THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

CERTIFICATE IN BUILDING & CIVIL ENGINEERING (CTI)

EBC 1116: LEVELING SURVEY

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One

With the aid of sketches, describe the following techniques in chain surveying.
    (i)   Measuring a line longer than a tape length by ranging
    (ii)   Measuring a line over a small hill by the random line method
    (iii)   Measuring a line across a tall building.   **(20 marks)**

Question Two

a) Differentiate between engineering surveying and cadastral surveying.   **(4 marks)**

b) Define the following terms:
    (i)   Perpendicular offsets
    (ii)   Oblique offsets
    (iii)   Chainage   **(3 marks)**

c) With the aid of a sketch, describe the step chaining technique.   **(5 marks)**

d) (i) List any **THREE** of the following:
    -   Errors in chain surveying
    -   Obstacles in chain surveying   **(3 marks)**

    (ii) With the aid of a sketch, explain the procedure of measuring a line across a marshy ground.
         (5 marks)

Question Three

a) The following readings were taken in series during a leveling exercise with the underling readings being back sights:

    1.650, 2.450, 1.731, 1.897, 2.000, <u>1.580</u>, 3.610, 2.100, <u>2.689</u>, 1.680, 1.690, 2.710, 1.720, <u>3.058</u>, 2.550, 2.107, 0.970, 0.500, 1.670, 2.450, <u>1.817</u>, 1.801, 2.010 and 2.980 all in metres. Given the reduced level of the first point as 88.00m, reduced the levels by the rise and fail method, applying all the necessary arithmetical checks.   **(20 marks)**

Question Four

a) Explain the following temporary adjustment of a dumpy level
    -   Setting up the tripod stand
    -   Leveling (centering the tube bubble)
    -   Focusing and elimination of parallex   **(12 marks)**

b) In order to test a tilting level for collimation error, the level was set up mid way between two point P and Q 60m apart. After careful leveling staff readings of 2.950m and 1.650m were obtained at P and Q respectively. The level was then shifted to another point R and staff readings of 3.850m and 1.950m obtained at P and Q.
    (i)   Calculate the amount and direction of the collimation error

(ii)   Calculate the true readings at P and Q from R

(iii)   Explain the adjustment procedure of the level for the collimation error   **(8 marks)**

Question Five

a) State any **THREE** uses of a contour map.   **(3 marks)**

b) State any **FIVE** characteristics of contour lines.   **(5 marks)**

c) Given the reduced level of two points A and B, 30m apart as 48.00m and 62.00m respectively, calculate the position of the 55m contour point between the given levels.   **(2 marks)**

d) With the aid of a sketch, describe the grid method of contouring.   **(10 marks)**