



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN
RENEWABLE ENERGY TECHNOLOGY AND MANAGMENT**

SECOND YEAR RESIT EXAMINATION 2020/21 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3224

COURSE TITLE: ENGINEERING SURVEYING

EXAM VENUE: STREAM: BSc REN TECH & MGT

DATE: ../11/2020 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 30 Marks

- a) Answer the following
 - i. Define what you understand by the term surveying as used in this unit **(2Marks)**
 - ii. Measurements in survey basically fall under four main categories. List these categories **(2Marks)**
- b) Briefly discuss how the following surveying instruments can be used in carrying out a survey field work **(15Marks)**
 - i. Measuring tape
 - ii. Clinometer
 - iii. Plumb bob
 - iv. Dumpy level
 - v. Surveyors compass
- c) The work of a surveyor consists of five phases. List these phases **(5Marks)**
- d) Clearly distinguish amongst accuracy, precision and error as used in surveying **(6Marks)**

QUESTION TWO 20 Marks

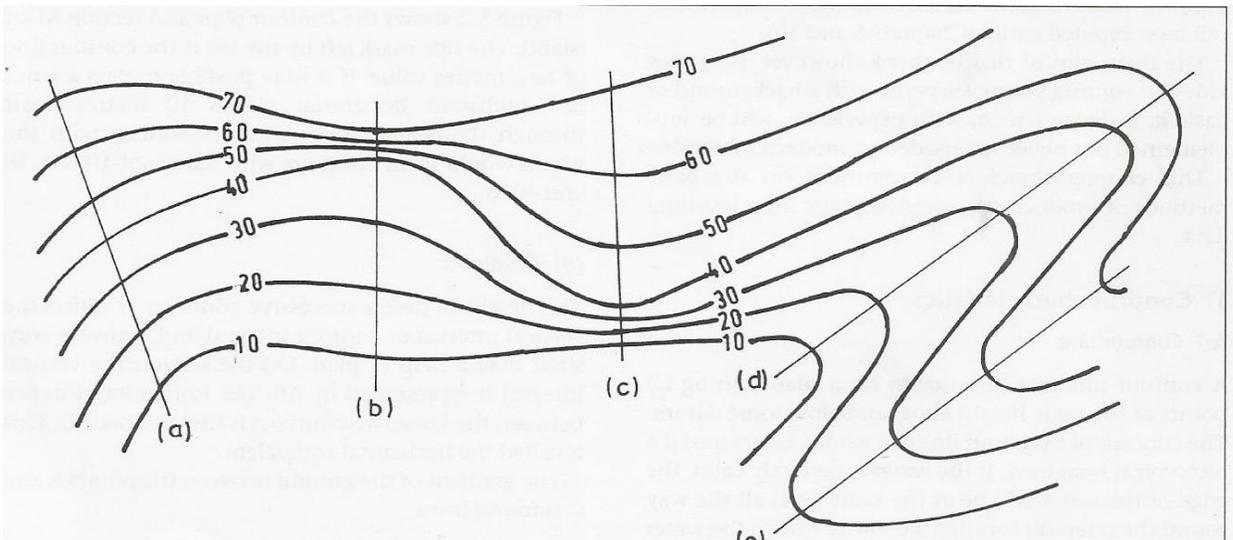
- a) Define the following terminologies as used in engineering survey **(6Marks)**
 - i. Datum
 - ii. Bench Mark
 - iii. Survey Station
- b) Briefly explain, **with the aide of sketches** how a level instrument is used in levelling survey **(6Marks)**
- c) In carrying out levelling work, errors are inevitable just like in any other survey work. Discuss ways in which such errors can be eliminated or minimized **(8Marks)**

QUESTION THREE 20 Marks

- 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 **(3 marks)**
 - b) Which of the three methods would you prefer for use in control survey? Give reasons to support your choice **(3marks)**
- ii. 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 sloppy ground for work requiring very high level of accuracy **(4 marks)**
 - b) Clearly outline the standard procedure of taping on a level /flat ground **(10marks)**

QUESTION FOUR 20 Marks

- a) A parcel of ground was measured on 1:250 scale map, using a planimeter and found to be 65.56 cm^2 . Calculate the ground area in hectares (**4Marks**)
- b) The following data was obtained from a topographical map
- The difference in elevation between two consecutive contours = 0.5 m and the average horizontal plan distance between any two contours = 20cm
 - The scale of the map was 1:100
- i. Determine the vertical interval for the map (**2Marks**)
- ii. Compute the average percentage slope for the area presented on the map (**4Marks**)
- c) The figure below shows a set of contours in a site plan.



Explain the topographical features portrayed by the sections marked by the following letters (a), (b), (c), (d), (e) (**10Marks**)

QUESTION FIVE 20 Marks

In a field practical exercise, students of JOOUST undertaking a course in Construction Management obtained the data given in the table below. The work started at a Bench Mark on a culvert near the gate and was closed on a Bench Mark near the sewerage treatment works. The position of the instrument was changed along the way whenever necessary as the work proceeded.

Staff reading	Remarks	
1.289	On Bench Mark with reduced level 110.941 m asl	
0.488	Reading on intermediate station	
0.853	Reading on intermediate station	
0.448	Forward reading on first change point	
2.829	Back reading on first change point	
2.012	Reading on intermediate station	
0.945	Reading on intermediate station	
0.756	Reading on intermediate station	
0.994	Forward reading on second change point	
1.670	Back reading on second change point	
2.652	Reading on intermediate station	
0.640	Reading on intermediate station	
3.152	Reading on last station	
2.371	Reading on nearby Bench Mark, RL =112.912 m asl	

- Using any of the two common booking methods, enter the data and compute the reduced levels of all the stations **(15 Marks)**
- Carry out check on the arithmetic work **(3Marks)**
- Compute closing error if any **(2Marks)**