



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN
CONSTRUCTION MANAGEMENT**

2ND YEAR 1ST SEMESTER 2024 - 2025 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCB 1213

COURSE TITLE: ENGINEERING SURVEYING I

EXAM VENUE: STREAM: BSc CONSTRUCTION MGT

DATE: 14/1/2025 EXAM SESSION: 14-16.00 HRS

DURATION: 2 HOURS

Instructions

- 1. Answer all questions in section A (Compulsory) and ANY other two questions in section B**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

SECTION A 10 Marks (Compulsory)

QUESTION ONE (10 Marks)

a) Answer the following

- i. Define what you understand by engineering surveying. (1 Mark)
- ii. What do you understand by the term **chaining** in survey. (1 Mark)
- iii. What is a tacheometer? (1 Mark)
- iv. Name the equipment given below (1 Mark)



- v. Name the instrument given here below (1 Mark)

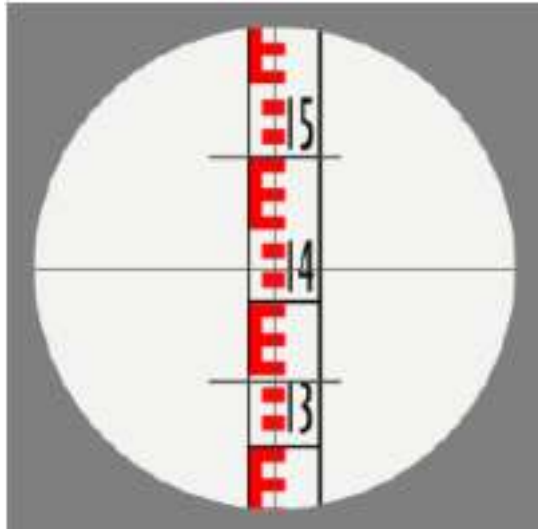


b) Answer all the questions given here below

- i. What is **stake-out** survey? (1 Mark)
- ii. State what the survey instrument given below is used for (1 Mark)

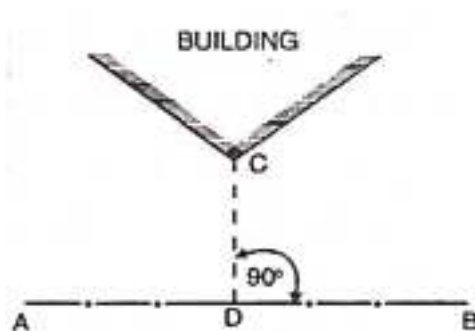


iii. The staff reading shown in the figure below is? (1 Mark)



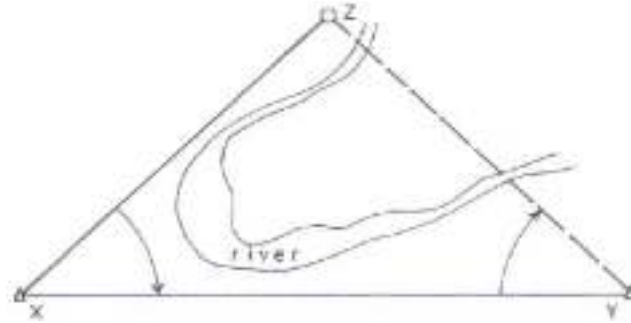
iv. Define the term **error** as used in surveying (1 Mark)

v. A and B are survey stations hence AB is a survey line. The objective or intent of the survey practice shown below is (1 Mark)

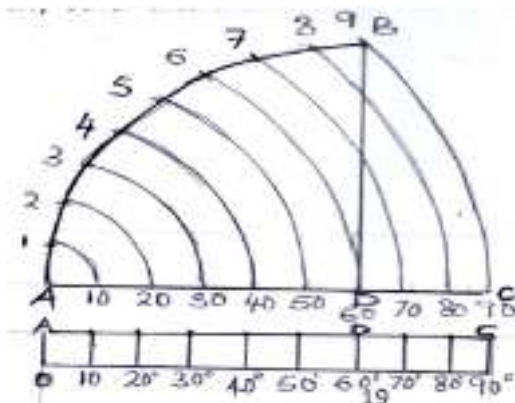


QUESTION TWO (20 Marks)

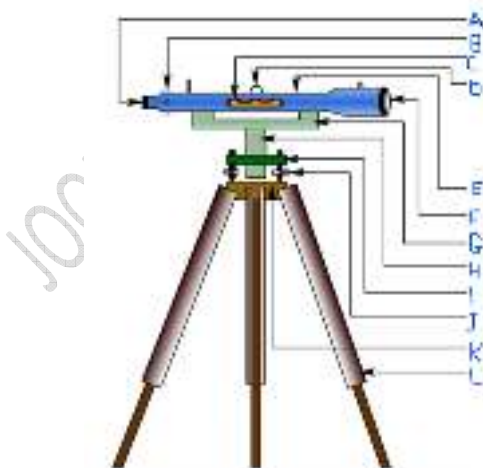
a) The figure below shows three survey stations established around a river course. The intention of the survey is to map the river course. With the aid of a neat diagram, explain how this can be done while using two tapes and a cross staff only (3 Marks)



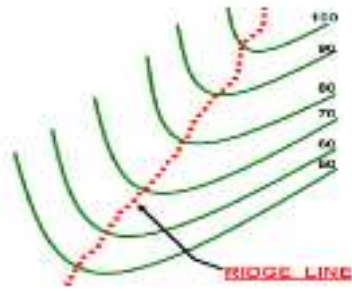
- b) No survey measurement can be taken without any error. Errors in survey can be classified based on their sources or behaviour/characteristics. Classify the common errors experienced in engineering surveying based on behaviour. **(3 Marks)**
- c) Given an angular measurement as 120.535° . Express the same in,
- Sexagesimal system **(1.5 Marks)**
 - Centesimal system **(1.5 Marks)**
 - Hour system **(1.5 Marks)**
- d) Use the chord scale given to construct an angle of 40° degrees clearly showing the process of construction. Also explain the procedure involved **(5 Marks)**



- e) Below is a common surveying instrument. Name the parts marked by the letters listed below **(3 Marks)**



- f) Calculate the average gradient of the ridge line if the scale of the map is 1:3000 and the contour numbers are in metres **(1.5 Marks)**

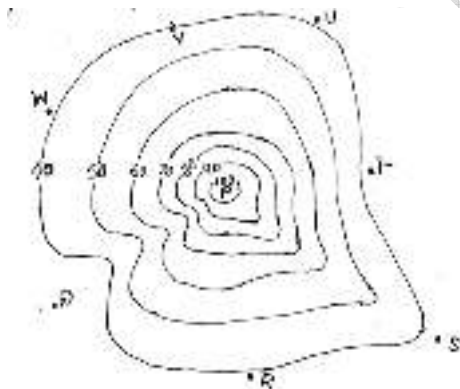


SECTION B 40 Marks

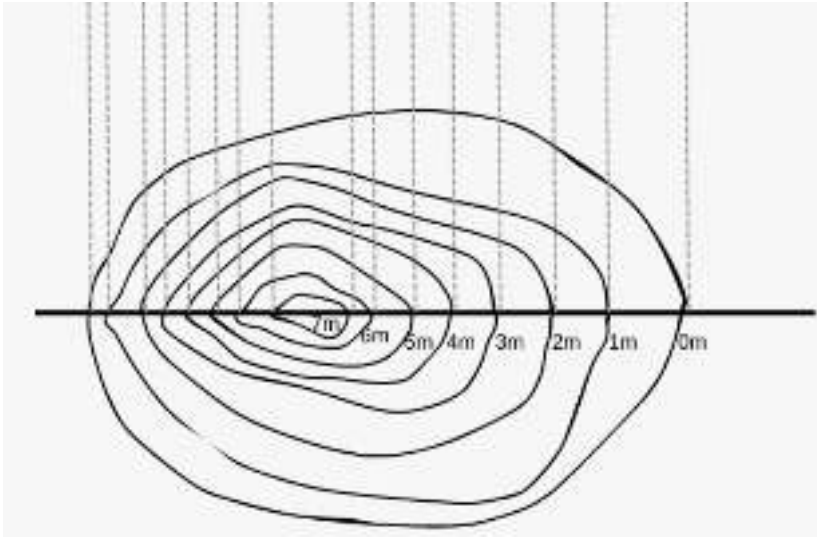
This section has four questions. All the questions carry the same marks. You are required to attempt any two questions only

QUESTION THREE (20 Marks)

- a) Given here below are a set of contours which represent some natural topographical feature. Parts of the feature has been marked by letters starting from P to W. Answer the questions that follow
- i. With reasons to support your answer, state feature depicted by the contours as a whole **(4 Marks)**
 - ii. Assume you are standing between stations *T* and *U*. You are required to reach station *P* following either path *TP* or *UP*. With reasons to support your answer, state which route will be the most practical and convenient to follow? **(5 Marks)**
 - iii. Compare and contrast the topographical features represented by contours along *SP* and that along *QP* **(6 Marks)**

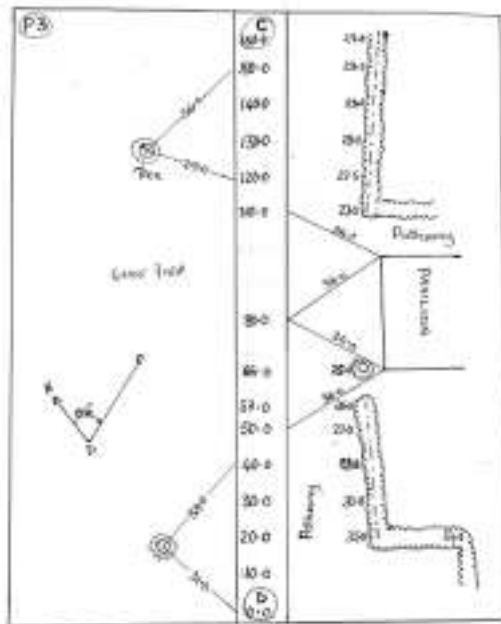


- b) Sketch the topography along the given thick line while moving from left to right. You may use the worksheet attached at the back **(5 Marks)**



QUESTION FOUR (20 Marks)

The figure below is an extract from a student's survey notebook. The note were taken during a survey practical in the field by construction management students of Jooust (Cohort 2023). The intention was to trace a live fence (hedge) which runs along the survey line DC and any other feature found nearby. Use it to answer the questions that follow

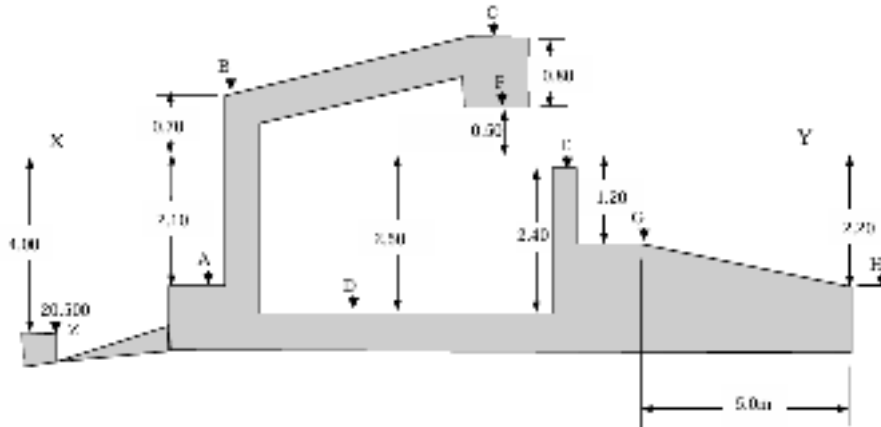


- If this was a new field where no survey had been previously carried out, give a detailed outline of the procedure which was carried out. **(10 Marks)**
- Use the data given on the field notebook page to map the details capture **(10 Marks)**

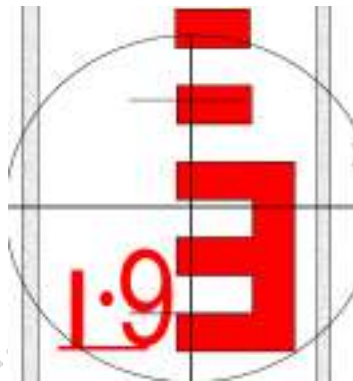
QUESTION FIVE (20 Marks)

- The diagram below is survey data captured during a surveying exercise in a building under construction. Assuming the data was captured by a dumpy level and levelling staff, answer the questions that follow

- i. Station Z is a benchmark and XY is a line of sight established by a dumpy level after being levelled. Using the height of instrument method, book the data in the booking sheet and determine the levels of points A to F (10 Marks)
- ii. Carry out any necessary check (3 Marks)
- iii. Calculate the gradient of the rump between points G and H. (3 Marks)

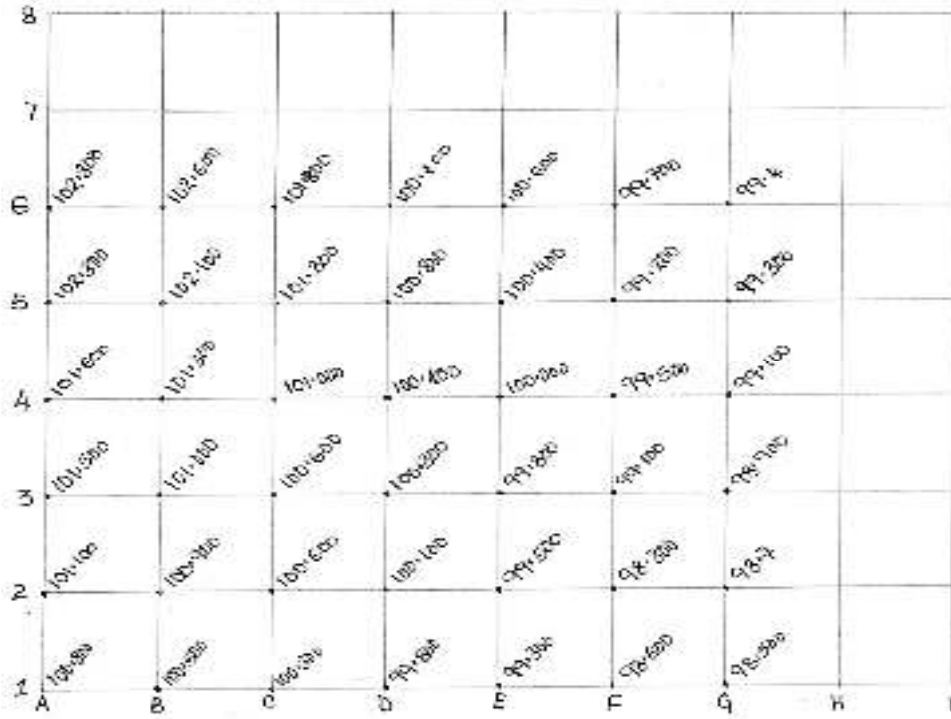


- b) Below is a view through a dumpy level while focused on a levelling staff. Determine how far the staff is from the dumpy level if the instrument constant is 100. (4 Marks)



QUESTION SIX (20 Marks)

Use the data given here to trace contour 99 and contour 102. Show at least two sample interpolation calculations. Use the grid worksheet provided at the back



JOUST OBSERVES ZERO TOLERANCE

CHEATING

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