

**Faculty of Engineering
Prince of Songkla University**

Mid-Term Examination
July 29th, 2009
221 – 361 Surveying II

1st Semester 2009
Room R300
Time: 13:00 - 16:30 (3 hours)

Instructions

1. There are 5 problems in this exam. (100 points)
2. Attempt all problems.
3. Books and lecture notes are not allowed.
4. Students can bring in a calculator and a dictionary.
5. Students can use pencil in the answer books.

.....

นาย รุจ ศภวิไล ผู้ออกข้อสอบ

- 1) From the control stations A and B, the horizontal angles $\angle PAB$ and $\angle PBA$ were measured respectively. Please calculate the coordinates of the unknown station P (X_p and Y_p) by using the given field data.

From	To	Face	Horizontal Circle Readings	Horizontal Angles	Remarks
A	P	L	283° 15' 21"		Angle α
	B	L	320° 54' 51"		
	B	R	140° 54' 47"		
	P	R	103° 15' 21"		
B	A	L	300° 07' 15"		Angle β
	P	L	37° 38' 43"		
	P	R	217° 38' 47"		
	A	R	120° 07' 13"		

Given $X_A = 3,300.259$ m. $X_B = 3,047.954$ m.
 $Y_A = 3,082.183$ m. $Y_B = 3,048.344$ m. (20 points)

- 2) Given the data of the three control points **L**, **M** and **R** stations with the coordinates, $X_L = 10,000.000$ m. $Y_L = 20,000.000$ m. $X_M = 16,672.500$ m. $Y_M = 20,000.000$ m. $X_R = 27,732.760$ m. and $Y_R = 14,215.240$ m. respectively. Angles to these control points were observed from an unknown stations P and the measured horizontal angles are $\alpha = \angle LPM = 20^\circ 05' 53''$ and $\beta = \angle MPR = 35^\circ 06' 08''$. Please calculate the coordinates of the unknown station P (X_p and Y_p) by using the resection method. (30 points)
- 3) How many types of conditions are there in triangulation? Please name the types of conditions that are available in the chain of quadrilaterals. Write down the equations of these conditions that must be fulfilled in the adjustment of triangulation network. (10 points)

- 4) From the given quadrilateral ABCD, please adjust the interior angles until they satisfy both geometric conditions and trigonometric condition. (30 points)

$$\angle 1 = 23^\circ 44' 38''$$

$$\angle 2 = 38\ 44\ 05$$

$$\angle 3 = 75\ 12\ 14$$

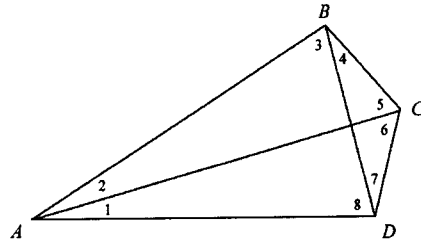
$$\angle 4 = 26\ 25\ 51$$

$$\angle 5 = 39^\circ 37' 48''$$

$$\angle 6 = 69\ 04\ 21$$

$$\angle 7 = 44\ 52\ 02$$

$$\angle 8 = 42\ 19\ 09$$



- 5) Name the type of controls that are very common in mapping project. Also give examples of their applications in civil-engineering project. (10 points)
-