



UNIVERSITY OF MINES AND TECHNOLOGY (UMaT), TARKWA

SECOND SEMESTER EXAMINATIONS, APR/MAY 2019

COURSE NO: GL/MN/ES 262
COURSE NAME: LAND SURVEYING
CLASS: GL/MN/ES II **TIME:** 3 HOURS

Name: _____ Index Number: _____

Section A: Answer All. This must be done on the question paper and submitted within the first 1.5 hours. Be sure to write your index number on it. **Fill in the Blank Space(s) OR Write TRUE or FALSE OR UNDERLINE the right answer** from the options provided for each question. A correct answer attracts 2 mark. Write the correct answer besides the question if it is not among the options provided.

1. With reference to the tacheometric survey data in Table 2, the slope distance D_{AB} will be.....
2. If the traverse at Table 3 was observed in May 2009, and the magnetic declination at that time was 5.0° E, varying at 1° per year westwards, then the magnetic bearing of line BC at May 2019, will be.....
3. With respect to the levelling survey data in Table 4, the height difference between points B and D will be.....
4. Based on the levelling survey data in Table 4, the total error in the height measurements will be
5. As shown on Table 1, the correction that should be applied to the observed angle at point A (assuming the same error for each angle) will be
6. Distance D_{AB} , was measured using EDM. The values for f , λ , t_1 and t_2 of the wave used for the measurement are 10.2 MHz, 30 m, $9\text{h}:22\text{m}:32.05 \times 10^{-7}\text{s}$ and $9\text{h}:22\text{m}:32.25 \times 10^{-7}\text{s}$ respectively. (Symbols have their usual meanings). Distance D_{AB} will be equal to:
.....
7. The whole circle bearing of the line connecting points A and C of Table 3 is
8. The departure and latitude of line AB of the traverse at Table 3 are
..... andrespectively.
9. The main reason for providing various checks on field measurements, booking, computations and plotting in land surveying is.....
.....
10. 'Control Points' are used in land surveying for initiating and closing field measurements, for coordinates computations and for accuracy assessment of new surveys.

- 11.** The basic survey instruments for measuring *coordinates, elevations, directions, and distances*, on the field, as done during the practicals, are respectively, the *GPS receiver, level, compass* and *tape*.
- 12.** One of the main reasons for stating the error limit or tolerance for a survey work or project is that it affords assessment of the accuracy of the work and a basis for accepting or rejecting it
- 13.** Cadastral, hydrographic and mining surveys are classifications based on:
(a) *the purpose of the survey*
(b) *instrument used*
(c) *method used*
(d) *the medium from/in which the measurement observations are made*
- 14.** In surveying, the lines, points or surfaces used as references for describing or stating the relative positions of objects are collectively referred to as:
(a) *bearings* (b) *datum* (c) *elevations* (d) *coordinates*
- 15.** The basic survey technique employed in GPS for position determination is:
(a) *triangulation* (b) *traversing* (c) *intersection* (d) *resection*

E. A. A. KWESI/

Section B (30 marks): Answer ONLY Two (2) questions. Question Q1 is COMPULSORY

Q1. Fill Table 5 regarding the land survey practicals done in the semester **(8 marks)**.

Q2.

- (a) Plot the profile of the survey at Table 4 (i.e. reduced level against chainage), using a suitable scale (e. g. horizontal scale of 1: 100 and a vertical scale of 1: 20) and indicating all the necessary map elements and labels. **(10 marks)**. Draw the design line through points A and E and indicate its gradient, and the areas of fill and cut on your plot **(4 marks)**.
- (b) Outline (list with brief explanations) the main or essential steps for a drainage design by land surveying methods as carried out by your group. **(8 marks)**.

Q3.

- (a) Plot the traverse at Table 3 using a suitable a scale (e. g. 1: 5,000), indicating all the necessary labels and the area (size) of the traverse on your plot. **(10 marks)**. If a straight road passes through the traverse at points A and C, plot it and indicate its length on the plan. **(4 marks)**.
- (b) Outline (list with brief explanations) the main or essential steps for farm compensation by land surveying methods as carried out by your group. **(8 marks)**.

EXAMINER: E. A. A. KWESI

DATA FOR SOME OF THE QUESTIONS IN SECTIONS A AND B

Table 2 Data for Tacheometric Survey, with instrument at point A and target at B

Instrument Height	Target Height	Vertical Angle	Lower Stadia	Middle Stadia	Upper Stadia	Reduced Level of point A	Reduced Level of point B
I	T	ϕ	L	M	U		
2.50 ft	3.50 ft	25.32°	3.154 ft	3.000 ft	4.686 ft	45.25 ft	?

NB: $H = Ks \cos^2 \phi + C \cos \phi$ and $V = (Ks \sin 2\phi)/2 + C \sin \phi$; $K=100.00$; $C=0.30$

Table 1. Theodolite Observations of Angles in a 5-sided Traverse

Station	Hor. Circle (Degrees)	Corrections To Apply	Adjusted Angles
A	116		
B	109		
C	101		
D	121		
E	97		

The Expected (true) value for the sum of internal angles of an n-sided polygon is $(n-2)180$

Table 3 Compass Traverse

Line	Bearings (degrees)	Distance (m)	ΔE_{ij} (m)	ΔN_{ij} (m)	Easting (m)	Northings (m)	Points
							A
AB	357.98	850.53			420	1300	B
BC	94.21	681.84			1100	1250	C
CD	173.29	855.86			1200	400	D
DE	272.86	400.50			800	420	E
EA	274.90	351.28			450	450	A

Table 4 Data for Levelling Survey

Back sight (ft)	Inter-sight (ft)	Fore-sight (ft)	Chainage (Dist.) (ft)	Rise and Fall (or HC) (ft)	Reduced Level at Terrain (ft)	Reduced Level at Design (ft)	Points
6.85			0.00		101.54	102.50	A = BM1 with RL = 101.54 (ft)
	5.5		25.00		102.89		B
	4.67		50.00		103.72		C
	5.09		75.00		103.3		D
		6.1	100.00		102.29	103.50	E = BM2 with RL = 103.15 (ft)

Table 5. Land Survey Practicals Done During Semester 1 of 2018/2019 Academic Year

SN	Name or Type of Survey	Quantities Measured on Field	Units	Set of Instruments Used	Products Derived or Processed from Field Measurements
1	Chain Surveying				
2	GPS Surveying				
3	Tacheometry				
4	EDM Surveying				
5	Compass Surveying				
6	Theodolite Surveying				
7	Level(ling) Surveying				