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Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
SEMESTER II  
SESSION 2023/2024**

COURSE NAME : GEOMATIC ENGINEERING

COURSE CODE : BFC 20703

PROGRAMME CODE : BFF

EXAMINATION DATE : JULY 2024

DURATION : 3 HOURS

INSTRUCTION : 1. ANSWER ALL QUESTIONS  
2. THIS FINAL EXAMINATION IS CONDUCTED VIA  
 Open book  
 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 FIVE (5) PAGES

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**Q1**

- (a) There are numerous factors that need to be considered during a taping (distance measurement using a tape) procedure. List 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 are a graphical representation of a portion and characteristics of the earth's surface. Differentiate between map and plan. (5 marks)

**Q2**

- (a) The data from a levelling survey are shown in **Table Q2.1**. 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)

**Table Q2.1** Levelling survey data

<b>Backsight</b>	<b>Intermediate Sight</b>	<b>Foresight</b>	<b>HoC</b>	<b>Reduce Level (m)</b>	<b>Distance (m)</b>	<b>Remark</b>
1.321				11.111		TBM 1
2.100		1.552			80	cp 1
	-0.311					bridge
1.423		2.222			80	cp 2
	-3.782					bridge
	-2.672					bridge
3.024		1.007			80	cp 3
	-1.711					Bridge
		4.567			80	TBM 3

\*Create your own table to complete this question

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- (b) Change point (CP) and staff was used to perform the levelling work from BM to TBM. Based on your experience during fieldwork, list **5 (FIVE)** criteria that must be follows to reduce the error and obtains the high accuracy. (5 marks)
- (c) Differentiate the meaning 'absolute height' and 'relative height' to describe the position of two points. (3 marks)
- (d) Describes advantages and disadvantages between Height of Collimation (HoC) method and Rise-and-Fall method. (4 marks)

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

**Table Q3.1** Adjusted latitude and departure traverse data

Line	Adjusted Latitude		Adjusted Departure		Coordinates	
	N	E	E	W	N	E
1					<b>5110.500</b>	<b>1202.450</b>
2	129.214			94.436		
3		21.962		180.601		
4		195.47	29.933			
5		30.551	139.08			
1	118.769		106.024		<b>5110.500</b>	<b>1202.450</b>

- (a) Determine the coordinate for station 2,3,4 and 5. (5 marks)
- (b) Find the area of traverse using coordinate method. (3 marks)
- (c) Calculate the bearing and distance for all lines. (10 marks)
- (d) Plot the orientation of traverse without scale. (2 marks)

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**Q4**

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

(i)  $D = KS \cos^2 \theta + C \cos \theta$

(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 Q4.1** shows the observation made in tacheometric survey work from station S3.

**Table Q4.1** Tacheometry survey work data

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

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

(2 marks)

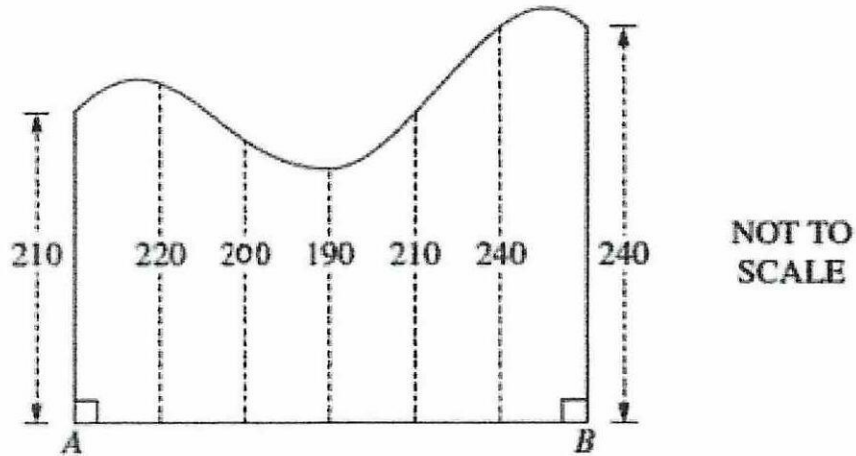
(ii) Compute the vertical distances and reduced levels of point A1, A2 and A3.

(6 marks)

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**Q5**

- (a) **Figure Q5.1** 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.



**Figure Q5.1** A block of land and its dimensions

- (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 project. The chainage of intersection point is CH 171.574 meter and the deflection angle is  $13^{\circ}00'00''$ . 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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