



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF ENGINEERING AND TECHNOLOGY
UNIVERSITY EXAMINATIONS FOR THE DEGREE OF SCIENCE IN:
BUILDING CONSTRUCTION AND MANAGEMENT
2ND YEAR 1ST SEMESTER 2015/2016 ACADEMIC YEAR
CENTRE: MAIN CAMPUS

COURSE CODE: TCM 3217

COURSE TITLE: ENGINEERING SURVEYING I

EXAM VENUE: W/S

STREAM: BSc IN CONSTRUCTION

DATE: 26/4/16

EXAM SESSION: 2.00 – 4.00 PM

TIME: 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 **(6 Marks)**
- ii. Four principles of conducting survey work were discussed in class. Name these principles. **(4 Marks)**
- iii. During the measurement in Catenary of a survey line of four bays the following information was obtained.

Bay	length (m)	Temp. (°C)	Difference in level Between ends (m)	Tension (N)
1	29.899	18.0	+0.064	178
2	29.901	18.0	+0.374	178
3	29.882	18.1	-0.232	178
4	29.950	17.9	+0.238	178

The tape has a mass of 0.029kg/m and across sectional area of 3.24 mm². It was standardized on the flat at 20° C under a pull of 89N, the coefficient of linear expansion for the material of the tape is 0.000011/°C, and Young's modulus is 20.7x10⁴ MN/m². The mean level of the line is 26.89 m above mean sea level. Carrying out tension and sag corrections, determine the length of the survey.

(20 Marks)

QUESTION TWO

- i. All methods of survey involve measurements of angles and distances in the horizontal and vertical planes. The locations of points in these planes 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 **(3 Marks)**
 - b) Briefly describe each of the methods listed in (a) above making use of diagrams also to illustrate your answer **(12 Marks)**
- ii. Describe the trigonometric method of measuring linear distances along the vertical plane **(5 Marks)**

QUESTION THREE

- a. Linear measurements in survey refer to measuring horizontal distances between any two survey stations. In the process of carrying out line measurements using a chain obstacles often occur. Describe two types of obstacles that are prevalent in chain surveying and how they can be managed. **(10 Marks)**
- b. A surveyor and an assistant are available to undertake linear measurements between two survey stations A and B which are very far apart and not inter-visible using a chain.
- i) Describe how a straight line will be ranged between the two stations A and B. **(5 marks)**
- ii) A survey line AB is obstructed by a high building. To prolong the line beyond the building, a perpendicular BC 121.92 m long is set at B . From C two lines CD and CE are set out at angles of 30° and 40° with CB respectively. Determine the lengths CD and CE so that D and E may be on the prolongation of AB . If the chainage of B is 95.10 m find the chainage of D . Draw a sketch showing all the points. **(5 Marks).**

QUESTION FOUR

- i. Briefly explain, using sketches also how temporary adjustment is carried out in an ordinary spirit level. **(6 Marks)**
- ii. Book and reduce the following levels the first number in a pair of levels at a change point being a back sight.

1.632		Point A, RL 54.173 m
3.467	1.124	Change point
	0.568	point X
1.835	0.381	Change Point
	- 2.473	Point Y
1.732	3.941	Change Point
	2.484	Point B, RL 54.893 m

Apply suitable corrections so that the specified level of B is attained and hence determine the difference in level between X and Y. **(14 Marks)**

QUESTION FIVE

- i. Discuss the following corrections as applied to linear tape measurements:
 - a. Correction for scale
 - b. Variation of temperature
 - c. Variation in temperature
 - d. Correction for sag **(10 Marks)**
- ii. A base line known to be precisely 100m long was measured with a nominal 20m tape. The observed length of the base was found to be 99.925m. What is the actual length of the tape? **(5 Marks)**
- iii. The tape above was used in the measurements to provide calculated area of 3.162 ha. What is the true area? **(5 Marks)**