UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME	:	ENGINEERING GEOMATIC
COURSE CODE	:	BFC 20703
PROGRAMME CODE	:	BFF
EXAMINATION DATE	:	JANUARY / FEBRUARY 2022
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTIONS.
		2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **CLOSE BOOK**.

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

Q1   (a)   Illustrate with sketch the quadrant and full circle bearing.

(4 marks)

(b)   Demonstrate the procedures of temporary adjustment for Total Station instrument.

(4 marks)

(c)   Define correctly the following terms in Geomatics engineering.

(i)   Mean Sea Level
(ii)   Super Elevation
(iii)   Traverse datum
(iv)   Class of traverse survey

(8 marks)

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

(4 marks)

Q2   (a)   Change point (CP) and staff was used to perform the levelling work from BM to TBM. List **FIVE (5)** 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**. 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 formulae:

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

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

(5 marks)

   (b)   Draw a diagram and list any **FIVE (5)** data needed to be collected during Electronic Tacheometric Surveying.

(7 marks)

   (c)   A stadia tacheometric surveying has been conducted at Kampung Kechil. **Table Q4** 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)

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Q5   (a)   The **Figure Q5** 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: 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 N	Adjusted Latitude S	Adjusted Departure E	Adjusted Departure W	Coordinates N	Coordinates 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: Tacheometry survey work data

Instrument Station : S3							Height of Instrument : 1.45 meter
RL of Station : 26.150 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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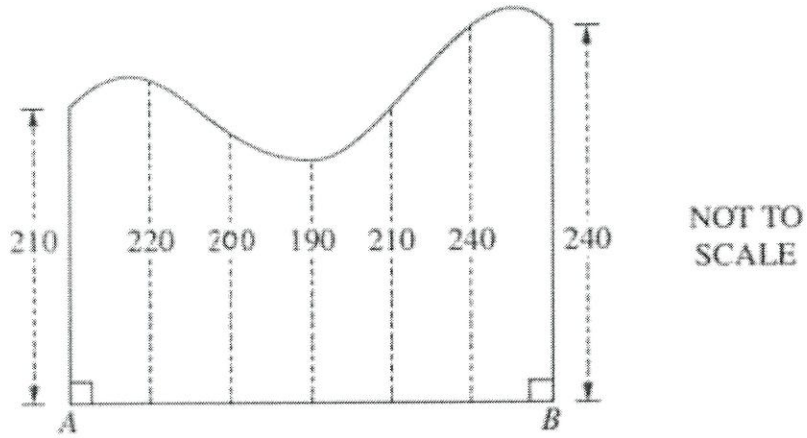| SEMESTER/SESSION	: SEM I 2021/2022	PROGRAMME CODE	: BFF
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Figure Q5: A block of land and its dimensions