Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2022/2023

COURSE NAME	:	GEOMATIC ENGINEERING
COURSE CODE	:	BFC 20703
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JULY / AUGUST 2023
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS.
		2. THIS FINAL EXAMINATION IS CONDUCTED VIA **CLOSED BOOK**.
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK.

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

Q1 (a) There are numerous factors that need to be considered during a taping (distance measurement using a tape) procedure. Lists any **FIVE (5)** factors and features should be considered during the process.

(5 marks)

(b) Describe how would you carry out a taping process to determine the length of 2 pegs on hilly slope approximately 60 m apart.

(10 marks)

(c) A map and plan is a graphical representation of a portion and characteristics of the earth's surface. Differentiate between map and plan.

(5 marks)

Q2 (a) Change point (CP) and staff was used to perform the levelling work from BM to TBM. Based on your experience during lab geomatics, list **5 (FIVE)** criteria that must be follows to reduce the error and obtains the high accuracy.

(5 marks)

(b) Differentiate the meaning 'absolute height' and 'relative height' to describe the position of two points.

(3 marks)

(c) The data from a levelling survey are shown in **Table Q2 (c)**. Use the Height of Collimation (HOC) method to calculate the data from TBM 11 (11.111 m) to TBM 13 (9.635 m). Calculate all reduce level and perform arithmetic checks to determine the accuracy acceptance.

(8 marks)

(d) Describes advantages and disadvantages between Height of Collimation (HOC) method and Rise-and-Fall method.

(4 marks)

Q3 **Table Q3** shows the adjusted latitude and departure for traverse line 1-2-3-4-5-1.

(i) Determine the coordinate for station 2,3,4 and 5.

(5 marks)

(ii) Find the area of traverse using coordinate method.

(3 marks)

(iii) Calculate the bearing and distance for all lines.

(10 marks)

(iv) Plot the orientation of traverse without scale.

(2 marks)

Q4 (a) State all the parameters in the following formula:

(i) $D = K\,s\,cos^2\,\theta + C\,cos\,\theta$

(ii) $RLa = RLb + Hi + V - ht$

(5 marks)

(b) List any **FIVE (5)** data needed to be collected during Electronic Tacheometric Surveying with the aid of a diagram.

(7 marks)

(c) A stadia tacheometric surveying has been conducted at Kampung Kechil. **Table Q4 (c)** shows the observation made in tacheometric survey work from station S3.

(i) Sketch the complete diagram for the survey work.

(2 marks)

(ii) Compute the vertical distances and reduced levels of point A1, A2 and A3.

(6 marks)

Q5 (a) **Figure Q5 (a)** shows a block of land and its dimensions, in meters. The block of land is bounded on one side by a river. Measurements are taken perpendicular to the line AB to the river, at equal intervals of 50 meter.

(i) Use Trapezoidal and Simpson's rule to find an approximation to the area of block of land.

(8 marks)

(ii) Determine estimation volumes of reclamation if the ground level needs to be raised to 1.5 meter height.

(2 marks)

(b) One circular curve with radius of 400 meter to be constructed to on new route projects. The chainage of intersection point is CH 171.574 meter and the deflection angle is 13°00'00". The curve will be marked at every offset of 25 meter. Calculate the setting out data required to staking the curve with offset method by tangential angles.

(10 marks)

- **END OF QUESTIONS** -

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Table Q2 (c): Levelling survey data

Back-Sight	Inter-mediate Sight	Fore-Sight	H O C	Reduce Level (meter)	Distance (meter)	Remark
1.321				*1.111*		*(TBM 11)*
2.100		*1.552*			*80*	*cp1*
	-0.311					*bridge*
1.423		*2.222*			*80*	*cp2*
	-3.782					*bridge*
	-2.672					*bridge*
3.024		*1.007*			*80*	*cp3*
	-1.711					*bridge*
		4.567			*80*	*(TBM 13)*

* Used your own table to complete this question

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Table Q3: Adjusted latitude and departure traverse data

Line	Adjusted Latitude		Adjusted Departure		Coordinates	
	N	S	E	W	N	E
1					***5110.500***	***1202.450***
2	*129.214*			*94.436*		
3		*21.962*		*180.601*		
4		*195.470*	*29.933*			
5		*30.551*	*139.080*			
1	*118.772*		*106.022*		***5110.500***	***1202.450***

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Table Q4 (c): Tacheometry survey work data

Instrument Station : S3 *RL of Station : 26.150 meter*						*Height of Instrument : 1.45 meter* *Height of Target : 1.40 meter*	
Horizontal Circle			***Vertical Circle***			***Slope Distance***	***Remarks***
°	'	"	°	'	"		
00	*00*	*00*					*S2 (Back bearing)*
39	*15*	*20*	*87*	*20*	*00*	*19.617*	*A1 (Lamp post)*
51	*23*	*40*	*88*	*00*	*20*	*22.133*	*A2 (Main hole)*
211	*34*	*40*	*91*	*00*	*30*	*15.132*	*A3 (Tree)*
00	*00*	*00*					*S2 (Back Bearing)*

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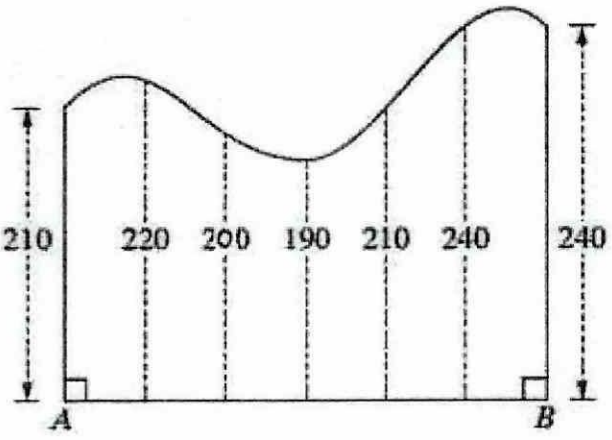

NOT TO SCALE

Figure Q5 (a) : A block of land and its dimensions