W1-2-60-1-6
JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
UNIVERSITY EXAMINATIONS 2012/2013
SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECE 2202: SURVEYING 1

<u>**DATE: AUGUST 2012**</u>   <u>**TIME: 2 HOURS**</u>

INSTRUCTIONS: ANSWER **ONE** QUESTION FROM EACH SECTION

SECTION A

QUESTION ONE

1.   Outline the following terms;

     a.   Level line

     b.   Horizontal line

     c.   Back sight

     d.   Foresight

     e.   Intersight

     f.   Line of collimation

     g.   Zero error

     h.   Check

     i.   Benchmark   [18 marks]

2.   Outline four branches of land surveying.   [10 marks]

3.   Distinguish between geodetic and plane surveys.   [4 marks]

4.   Explain how you would measure a distance which is longer that the chain being used. [8 marks]

QUESTION TWO

a.   Define surveying and outline its major branches.   [8 marks]

b.   Outline three types of errors in surveying.   [6 marks]

c.   Outline the following methods of picking details in chain surveying;

     i.   Offset method

     ii.   Intersection

     iii.   Radiation

     iv.   Tie-lines   [6 marks]

d.   List any four components of a plane table.   [2 marks]

e.   Using a suitable well labeled diagram, describe a horizontal line. [2 marks]

f.   briefly describe three major categories of sources error in leveling. [6 marks]

g.   A level set up at C in a position 30m from a staff held at A and 60m from a staff held at B gave readings of 1.914m and 2.237m respectively. The bubble having been brought to the centre of its run before each reading. The level was then taken to D, 30m from B and 60m from A, and staff readings of 1.874 and 2.141 respectively were obtained at A and B. the level stations and staff stations lay in a straight line.

     i.   Determine the collimation error of the level.   [6 marks]

     ii.   The corrected difference in level between A and B.   [2 marks]

     iii.   The staff readings obtained from D when the instrument has been placed in adjustment.

                                                                         [2 marks]

SECTION B

QUESTION ONE

a.   What is plane table surveying?   [2 marks]

b.   A theodolite having constant of 98 and 2 was correctly centered and leveled above a point Q and the following readings taken to a leveling staff held vertically at the points P and R in turn. The RL of point p was 77.76m

Staff position	Staff reading (m)	Vertical angle
P	2.806, 2.213, 1.616	-06^0 24$'$
R	2.148, 1.803, 1.462	+08^0 30$'$

Calculate the reduced level of point R.   [8 marks]

c.   Five bays of a line AB were measured under a tension of 54N and the following data recorded

Length of span (m)	Rise between ends of span (m)
29.149	0.027
29.944	0.196
29.474	0.126
29.514	0.055
29.690	0.336

Field temperature = 10^{0}C

The tape was standardized on the flat under a pull of 89N and at a temperature of 20^{0}C. the tape details are; coefficient of thermal expansion is 0.000011/^{0}C young's modulus 207KN/mm^2; density 7700 kgm^{-3}; cross sectional area = 6mm^2; density 7700 kgm^{-3}, cross sectional area = 6mm^2. How long is the line AB.   [10 marks]

QUESTION TWO

a.   Explain usage of Pythagoras's theorem and isosceles triangle in establishment of right angles in the field.   [5 marks]

b.   Discuss three categories of obstacles in chain surveying. In your discussion, using examples, demonstrate how you overcome them.   [15 marks]

SECTION C

QUESTION ONE

a.   Outline four applications of leveling.   [5 marks]

b.   The diagram below shows staff readings along a leveling leg. The reduced level of BM is 98.760m. Compute the reduced levels of points A to G using both Rise and Fall, and Height of collimation methods.   [15 marks]

QUESTION TWO

A 30m tape weighing 0.55kg and with a cross-sectional area of $0.02cm^2$ was standardized and found to be 30.005m at 20^0C, with 5kg tension and supported at the 0m and 30m points. The tape was used to measure a distance at sea level, in three sections, over a terrain of 5% slope. The temperature was constant at 30^0C, and a tension of 5kg was applied to each tape length. The observed distances were 30.000m, 30.00m and 29.500m. Calculate the distance to be plotted given that the coefficient of expansion of the tape material is $0.0000116m/^0C$.   [20 marks]

QUESTION THREE

a.   Discuss what you understand by the term contours highlighting their importance. [3marks]

b.   Contouring is one of the applications of leveling; discuss using appropriate diagrams three main ways in which contouring can be accomplished.   [12 marks]

c.   Discuss a two peg test.   [5 marks]