographs for stereoscopic Viewing. Use sketches where necessary (9 marks)

QUESTION 3 (25 Marks)

- (a) Differentiate between the following terms as used in photogrammetry
- a vertical photograph and a tilted photograph
 - Stereopair and Neat model
 - Endlap and side lap
 - Crab and drift
- (8 Marks)
- (b) (i) What is vertical exaggeration as used in photogrammetry
- (ii) Photography data is given as follows: focal length of camera is 152mm; photo format is 23cm x 23cm, overlap is 60%, flying height is 900m. Assume eyese/height ratio is 0.15. Compute the vertical exaggeration
- (5 Marks)
- (c) An area of 150km² at a datum level is to be photographed at a scale of 1:10000 using a camera whose focal length is 152mm and photo format is 23cm x 23cm. The overlap and side lap are to be maintained at 60% and 25% respectively. Assuming an aircraft speed 250km/h, compute the following
- (i) Flying height of the aircraft
 - (ii) Time interval between exposures
 - (iii) Number of photographs required if the strips are 15km long.
- (12 marks)

QUESTION 4 (25 Marks)

- (a) (i) Differentiate between specular and diffuse reflection.
- (ii) Explain why leaves appear green in color and water typically looks blue or blue green under natural conditions
- (6 Marks)
- (b) Outline the differences between Passive and Active sensors stating the advantages and disadvantages of each sensor system.
- (6 Marks)
- (c) Explain the differences between Rayleigh and Mie scattering of radiation in the earth's atmosphere
- (6 Marks)
- (d) How would you distinguish coniferous trees from pine trees in a remotely sensed image of a forested area.
- (4 Marks)
- (e) What is global warming? Explain the effects of global warming on the environment.
- (4 marks)