



JARAMOGI OGINGA ODONGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

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

2ND YEAR 1ST SEMESTER 2018/2019 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TCM 3217

COURSE TITLE: ENGINEERING SURVEYING I

EXAM VENUE: STREAM: BSc CONSTRUCTION MGT

DATE: ../12/2018 EXAM SESSION:

DURATION: 2 HOURS

Instructions

- 1. Answer question 1 (Compulsory) and ANY other two questions**
- 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**

QUESTION ONE

- i. Briefly compare and contrast geodetic survey and plane survey **(8marks)**
- ii. The basic surveying principles give discipline and unity to the profession and sets effective basis for conducting surveying exercises in the field.
 - a) One of the principles states that “*always work from whole to part*”. Explain the importance of this principle in survey **(3marks)**. Also give a brief outline of how it can be applied in survey **(2marks)**
 - b) Also another principle states always choose the method of surveys that is most suitable for the purpose **(3marks)**. Also give a brief outline how it can be carried out in the field **(2marks)**
- iii. Measurements in survey basically fall under four main categories. List any three of these categories **(3marks)**
- iv. List any five equipment which one may need for linear survey work of high level accuracy on a slightly sloping ground **(3marks)**
- v. Surveying can be broadly classified into three categories. List the three considerations under which the classifications are based **(3marks)**
- vi. Based on the considerations you have mentioned in (v) above, mention two types of survey which fall under each of the categories **(3marks)**

QUESTION TWO

- i. Locations of points in space are determined by applying various trigonometric and geometrical processes to the measured quantities
 - a) List the three basic methods of fixing a point on a horizontal plane **(3marks)**
 - b) Briefly describe each of the methods listed in (a) above making use of diagrams to illustrate your answer **(12marks)**
- ii. Describe the trigonometric method of measuring linear distances along the vertical plane **(5 marks)**

QUESTION THREE

- i. Linear measurements in survey refer to measuring horizontal distances between any two survey stations.
 - a) Mention any three main methods in survey used for linear measurements **(1.5marks)**
 - b) Which of the three methods would you prefer for use in control survey? Give reasons to support your choice **(1.5marks)**
- ii. What is the importance of ranging out in linear survey measurements? **(1.5marks)**
- iii. A surveyor and an assistant are available to undertake linear measurements between two survey stations which are very far apart using a 30m tape. A third assistant may be hired if deemed very necessary.
 - a) Decide whether a team of two or three are required. Give reason (s) to support your decision **(3marks)**
 - b) Also assign duties to the team members detailing the specific responsibilities each will undertake **(3marks)**

- iv. Often linear measurements involve taping between two points (ie A and B) which may be far apart.
 - a) List the equipment required for taping on a plain ground for work requiring very high level of accuracy(3marks)
 - b) Clearly outline the standard procedure of carrying linear survey along a level /flat ground (5marks)
 - c) Show how the final results can be computed for the exercise in b) above stating any assumptions made. Also assume the last tape length laid is not full tape length (take 21.345m)(1.5marks)

QUESTION FOUR

- i. Differentiate between methods of representing a scale and types of measuring scale (MARKS 2)
- ii. Briefly describe any two types of scales which fall under each of the two categories as per your understanding of the above (8 MARKS)
- iii. A plain scale whose RF (Representative Fraction) is 1:20 was used to measure length and area on a map prepared on a scale of 1:500. The measured length was 75.814 m and the measured area was 4225 m². Determine
 - a) Correct length(2.5 marks)
 - b) Correct area(2.5marks)
- iv. In a practical exercise to determine the elevation of a point marked B, students undertaking a course in Building and Civil Engineering at JOOUST obtained the following data using ordinary spirit levelling method
 - Elevation of Bench Mark (BM) =1154.321 m asl
 - Staff reading on BM = 2.684 m
 - Staff reading on unknown elevation point B = 0.924 m
 - Staff reading on unknown elevation point E = -2.517m
 Determine the elevation of points B and E (5marks)

QUESTION FIVE

- i. Define *levelling* as used in engineering survey (2marks)
- ii. Define the following terminologies as used in engineering survey(MARKS 4)
 - a) Datum
 - b) Bench Mark (BM)
 - c) Turning Point (TP)
 - d) Interforesight(IFS)
- iii. With the aid of sketches, briefly explain how the ordinary spirit level is used in levelling survey (6marks)
- iv. The figure below shows a proposed construction site with four survey stations (A to D) marked with pegs. The pegs are to be used as Temporary Bench Marks (TBM) for the duration of the construction works. The elevation of peg A has already been established as 10,000m above sea level. Flying levelling was made around the site in order to establish the reduced levels of the pegs.

- Book the readings using height of collimation method and calculate the reduced levels (6marks)
- Carry out a check for arithmetic computations (1mark)
- Check also the accuracy work (1MARK)

