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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : GEOMATIC ENGINEERING
TECHNOLOGY

COURSE CODE : BNP 21303

PROGRAMME CODE : BNA / BNB / BNC

EXAMINATION DATE : JUNE / JULY 2018

DURATION : 3 HOURS

INSTRUCTION : ANSWERS ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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- Q1** (a) Define and give explanation on the terms below
- (i) Precision. (8 marks)
 - (ii) Representative Fraction (RF) (2 marks)
 - (iii) Systematic error
 - (iv) Topographical surveys (4 marks)
- (b) (i) Differentiate the fundamental difference between surveying and levelling? (2 marks)
- (ii) Clarify the terms 'large-scale' and 'small-scale' maps. (4 marks)
- (c) In **Figure Q1(c)**, P and Q are two points 367 m apart on the same bank of a river. The bearing of a tree on the other bank observed from P and Q are $N 36^{\circ} 25' 00'' E$ and $N 40^{\circ} 35' 00'' W$, respectively. Find the width of the river if bearings of PQ are $S 86^{\circ} 35' 00'' E$. (6 marks)
- Q2** (a) Define the definition below
- (i) Change point (Cp) (6 marks)
 - (ii) Leveling
 - (iii) Benchmark
- (b) The following consecutive readings were taken with automatic level along a survey line at common intervals of 20 m. The first reading was at a chainage 0+00 meter where RL is known to be 150.250 m.
- 3.865, 3.345, 2.930, 1.950, 0.855, 3.795, 2.640, 1.540, 1.935, 0.865, 0.665
- The instrument was shifted after the sixth and eighth readings. Using a **Table Q2(b)**,
- (i) Calculate the RLs of all points using Height of Collimation method. (8 marks)
 - (ii) Apply the arithmetic checks. (1 mark)
 - (iii) Find the difference of level between the first a point and the last. (1 mark)
- (c) Differentiate between the arithmetical checks for the height of collimation (HoC) method and rise-and-fall method. (2 marks)
- (d) Compare the difference between Temporary adjustment and Permanent adjustment. (2 marks)

- Q3** (a) Define the definition below
- (i) Latitude and departure
 - (ii) Closed traverse
 - (iii) Datum
- (6 marks)
- (b) The bearings and distances of all the traverse legs are tabulated as **Table Q3(b)**. Calculate the quadrant bearing of all lines.
- (5 marks)
- (c) In **Figure Q3(c)**, AF has a length of 91.880 m and a bearing of $295^{\circ} 25' 45''$. Calculate the coordinates of F if those of A are E1932.760, N770.470.
- (3 marks)
- (d) **Table Q3(d)** shows a data for adjusted latitude and departure of the traverse line given.
- (i) Calculate 2x latitude and departure for each line.
- (4 marks)
- (ii) Find the area of traverse network using 2x latitude and departure method.
- (2 marks)
- Q4** (a) Write short notes with sketches where necessary on the following:
- (i) Contour and contour interval (4 marks)
 - (ii) Profile levelling (2 marks)
 - (iii) Characteristics of contours (4 marks)
- (b) Discuss the important of contour maps in civil engineering works.
- (4 marks)
- (c) A tacheometer is setup at an intermediate point on a traverse line PQ and the following observations are made as **Table Q4(c)**, on a staff held vertical. The constants are 100 and zero and the RL of P is 350.500 m.
- (i) Compute the length PQ.
 - (ii) Calculate the reduced level of Q.
- (6 marks)
- Q5** (a) A series of offsets were taken from a traverse line to an irregular boundary at interval of 30 m in the following order:
- 0, 7.40, 5.60, 6.30, 6.90, 7.50, 8.30, 0 m
- Compute the area between the traverse line, boundary line and the end offsets by:
- (i) The Trapezoidal rule (2 marks)
 - (ii) Simpson's rule (2 marks)
 - (iii) The average ordinate rule (2 marks)

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- (b) **Figure Q5(b)** shows a rectangular plot with series of heights, which is to be excavated to the design level of 9.0 meter. Assuming the sides to be vertical, calculate the volume of earth to be excavated using rectangle method. (6 marks)
- (c) Solve the following:
- (i) basic definition of Mass-haul diagram. (2 marks)
 - (ii) the characteristics of Mass-haul diagram. (6 marks)

-END OF QUESTIONS -

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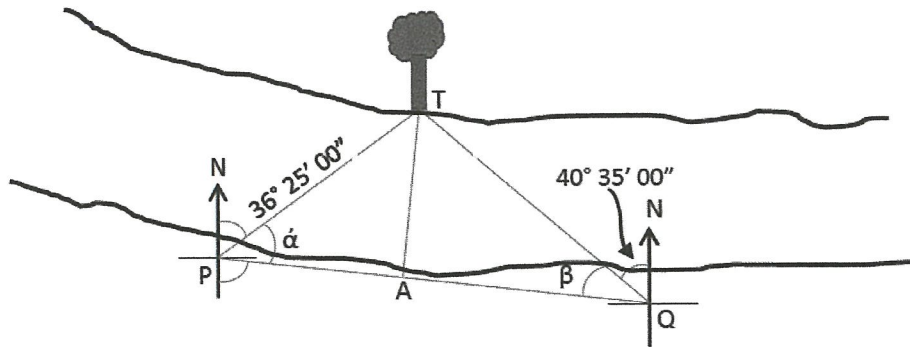


Figure Q1(c)

Table Q3(b)

Line	Distance (m)	Bearing (WCB)	Quadrant Bearing (QB)
A - B	66.600	30° 30' 00"	
B - C	135.700	102° 47' 36"	
C - D	66.300	95° 39' 12"	
D - E	76.600	198° 08' 48"	
E - A	214.300	284° 01' 24"	

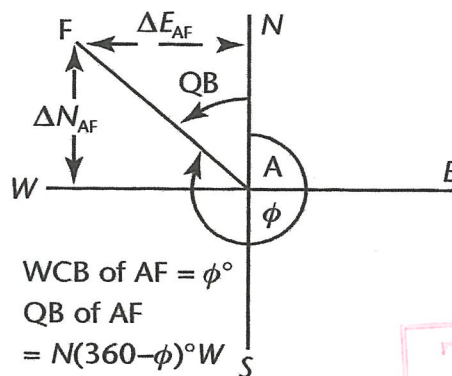


Figure Q3(c)

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Table Q3(d)

Stn	Adjusted		2 X		2 X	
	Latitude	Departure	latitude	Departure	Latit x Dipat	Dipat x Latit
S30 -						
- 2	*40.573	-39.421				
- 3	3.554	*47.240				
- S2	-14.697	28.365				
- S30	-29.430	-36.184				

Table Q4(c)

Staff Station	Vertical Angle	Staff Intercept	Middle Hair Readings
P	+ 9° 30'	2.250	2.105
Q	+ 6° 00'	2.055	1.975

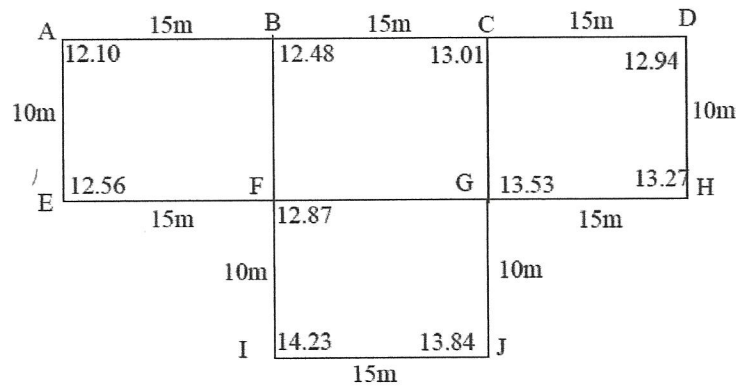


Figure Q5(b)

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