



*(University of Choice)*

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

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF TECHNOLOGY EDUCATION  
(CIVIL AND STRUCTURAL ENGINEERING)**

**COURSE CODE: TEB 341**

**COURSE TITLE: ENGINEERING SURVEYING I**

**DATE: MONDAY 13<sup>TH</sup> JANUARY 2020 TIME: 12.00–2.00PM**

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**INSTRUCTIONS:**

1. This paper contains FIVE Questions
2. Answer Question ONE and any other TWO 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 ONE (COMPULSORY -40MARKS)**

- a) Define the following terms
- i) Surveying **(2marks)**
  - ii) Levelling **(2marks)**
- b) Differentiate between the two branches of surveying **(4marks)**
- c) Explain the two principles of surveying **(3marks)**
- d) Explain what is referred to as scale in surveying. By aid of sketches give examples of plain and diagonal sketches. **(4marks)**
- e) The following staff readings were observed successively with a levelling instrument having been moved after third, sixth and eighth readings: 2.300: 1.600: 1.100: 2.000: 2.900: 1.300: 0.600: 2.100: 1.000: 2.700 metres. Draw a level book page, enter the readings and calculate the reduced levels of points if the first reading was taken with a staff held on a bench mark of 450.400m using Rise and Fall method **(4marks)**
- f) What is a station in surveying? Illustrate how the stations are identified in field work if the first station is at zero measurement and station intervals are 100m. Show the markings for 250m, 456m, 892.33m and 89m. **(4 marks)**
- g) i) Distinguish between the azimuth and bearing. **(2marks)**
- ii) The following azimuths are reckoned from the north. FE =  $4^\circ$ , ED =  $90^\circ$ , DC =  $271^\circ$ , CD =  $320^\circ$  and BA =  $190^\circ$ . What are the corresponding bearings? **(5marks)**
- h) Outline the considerations taken into account when choosing the contour interval in contouring process **(4marks)**
- i) A road actually 1330 m long was found to be 1326 m when measured with a defective 30 m chain. How much correction does the chain need? **(3marks)**
- j) Describe how the obstacles in chain surveying are categorized? **(3marks)**

**Attempt ANY 2 Questions from this section (30MKS)****QUESTION TWO**

- a) Explain any three types of errors in surveying **(4marks)**
- b) outline the objectives of levelling in surveying **(3marks)**
- c) The following staff readings were observed successively with a leveling instrument having been moved after third, sixth and eighth readings: 2.300: 1.600: 1.100: 2.000: 2.900: 1.300: 0.600: 2.100: 1.000: 2.700 metres. Draw a level book page, enter the readings and calculate the reduced levels of points if the first reading was taken with a staff held on a bench mark of 450.400m using Height of collimation method **(8marks)**

**QUESTION THREE**

- a) State instruments used in chain surveying. **(3marks)**
- b) Explain the following terms as applied in chain surveying.
- i) Chain triangulation **(2marks)**

- ii) Check lines **(2marks)**
  - iii) Survey station **(2marks)**
- c) The distance between two points A and B measured along a slope is 504 m. Find the horizontal distance between A and B when (a) the angle of slope is  $15^\circ$ , (b) the slope is 1 in 4.5, and (c) the difference in elevation of A and B is 65m. **(6marks)**

**QUESTION FOUR**

- a) Describe any six characteristics of contours **(6marks)**
- b) Discuss various methods of contouring. Discuss the merits and demerits of each **(9marks)**

**QUESTION FIVE**

- a) Describe what are construction surveys **(3marks)**
- b) Outline the instruments used in setting out process in any construction project works **(6marks)**
- c) Explain the procedure of setting out a peg on a specified distance and bearing on a level ground. Use figure Q.5, a peg C is to be set out from a survey line AB. **(6marks)**