UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2009/2010

SUBJECT NAME	:	ENGINEERING GEOMATICS
SUBJECT CODE	:	BFC 2103
COURSE	:	2 BFF
EXAMINATION DATE	:	APRIL 2010
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER ONLY **FOUR (4)** QUESTIONS

THIS PAPER CONSISTS OF EIGHT (8) PAGES

Q1 (a) Give the exact definition of Geomatic. Discuss briefly the five (5) disciplines in Geomatic.

(10 marks)

(b) Briefly describe the type of errors in linear measurement and explain their source of error. What types of errors are classified as blunders and mistakes in linear measurement?

(10 marks)

(c) What is the significant difference between topographic survey and engineering survey in terms of their uses and scales.

(5 marks)

Q2 (a) What are the applications of leveling in civil engineering.

(4 marks)

(b) The following consecutive readings in meters were taken with a automatic level:

(0.795, 1.855, 3.190, 3.015, 0.655, 0.625, 0.955, 0.255, 1.635, 0.860, 2.375).

The level was shifted (move) after the fourth and eight readings. The first reading was taken on a benchmark whose Reduce Level (R.L) is 550.605 meters. Create a page of a level book and enter the readings. Calculate the reduced levels of a stations by the RISE and FALL Method and apply arithmetical checks.
Note : Use Form **Q2** to answer this question

(15 marks)

(c) In a two peg test of a automatic level, the following readings were taken:

(i) Instrument at B, midway between A and C where AB=BC

Staff reading on A = 1.726
Staff reading on C = 1.262

(ii) Instrument at D where CD = AB/10

Staff reading on A = 2.245
Staff reading on C = 1.745

Determine whether or not the instrument is in adjustment?

(6 marks)

Q3   (a)   Define the following:

(i) Close Traverse

(3 marks)

(ii) Open Traverse

(3 marks)

(b)   Table Q3 shows the final bearing and distance from second class field work book.

Table Q3 : Traverse bearing and distance

Line	Final Bearing	Final Distance (m)	Coordinates	
			North	East
			1234.50	6789.00
1 - 2	063°30'00"	63.264		
2 - 3	077°25'00"	75.119		
3 - 4	173°43'30"	82.147		
4 - 5	231°55'00"	87.273		
5 - 1	322°19'00"	114.829		

Note: Use Form **Q3** to answer this question.

Determine the following :

(i)   Linear Misclosure

(5 marks)

(ii)   Latitude and departure correction using Bowditch method

(5 marks)

(iii)   Coordinate for every stations

(5 marks)

(iv)   The traverse area using coordinate method

(4 marks)

Q4   (a)   Briefly explain the tacheometry systems below:

(i)   Optics tacheometry

(3 marks)

(ii)   EDM tacheometry

(3 marks)

(b)   Tacheometry survey using stadia technique was performed from station O.   Table Q4(a) shows all the observation data.

Table Q4(a) : Techeometry data

Station   : O
Instrument height   : 1.500 meter
Station reduced level   : 12.635 meter

Vertical Angle	Stadia			Notes
	Upper	Middle	Lower	
16°20'40"	2.120	1.435	0.750	To A
10°32'40"	3.050	1.837	0.625	To B

Based on this data, determine :

(i)   Horizontal distance for each observation point when the constant values (K) = 100 and (c) = 0.

(4 marks)

(ii)   Reduced level for every observation point.

(6 marks)

(c)   Table Q4(b) shows the data from tacheometry survey using total station.

Table Q4(b) : Tacheometry observations data

Fr. Stn	To Stn	R.L. Stn	Ins. Height	Bearing	Horz. Dist.	Prism Height	Diff. Height	Notes
1	2	8.940	1.543	00° 00'				
				72° 05'	21.333	1.350	0.250	A
				102°00'	18..490	1.350	-0.347	B
				102°00'	28.897	1.350	0.634	C

Calculate :

(i)   Reduced level for point A, B and C

(6 marks)

(ii)   Horizontal distance for AC

(3 marks)

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Q5   (a)   Table Q5(a) shows the area of contour lines from 100m to 140m. Based on this value determine the volume using trapezium and simpson method.

Table Q5(a) : Contour line and area

Contour line (m)	Area (m²)
100	3250
110	3101
120	2875
130	1337
140	571

(10 marks)

(b)   Figure Q5 shows all point observed using the levelling equipement with grid method. The reduced level values for each point are given in Table Q5(b). Each point will be dug to same level of 10 m above datum. Determine the mean value and volume using both methods.

(i)   Triangle method

(5 marks)

(ii)   Square method

(5 marks)

Table Q5(b) : Reduced level for each point

Point	Reduced level (m)
A	13.10
B	13.48
C	14.01
D	13.94
E	13.56
F	13.87
G	14.53
H	14.27

(c)   Define the algorithm to calculate the area for irregularly curved boundaries.

(5 marks)

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Form Q2

BS	IS	FS	Rise	Fall	Reduced Level	Correction	Adjusted Reduced Level	Remarks

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Form Q3

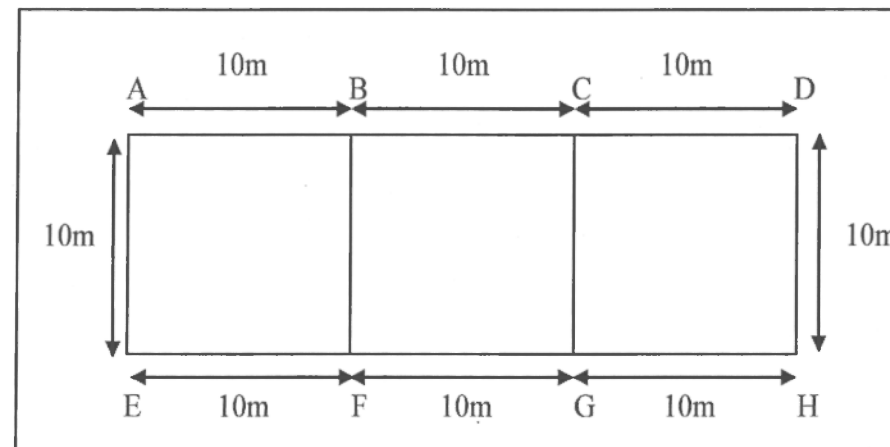| Stn	Bearing	Distance (Meters)	Latitude		Departure		Corrected		Coordinate	
			(+)	(-)	(+)	(-)	Latitude	Departure	N	E

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FIGURE Q5: Point observed using the levelling equipement with grid method