TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BSC IN CIVIL ENGINEERING

ECE 2211 : ENGINEERING SURVEYING II

END OF SEMESTER EXAMINATION

SERIES:APRIL2016

TIME:2HOURS

DATE:16May2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID

This paper consists of five questions.

Attemptquestion ONE (Compulsory) and any other TWO questions.

QUESTION ONE

i. State and briefly explain the classification of a theodolite **(6marks)**

ii. Define the following terms as used in tachometry

a) Transit

b) Vertical axis

c) Line of collimation

d) Lining in

e) Swinging the telescope **(10marks)**

iii. The sources of error in angular measurement may arise from imperfections in the adjustment and construction of the theododlite. State and briefly elaborate them. **(4marks)**

iv. Define the term plane table and state its advantage in surveying **(6marks)**

v. A stadia tube is 300mm long and has upper and lower stadia lines 100mm apart, when sighted on to a vertical leveling staff. The upper stadia reading was 2.5m and the lower stadia reading 1.5m. calculate the distance from the eye piece to the staff **(4Marks)**

QUESTION TWO

i. There are three methods of measuring distances by optical means in tacheometry State and briefly explain them **(8marks)**

ii. Derive the following expression for the distance D from the vertical axis of the instrument to the leveling staff D= CS+K **(12marks)**

QUESTION THREE

i) A theodolite with an anallactic 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.	Vert. Angle	Stadia Reading		Mid Reading	Bearing
A	B	1.47	+4° 30’	1.83	1.01	1.42	10°
B	C	1.57	-1° 30’	3.13	2.11	2.62	56°
C	D	1.60	+3° 30’	3.01	2.41	2.71	95°

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

ii) A leveling staff is held vertically at a distance of 100m and 300m from the axis of a tachometer and the staff intercept for horizontal sight are 0.99mand 3.00m **(8Marks)**

QUESTION FOUR

i. The collimation height of the horizontal telescope of a transit theodolite is 6.7m. When sighted on to a vertical leveling staff the horizontal centre line reads 1.42m and the upper and lower stadia lines read 1.86m and 0.98m, respectively.

Calculate

a) The distance from the theodolite to the stadia

b) The reduced level at the staff station. **(8marks)**

ii. State the construction details of a theodolite **(6 Marks)**

iii. Using a detailed illustration show a stadia principle in its simplest form **(6 Marks)**

QUESTION FIVE

i. State the advantages and disadvantages of plane tabling survey. **(10marks)**

ii. Two sets of tachometric readings were taken from an instrument station A (R.L = 100.00m) to a staff station B as shown bellow

Instrument	Inst. Stn.	Staff. Stn.	Vertical Angle	Stadia readings
P	A	B	5° 44’	1.090, 1.440, 1.795
Q	A	B	5° 44’	?

Determine

a) The distance between instrument station and staff station.

b) The reduced level of staff station B

c) Stadia readings with instrument Q **(10Marks)**