Faculty of Engineering

Prince of Songkla University

Final Examination	1st Semester 2009
October 5th, 2009	Room R201
221 – 361 Surveying II	Time: 9:00 - 12:00 (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.

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นาย รุจ ศุภวิไล ผู้ออกข้อสอบ

1) Explain the effects of parallax and refraction on astronomical observation. Also sketch the diagram that clearly shows the relations among parallax, refraction and altitude of a celestial body. (15 points)

2) Match the appropriate pairs of the given technical terms that best suit each other. Select the letters of your choice from the right-hand column and put them in the space provided in the left-hand column. (10 points)

1) _____ Chain of Polygon	A) Altitude
2) _____ Eclipticity	B) Declination
3) _____ Elevation of a Celestial Body	C) Nadir
	D) 23° 30′
4) _____ Intersection	E) Leveling
5) _____ Vertical Curve	F) Inaccessible point
6) _____ Polaris	G) North Celestial Pole
7) _____ Quadrilateral	H) Triangulation network
8) _____ Resection	I) Parabola
9) _____ Right Ascension	J) Four-side figure
10) ____ Zenith	K) North point
	L) Three-point problem
	M) Center-point figure

3) Prepare the table required for staking out at every 50 m. full station of a horizontal curve by deflection angle method. Given the radius of the curve R = 200.000 m., the deflection angle $\theta = 75^{\circ}\ 00'\ 00''$ and the stationing at PI = 18+053.892 km. Also calculate the stationings of PC and PT. (25 points)

4) An entering grade of – 3% meets a departing grade of +2% at station 8+735.00 km. The two grades intersect at an elevation of 347.00 m. above mean sea level. If these two grades are connected by a 600-m equal-tangent curve, computing the elevation of points BVC, EVC and all full stations POC for every 50m. Also determine the location and elevation of the lowest point on the curve. (25 points)

5) Given a quadrilateral figure ABCD as shown in the sketch below. AB is the measured base line. Compute the strength of figure for all possible routes that can be used in calculating the distance CD. All given angles are rounded off and expressed in degrees. (25 points)

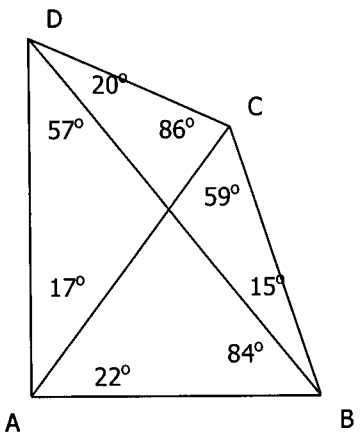

Table 10.3 Factors for Determining Strength of Figure (*Courtesy U.S. National Ocean Survey*)
Values of $(\delta_A^2 + \delta_A\delta_B + \delta_B^2)$ for various combinations of distance angles A and B of a triangle

	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
10°	428	359																					
12	359	295	253																				
14	315	253	214	187																			
16	284	225	187	162	143																		
18	262	204	168	143	126	113																	
20°	245	189	153	130	113	100	91																
22	232	177	142	119	103	91	81	74															
24	221	167	134	111	95	83	74	67	61														
26	213	160	126	104	89	77	68	61	56	51													
28	206	153	120	99	83	72	63	57	51	47	43												
30°	199	148	115	94	79	68	59	53	48	43	40	33											
35	188	137	106	85	71	60	52	46	41	37	33	27	23										
40	179	129	99	79	65	54	47	41	36	32	29	23	19	16									
45	172	124	93	74	60	50	43	37	32	28	25	20	16	13	11								
50°	167	119	89	70	57	47	39	34	29	26	23	18	14	11	9	8							
55	162	115	86	67	54	44	37	32	27	24	21	16	12	10	8	7	5						
60	159	112	83	64	51	42	35	30	25	22	19	14	11	9	7	5	4	4					
65	155	109	80	62	49	40	33	28	24	21	18	13	10	7	6	5	4	3	2				
70°	152	106	78	60	48	38	32	27	23	19	17	12	9	7	5	4	3	2	2	1			
75	150	104	76	58	46	37	30	25	21	18	16	11	8	6	4	3	2	2	1	1	1		
80	147	102	74	57	45	36	29	24	20	17	15	10	7	5	4	3	2	1	1	1	0	0	
85	145	100	73	55	43	34	28	23	19	16	14	10	7	5	3	2	2	1	1	0	0	0	0
90°	143	98	71	54	42	33	27	22	19	16	13	9	6	4	3	2	1	1	1	0	0	0	0
95°	140	96	70	53	41	32	26	22	18	15	13	9	6	4	3	2	1	1	0	0	0	0	
100	138	95	68	51	40	31	25	21	17	14	12	8	6	4	3	2	1	1	0	0	0		
105	136	93	67	50	39	30	25	20	17	14	12	8	5	4	2	2	1	1	0	0			
110	134	91	65	49	38	30	24	19	16	13	11	7	5	3	2	2	1	1	1				
115°	132	89	64	48	37	29	23	19	15	13	11	7	5	3	2	2	1	1					
120	129	88	62	46	36	28	22	18	15	12	10	7	5	3	2	2	1						
125	127	86	61	45	35	27	22	18	14	12	10	7	5	4	3	2							
130	125	84	59	44	34	26	21	17	14	12	10	7	5	4	3								
135°	122	82	58	43	33	26	21	17	14	12	10	7	5	4									
140	119	80	56	42	32	25	20	17	14	12	10	8	6										
145	116	77	55	41	32	25	21	17	15	13	11	9											
150	112	75	54	40	32	26	21	18	16	15	13												
152°	111	75	53	40	32	26	22	19	17	16													
154	110	74	53	41	33	27	23	21	19														
156	108	74	54	42	34	28	25	22															
158	107	74	54	43	35	30	27																
160	107	74	56	45	38	33																	
162°	107	76	59	48	42																		
164	109	79	63	54																			
166	113	86	71																				
168	122	98																					
170	143																						