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Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019**

COURSE NAME : GEOMATIC ENGINEERING
TECHNOLOGY

COURSE CODE : BNP 21303

PROGRAMME CODE : BNA / BNB / BNC

EXAMINATION DATE : JUNE / JULY 2019

DURATION : 3 HOURS

INSTRUCTION : ANSWERS ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF NINE (9) PAGES

TERBUKA

- 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 measurement in Geomatics survey. (3 marks)
 - (b) Classify briefly **FIVE (5)** Geomatic activities. (5 marks)
 - (c) Surveys can be classified as topographic, engineering and special surveys depending on their function or purposes. Briefly explain the difference between topographic and engineering survey in surveying works. (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** Leveling is a measurement process of the difference in height between two or more points.
- (a) Discuss **TWO (2)** important applications of leveling in constructions. (2 marks)
 - (b) When doing leveling jobs on fields sometimes the error will occur but this error can be reduced if practicing the correct procedure when doing the jobs. Suggest **FOUR (4)** basic rules of leveling to reduce the problem. (4 marks)
 - (c) An engineer conducts a leveling work for **TWO (2)** Temporary Bench Mark (TBM) as shown in **Figure Q2(c)**. Starting with TBM01 and finish at TBM02 with the TBM elevations given as 102.837m and 104.144m.
 - (i) Rewrite the leveling data using a Leveling Form in **Figure Q2(c)(i)** and calculate the reduced level points. (10 marks)
 - (ii) Perform the arithmetic check and misclosure check if the distance from TBM 01 to TBM 02 is 325.000 m. (4 marks)
- Q3**
- (a) There are several steps which should be followed and will lead to a smooth traversing work. Demonstrate the direct method of measuring horizontal bearing using a total station. (10 marks)
 - (b) In a case of closed traverse, some closing error is always found to exist while computing the latitude and departures of the traverse stations. A latitude and departure data of the traverse stations are given in **Table Q3(b)(i)**. Calculate the

adjusted latitude and departure using the Bowditch's rule with Coordinates Form (Table Q3(b)(ii)).

(6 marks)

Table Q3(b)(i)

Line	Distance	Latitude	Departure
S1 – S2	70.000	+ 21.500	- 65.450
S2 – S3	80.000	- 80.755	- 5.250
S3 – S4	43.000	- 41.000	+ 13.550
S4 – S5	38.000	- 14.250	+ 35.150
S5 – S1	115.000	+ 114.150	+ 22.315

(c) **Table Q3(c)** shows the observations of horizontal and bearing that were taken from station 2 and 3. Draw a sketch of this traverse legs without a scale.

(4 marks)

Table Q3(c)

Line	Length (m)	Bearings
2 - 1	125.000	S 60° 30' W
2 - 3	200.000	N 30° 30' E
3 - 4	150.000	N 50° 15' W

Q4 (a) Describe:

- (i) Electronic tacheometry
- (ii) Contour Interval
- (iii) Digital Terrain Model (DTM)

(6 marks)

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

(5 marks)

(c) A series of electronic tacheometry data is shown in **Table Q4(c)**. A total station was setup at Stn 1 and pole at Stn 2 and the reduced level of Stn 1 is 2.350m. Calculate the reduced level (RL) of all points.

(6 marks)

(d) A series of spot level are taken using automatic level and plotted in a grid form as shown in **Figure Q4(d)**. Draw a contour line of 97, 98 and 99 in the grid form.

(3 marks)

Q5 (a) Describe:

- (i) Haul
- (ii) Balance line

(4 marks)

- (b) Consider an excavation to be made for a reservoir of 40m long and 30m wide at the bottom as **Figure Q5(b)**. The side slope of the excavation has to be 2:1. Calculate the volume of the earth work using Prismoidal formula, if the depth of excavation is 5 m. (6 marks)
- (c) **Table Q5(c)** shows the perpendicular offsets taken from survey line to the lot boundary. Calculate the area between the survey line and the lot boundary by the Coordinate method. (10 marks)

Table Q5(c)

Chainage Distance (m)	0.00	5.50	12.70	25.50	40.50
Offset Distance (m)	5.25	6.50	4.75	5.20	4.20

-END OF QUESTIONS -

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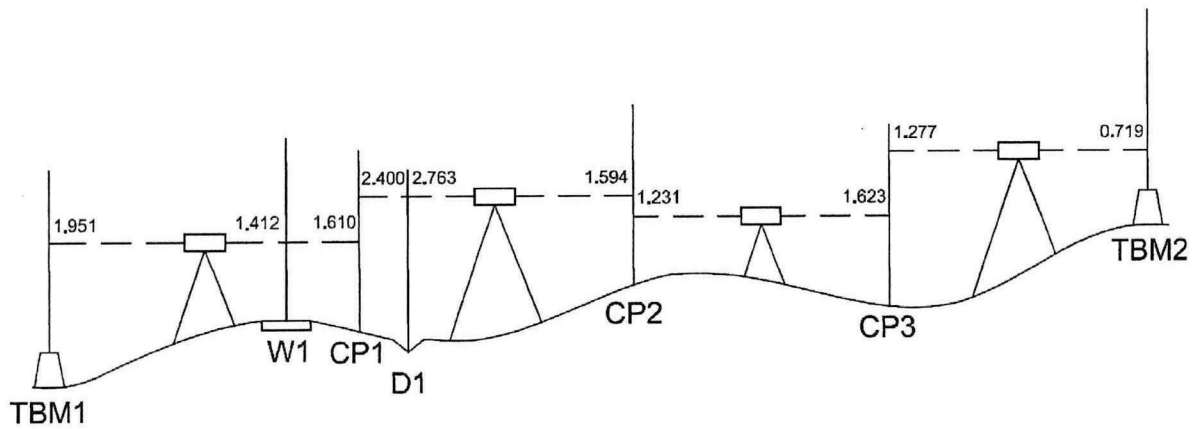


Figure Q2(c)

Table Q4(c)

From Stn	To Stn	Ins Height (HI)	Bearing	Horizontal Distance	Vertical Distance	Pole	Remark	Reduced Level
1	2	1.500	350 00 00	33.350	-0.211	1.320	Stn 2	
			345 30	26.45	-0.180	1.320	TL	
			331 00	20.32	-0.199	1.320	TL	
			10 16	21.82	-0.277	1.320	LP	
			279 10	15.99	-0.014	1.320	CD	
			113 42	5.334	-0.016	1.320	RD	
			255 17	45.09	0.112	1.500	RD	
			92 34	46.78	-0.242	1.320	B1	
			100 42	53.16	0.055	1.320	B2	
			99 51	7.53	0.064	1.730	B3	
			225 32	6.16	-0.006	1.320	T4	
			251 10	17.48	-0.041	1.320	T1	
			118 50	16.98	0.179	1.320	T3	

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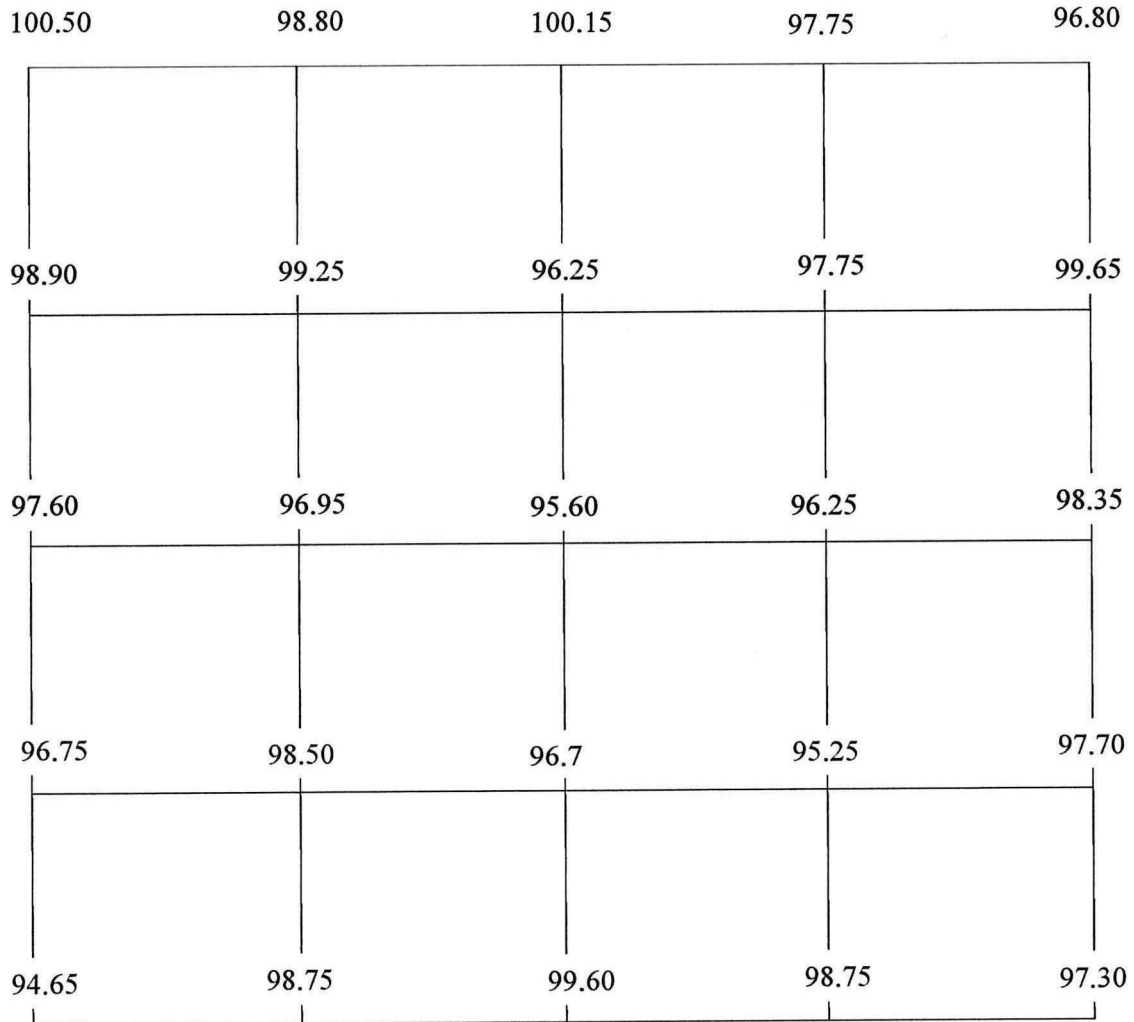


Figure Q4(d)

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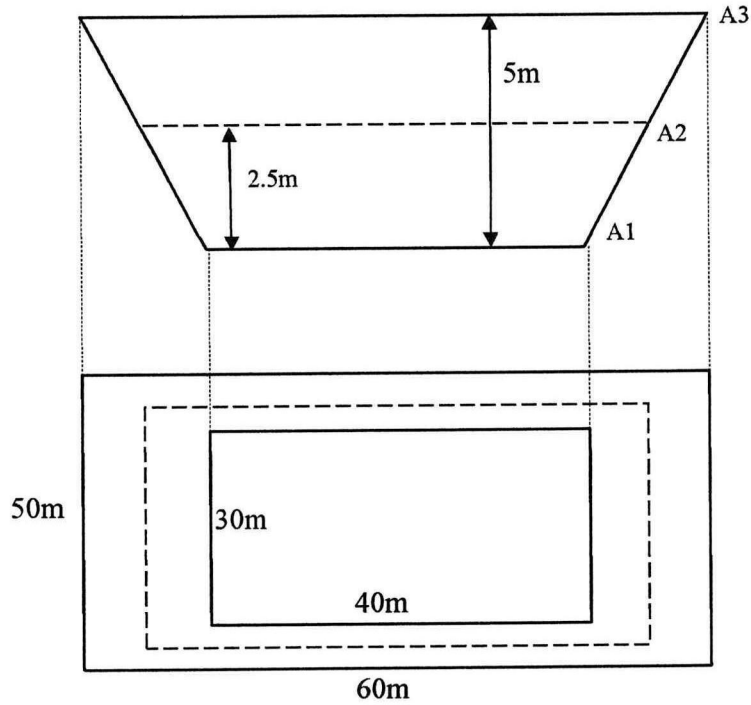


Figure Q5(b)

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Table Q2(c)(i): Leveling Form

BS	IS	FS	HoC		REDUCED LEVEL	CORRECTION	ADJUSTED RL	REMARKS
			RISE	FALL				

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Table Q3(b)(ii): Coordinates Form

Stn	Bearing	Distance	Latitude		Departure		Correction		Coordinate	
			+	-	+	-	Latitude	Departure	N/S	E/W

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