**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF BUILT ENVIRONMENT**

**DEPARTMENT OF QUANTITY SURVEYING**

**PART I SECOND SEMESTER EXAMINATIONS – JUNE 2011**

**ENGINEERING SURVEYING – AQS1208**

Time: 3 hours                                                    Total Marks: 100

**INSTRUCTIONS:**

Answer all questions. All questions carry equal marks.

**Requirements**

A non-programmable calculator

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**Question One**

a)      Define the following terms as they are used in surveying:-

      i)       Surveying                                                           (1 mark)

      ii)      Plane survey                                                      (1 mark)

      iii)     Control point                                                     (1 mark)

b)      Describe fully the following types of survey:-

      i)       Deformation survey                                          (2 marks)

      ii)      Engineering survey                                           (2 marks)

      iii)     Topographic survey                                          (2 marks)

c)      List two objectives of a survey.                              (1 mark)

d)      Enumerate the corrections to be applied to measured lengths     (10 marks)

## Question Two

The following observations were taken during a tacheometrical survey using stadia lines of a theodolite (multiplying constant 100, no additive constant).

| At B | Horizontal circle | vert-circle | U | M | L |
|------|------------------|-------------|---|---|---|
| To A | $26^0 36'$ | $+6^0 00'$ | 3,774 | 3,492 | 3,210 |
| To C | $173^0 36'$ | $-6^0 40'$ | 2,057 | 1,764 | 1,471 |

**Calculate**

a)     The horizontal length AB and BC

b)     The difference in level between A and C

c)     The horizontal length AC                                              (20 marks)


## Question Three

a)     Prove that the effects of collimation error in leveling can be eliminated by keeping the backsights and foresights of equal length.

b)     The following notes of a sectional leveling were taken along the line of a proposed road.

| B.S | I.S | F.S | R.L | M.D (m) | Remarks |
|-----|-----|-----|-----|---------|---------|
| 3,072 | | | +31,356 | | BM |
| | 1,389 | | | 0 | 1 |
| 0,441 | | | | 30 | 2 |
| 2,556 | | 0,123 | | 60 | 3 |
| | 1,569 | | | 90 | 4 |
| 3,792 | | 1,011 | | 120 | 5 |
| | | 1,761 | | 150 | 6 |

**Calculate** the reduced level at each station and the depth of cutting and filling necessary at each station to form an even gradient rising at 1 in 20 and starting at a level of 30,500m above datum at station 1.                                              (20 marks)

## Question Four

a) Describe in detail methods of controlling vertically during construction of a multi-storey building. (10 marks)

b) In deformation surveys it is very important to plan the survey. What are some of the most important considerations during the planning stage? (10 marks)

## Question Five
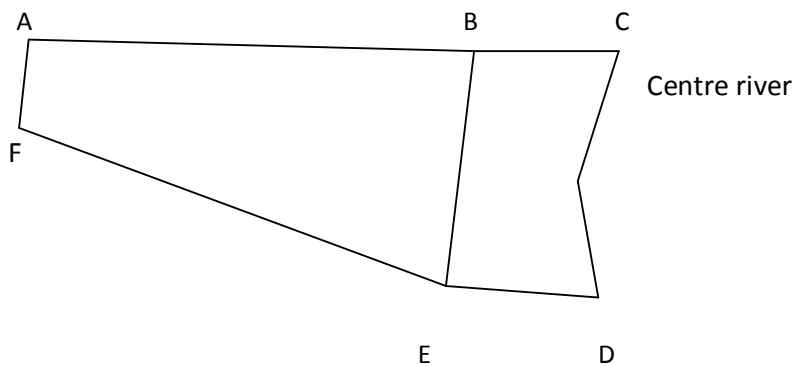


The above diagram is a farm A B C D E F and A. CD is an irregular boundary marked by the centre of the river. The co-ordinates of A, B, E and F are:-

| Point | Y(m) | X(m) |
|---|---|---|
| A | +1 047,25 | -219,36 |
| B | -  715,32 | -705,19 |
| E | -1 052,47 | +819,79 |
| F | +1 346,79 | +451,02 |

The irregular area along the river boundary is to be calculated using Simpson's Rule, from the following evenly spaced offsets (in meters) along BE:  10,5;  7,9;   8,4;  11,5;    12,4;  15,7;   21,9;   25,3;   23,4;   18,7 and 14,3.

**Calculate** the area of the farm in square metres. Carry out all the necessary checks.

(20 marks)