

7470 Digital processing and Survey Technology 2

CAMEROON GENERAL CERTIFICATE OF EDUCATION BOARD

Technical and Vocational Education Examination

JUNE XXXX

ADVANCED LEVEL

Specialty Name (Specialty Code)	SURVEYING - SURV(GTTO)
Subject Title	Digital processing and Survey Technology
Paper No.	2
Subject Code No.	7470

Three hours

INSTRUCTIONS TO CANDIDATES



You are reminded of the necessity for good English and orderly presentation in your answers.

You are advised to read carefully through the question paper, before you begin your answers.

Turn Over

Part one:

KNOWLEDGE AND COMPREHENSION

8 marks

NB: Answer all questions in this part

I. In Engineering surveying, what do the following terms mean?

- a) Set out
- b) Digital Terrain Model
- c) Differential levelling
- d) Horizontal curves
- e) Control networks

(2.5 marks)

II. a) By means of sketches and formulae, describe two ways of determining a horizontal distance on a sloping ground by means of a tape.

(2 marks)

b) Explain the difference between closed and open theodolite traverses.

(2 marks)

c) Comment also on their spheres of application and the various controls.

(1.5 marks)

Part two:

NUMERICAL APPLICATIONS

12 marks

NB: Answer two questions in this part

Question one

A 500 meters section of a road in a quarter in Bamenda is to be improved by regarding it to a constant gradient, rising towards point B, while the levels at A and B, remaining unchanged. From the following level book extract giving a longitudinal section of the existing road, you are required to:

- 1) Determine the natural ground heights at the various points. **(1 mark)**
- 2) What is the projected gradient of the new alignment? **(1 mark)**
- 3) Calculate the project heights at all the points. **(2 marks)**
- 4) Determine the maximum depth of cutting and embankment **(2 marks)**

Table 1

Back Sight(m)	Intermediate Sight(m)	Fore Sight(m)	Remark;Chainages
3.728			BM I;Height=89.170m
	3.542		0m, Point A
	3.109		50m
	2.606		100m
	2.524		150m
3.216		0.997	
	3.630		200
	2.161		250
3.417		0.920	
	2.374		300
3.356		0.238	
	2.768		350
	0.951		400
2.219		0.582	
	1.509		450
	1.920		500;Point B
		0.686	BM II ;Height=101.670m

Question two

Parcel EFGH shown in figure1 is to be partition from lot LB 11, in Ntah Tawah layout. This lot LB 11 is bounded by points E, F, J and I. The side EF is parallel to street 5. You are required to:

- 1) Compute the length of the line GH parallel to FE which will cut off 1245m² from lot LB 11. (2 marks)
- 2) Deduce the setting out distances EH and FG. (1 mark)
- 3) Calculate with control, the plane coordinates of G and H given that those of points A and F are in table 2. (3 marks)

Table 2

POINTS	X(easting),m	Y(Northing),m
E	626729.029	656633.869
F	626769.750	656644.738

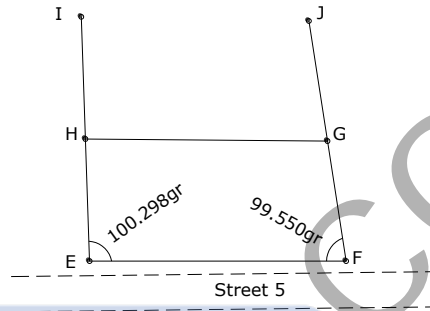


Figure 1

Question three

The proprietor of a proposed newly created Bilingual Nursery and Primary School needs an approval from the Ministry of Secondary Education for this establishment to go operational. He was required to present the plan of the proposed site and its surface area. It should be noted that the least surface area required is 2.5 hectares. It is bounded by points A,B,C D(see figure 2).In order to realize this project, the site was connected to two triangulation points P and Q, whose coordinates are presented in table 3 .The survey of the site was carried in a counter clockwise direction and the field notebook is presented in table 4.

Table 3

Point	X(easting),m	Y(Northing),m
Q	625803.923	657015.477
P	625744.544	656828.907

Table 4

Station	Point Sighted	Horizontal circle reading (gr)	Distance (m)
P	Q	152.218	
	A	256.987	102.61
A	P	184.680	
	B	319.110	108.48
B	A	352.783	
	C	89.492	103.86
C	B	276.386	
	Q	009.672	127.93
Q	C	109.196	
	P	200.002	

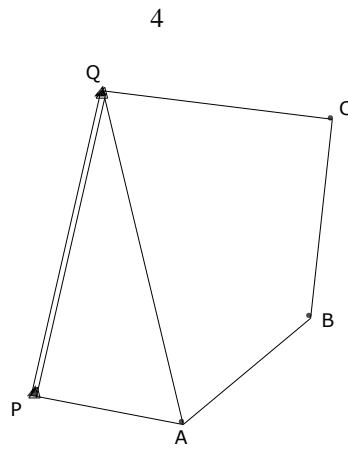


Figure 2

Work required

- 1) Reproduce the diagrammatic sketch of the traverse and highlight the measured angles and distances. **(1.5 marks)**
- 2) Deduce the plane coordinates of points A, B and C. **(3 marks)**
- 3) Determine the surface area occupied by the new establishment by any method of your choice. Is the area within the acceptable limit? **(1.5 marks)**