



UNIVERSITY OF MINES AND TECHNOLOGY, TARKWA

SECOND SEMESTER EXAMINATIONS, MAY 2018

COURSE NO: GM 370

COURSE NAME: COMPUTER APPLICATIONS

CLASS: GM III

TIME: 3 HOURS

Name: _____ Index Number: _____

ANSWER ONLY TWO QUESTIONS

Question1

A business entity wishes to modify one of its structures to serve a different purpose. Therefore a tacheometric survey was conducted to determine the elevations, the Eastings and Northings of all the three points. The following measurements taken at only one instrument station were recorded.

- staff readings: upper, middle and lower stadia hairs at each staff point,
- the instrument height, h_i ,
- horizontal angles with respect to the reference station at each staff point,
- vertical angles at each staff point.

Consider the following

- The bearing from the instrument station **A** to reference object **Q** is **Br1**.
- The Easting and Northing of the instrument station are **EA** and **NA** respectively.

Using the formulae below and any other relevant formulae, write **Excel relations** to *complete worksheet 1 and 2* in Tables 1 and 2.

Formulae:

$$HD = K * s * \cos^2 \theta + C * \cos \theta$$

$$V = 1/2 * K * s * \sin 2 * \theta + C * \sin \theta$$

$$RL = RL_x + h_i + V - M$$

Where

RL_x : reduce level of instrument station

K : the multiplying constant of the instrument, C : the additive constant of the instrument, usually 0, s : the difference between the two stadia hairs; **upper-lower**

θ : the vertical angle, h_i : the instrument height, and M : the middle staff reading

Table 1: Worksheet 1

	A	B	C	D	E	F	G	H	I
1		HCR			Computed bearing	Whole circle bearing	Whole circle bearing		
2	Staff point	D	M	D.DD	D.DD	D.DD	D	M	S
3	Q(RO)	0	0						
4	PT1	123	14	B4+C4/60	-----	=IF(E4>360,(E4-360),(E4))	-----	-----	-----
5	PT2	100	23	-----	-----	-----	-----	=INT((F5-G5)*60)	-----
6	PT3	79	45	-----	=D6+Br1	-----	=INT(F4)	-----	
9	Q(RO)	0	0						

[10 marks]

Table 2: Worksheet 2

	A	B	C	D	E	F	G	H	I	J	K	L	M
11	staff readings			Vertical angle									
12	U	M	L	D	M	D.DD	RADS	HD	V	V-M	RL	E	N
13													
14						-----	-----	---	---	-----	-----	-----	-----
15						=D15+E15/60	-----	---	---	-----	-----	-----	-----
16						-----	-----	---	---	-----	---	-----	-----

[10 marks]

Question 2

a) Describe how you will use ArcGIS to prepare a cadastral plan. In your description ensure that you provide details about the following:

- i) How you will set up the units for the cadastral plan,
- ii) How you will plot the initial controls and survey line,
- iii) The tools and menus you will use to plot the traverse and adjust it and label all survey lines,
- iv) How you will prepare layout which includes the legend, north arrow, scale and grids.

[12 marks]

b) State and describe the three (3) main stages in digital topographic map construction [8 marks]

Question 3

- a) The data in Table 3 was obtained in a closed loop traverse. Use the table to answer the following:
- Create a traverse table and compute the traverse manually showing the departures, latitudes and their corrections, final coordinates of stations and precision of the survey.
 - Create a traverse table showing all the formulas you will apply during the calculations if you were to use **MS excel** worksheet **instead of manual calculations**.
 - Provide a step by step description of the procedure you will use in MS Excel to calculate the departures, latitudes and their corrections, the coordinates of the traverse stations and the precision of the Survey.

The initial coordinate of traverse station A: Y=15000 m, X=20000 m.

Table 3: Traverse for cocoa farm

Line (at—to)		Hor. dist. (m)	Bearing (β) ° ' "
A			
	E	350.10	152 46 12
E			
	D	579.03	64 50 54
D			
	C	368.28	001 10 06
C			
	B	382.20	262 08 48
B			
	A	401.58	231 22 00
Σ			

[15 marks]

- b) List five items required to be provided when submitting cadastral plan to the Director of Surveys (Regional Surveyor) for approval.

[5 marks]

Examiner: Dr. Michael S. Aduah