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**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER I  
SESSION 2019/2020**

**COURSE NAME** : GEOMATIC ENGINEERING  
TECHNOLOGY

**COURSE CODE** : BNP 21303

**PROGRAMME CODE** : BNA / BNB / BNC

**EXAMINATION DATE** : DECEMBER 2019 / JANUARY 2020

**DURATION** : 3 HOURS

**INSTRUCTION** : ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

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**Q1** Geomatics is an umbrella term for a cluster of activities and technologies dealing with the locations and identities of earth features.

- (a) List **THREE (3)** kind of errors in geomatic measurement. (3 marks)
- (b) Unmanned Aerial Vehicle (UAV Photogrammetry) is one part of the geomatic application to measure and mapping the earth surface. Classify briefly **SEVEN (7)** of UAV applications in Geomatic. (7 marks)
- (c) The objective of geomatic measurement is to make measurements that are both precise and accurate. Briefly explain the difference between accuracy and precision in surveying works. (6 marks)
- (d) A map and plan is a graphical representation of a portion and characteristics of the earth's surface. Differentiate between Geographic map and Topographic map. (4 marks)

**Q2** (a) Describe terms:

- (i) Level surface
- (ii) Rise and Fall
- (iii) Loop closure

(3 marks)

(b) For booking and reducing the levels of points, there are two systems, namely the height of collimation method and rise and fall method. Differentiate both methods based on the advantages and disadvantages. (5 marks)

(c) A page of level book is reproduced as shown in **Figure Q2(c)** in which some readings marked as (x), are missing. Calculate and complete the page with all arithmetic checks. (12 marks)

**Q3** (a) **Figure Q3(a)** shown the traverse line of AB with the length of 100.00 m and the bearing is N 42 30' E. Determine the coordinates of point B if, coordinates of point A is (200, 300). (3 marks)

(b) A series of traverse network for establishing horizontal control points had been done at project site. The data obtained from the survey are listed below at **Table Q3(b)**.

(i) Rewrite the complete value of a1, a2, a3, a4, a5, a6 (6 marks)

(ii) Calculate the bearing misclosure (2 marks)

(iii) Calculate the 'C' corrections (4 marks)



(iv) Calculate the definite bearings and distances according to second class traverse (2 marks)

(c) **Table Q3(c)** shows the observations of horizontal and bearing that were taken from station 2 and 3. Convert the quadrant bearing to the whole circle bearing. (3 marks)

**Q4** (a) Describe:  
(i) Electronic tacheometry  
(ii) Contour Interval (4 marks)

(b) Describe the concept of electronic techeometry with the aids of a sketch. (4 marks)

(c) A series of electronic tacheometry data is shown in **Table Q4(c)** in which some readings marked as (X) are missing. Calculate and complete the page with all checks. (12 marks)

**Q5** A road embankment is 30 meters wide at the top with side slope of 2 : 1 as shown in **Figure Q5**. The ground level at 100 meters intervals along line PQ are as 153.000 at P; 151.800; 151.200; 150.800; and 149.200 at Q.

The formation level (FL) at P is 161.400 m with a uniform falling gradient of 1 in 50 from P to Q. Calculate by Simpson formula, the volume of earth work in cubic meters, assuming the ground to be level in cross section. (20 marks)

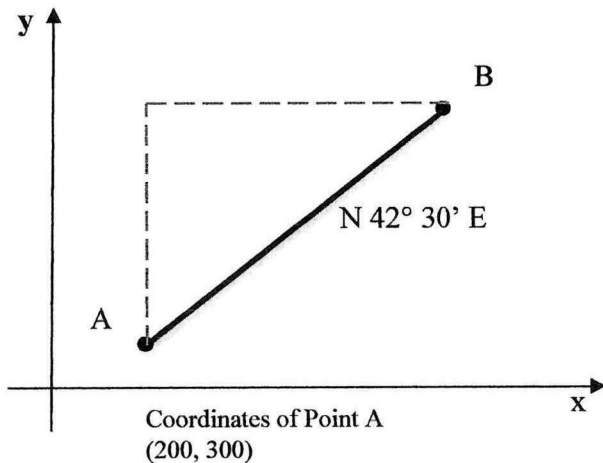
**-END OF QUESTIONS –**



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**Figure Q3(a)**

**Table Q3(c)**

Stn	Length (m)	Quadrant Bearings (QB)
2 - 1	110.000	S 55° 30' W
2 - 3	185.000	N 42° 40' E
3 - 4	130.000	N 31° 15' W

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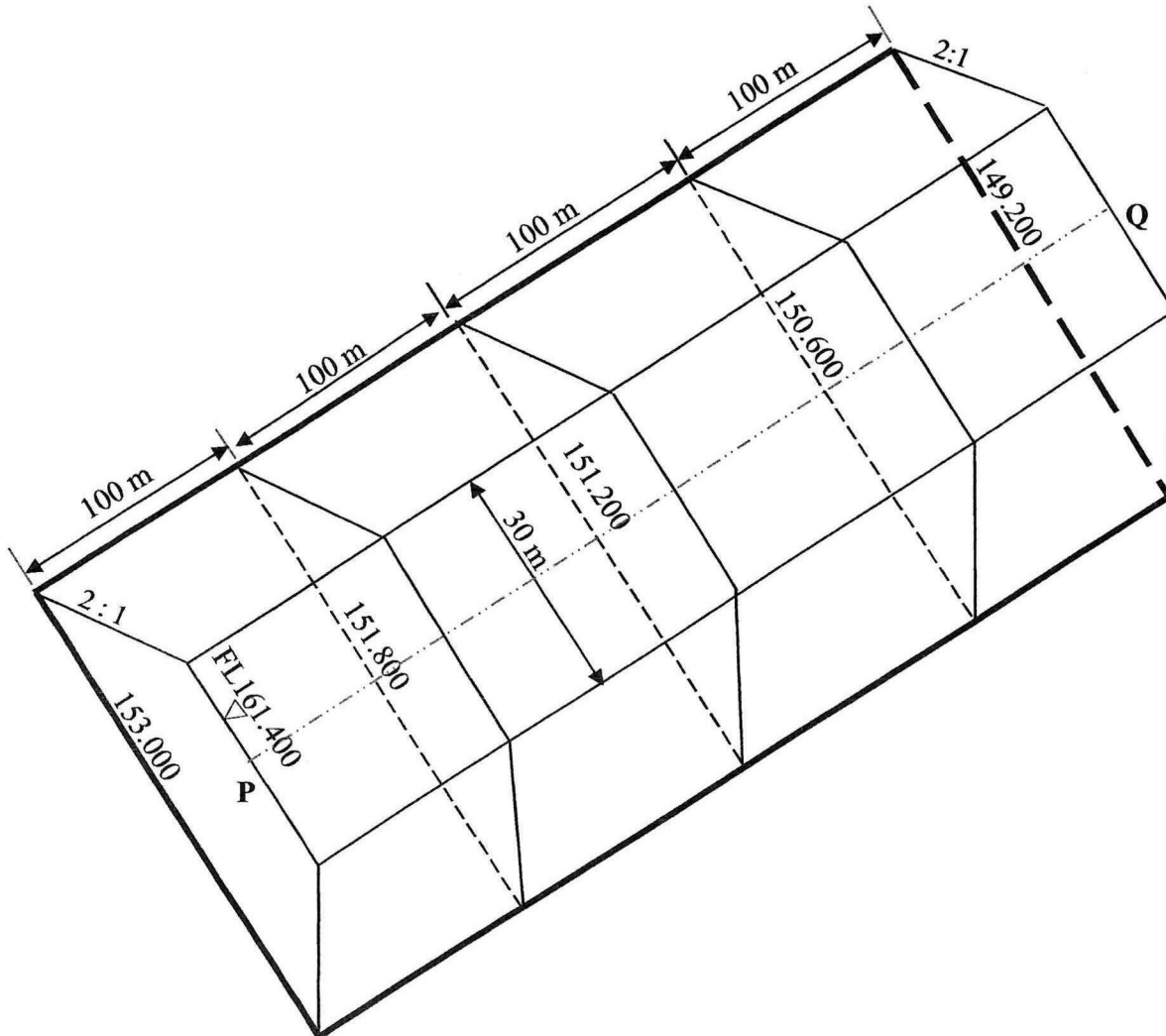


Figure Q5

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COURSE CODE : BNP 21303**Table Q2(c): Leveling Form**

BS	IS	FS	RISE	FALL	REDUCED LEVEL	CORRECTION	ADJUSTED RL	REMARKS
3.150					X			
1.770		X		0.700	X			Cp 1
	2.200			X	X			
X		1.850	X		X			Cp 2
	2.440			0.010	X			
X		X	1.100		X			Cp 3
1.185		2.010	X		222.200			Cp 4
	- 2.735		X		X			Inverted staff
X		1.685		4.420	X			Cp 5
		1.525		0.805	X			
Σ 12.055		X	X	X				

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**FINAL EXAMINATION**

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**Table Q3(b): Traverse Spreadsheet**

Stn	Bearing			Fr	Definite Bearing	To	Vertical angle	Distance	Definite Distance
	Face Left	Face Right	Average						
	Datum from	S20 – S21	116 19 00	S20		S21		40.894	
○									
S21	<i>a1</i>	<i>a2</i>	21 45 20	S20		3		34.934	
○S20								34.936	
3	21 45 20	<i>a3</i>							
S20	<i>a3</i>	21 45 20	114 04 40	3		4		48.015	
○3								48.016	
4	<i>a4</i>	294 04 40							
3	294 04 40	<i>a4</i>	<i>a5</i>	4		S21		36.954	
○4								36.953	
S21	213 00 40	33 00 20							
4	<i>a5</i>	213 00 30	<i>a6</i>	S21		S20		40.895	
○S21									
S20	296 19 00	116 19 20							

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**Table Q4(c): Tacheometry Form**

From Stn	To Stn	RL Stn	Inst. Height	Bearing	Horizontal Distance	Target Height	Vertical Distance	RL Point	Remarks
1	2	1.902	1.530			1.350	-0.347	X	P
						1.350	0.014	X	P
						X	0.115	1.997	TL
3	4	1.732	1.290			X	0.708	2.190	LP
						1.200	X	2.038	CD
						1.450	0.252	X	RD
						1.050	X	2.419	RD
						1.100	X	2.548	B1

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