TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR DECREE IN:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE 13S)

ECE 2211: SURVEYING II

END OF SEMESTER EXAMINATION
SERIES: APRIL 2015
TIME ALLOWED: 2 HOURS

<u>**Instructions to Candidates:**</u>
You should have the following for this examination
- *Answer Booklet*
- *Pocket Calculator*

This paper consists of **FOUR** questions. Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
Use neat, large and well labeled diagrams where required
This paper consists of **THREE** printed pages

Question One

a) Differentiate between:
   (i) Face left and face right
   (ii) Lining in and balancing in   **(4 marks)**

b) State the main classification of a theodolite   **(4 marks)**

c) Find out to which vertical angle in stadia work a sloping distance may be assumed to be horizontal so that the error may not exceed 1 in 300? The instrument is fitted with an anallactic lens and the staff is held vertical   **(5 marks)**

d) The following are the theodolite readings of the interior angles of a closed traverse ABCDE:

        A   95° 3' 20"
        B 120° 9' 40"
        C 118° 50' 00"
        D 89° 35' 20"
        E 116° 21" 00"

   Check and correct the angles   **(6 marks)**

e) Define Tacheometer hence state its essential characteristics   **(7 marks)**

f) Using a very simple form of illustration state the stadia principle   **(4 marks)**

Question Two

A simple four-sided closed traverse has the following internal angles:

    A   101° 30'
    B   95° 30'
    C   60° 00'
    D   103° 00'

Lengths of sides of the traverse are:

    AB   65m
    BC   110m
    CD   985m
    DE   70m

The whole circle bearing of line AB is 154° 30'
a) Check and adjust the angles if necessary
b) Determine the reduced bearings of the sides of the traverse
c) Calculate the coordinates required for plotting the survey   **(20 marks)**

Question Three

a) Proof D = CS + K   **(8 marks)**

b) A theodolite with a anallatic lens and a multiplying constant of 100 is set up at station A, B and C in turn and the following information recorded:

Inst stn	Staff stn	Ht.of Inst	Vertical angle	Stadia readings	Mid readings	Bearing
A	B	1.47	+4° 30'	1.83 1.01	1.42	10°
B	C	1.51	-1° 30'	3.13 2.11	1.62	56°
C	D	1.60	+3° 30'	3.01 2.41	2.72	95°

With the instrument at station A the telescope is first mode horizontal and sighted on to a leveling staff hold on an 0.13m of 20.0m and a reading of 2.92m obtained. Calculate the horizontal distance between AB, BC and CD and eh reduced level at each station. **(12 marks)**

Question Four

a) A theodolite with only central diaphragm lines is used for tacheomertical purpose. The following area readings taken on a vertical leveling staff:

Vertical Angle	Staff Readings
+3° 00'	0.82m
+5° 30'	2.76m

The collimation height of the instrument is 27.84m. Calculate the horizontal distance from the instrument to the staff and the reduced level of the ground at the foot of the staff. **(8 marks)**

b) Briefly elaborate:
   (i) Traverse triangulation
   (ii) Intersection
   (iii) Resection **(6 marks)**

c) State the errors that arise from imperfect adjustment of a theodolite **(6 marks)**

Question Five

a) A leveling staff is held vertical at distances of 100m and 300m from the axis of a tacheometer and the staff intercept for horizontal sights are 0.99m and 3.00m respectively. Find the constants of the instrument. The instrument is set up at station A and the staff is held vertical at a point B. With the telescope inclined at an angle of depression of 10o to the horizontal the readings on the staff are 2.670, 1.835, 1.000m. Calculate the R.L of B and its horizontal distance from A. The H.I is 1.42m and R.L is 450.5m **(10 marks)**

b) Compare the method of repetition and reiteration hence give the advantages of each method **(10 marks)**