Mansoura University   First term Exam   Time (3.0 hours
Faculty of Engineering   of   2nd Year Civil
Public works Depart.   Surveying   Fall in 13/1/ 2009

طلاب الصف الثاني مدني نظام قديم

2-c) The astronomic coordinates of point A is ($\Phi = 23° 48' 20 "$, $\Lambda = 32° 40' 05"$, $H=120.75$ m). If the Geoid undulation an deflection components are ($N= 12.25$ m, $\xi= 12.25"$, $\eta= -16.75$ ") and The ellipsoid parameters of WGS84 are ($a = 6378137$ m, $f= 1/297$). Calculate The geodetic and Cartesian coordinates of point A with respect to WGS 84.   **(8 Marks)**

3-a) In order to survey the building ABCD the following observations were taken
PA = 250.80m, QA = 240.40 m. PB = 203.07 m, and QB = 310.20 m. If the co-ordinates of two points P and Q are (30.00, 86.59) and (309.10, 0.00) respectively, calculate the length and bearing of building side AB.
(8 Marks)

3-b) Give a short notes on the following:

a) Ellipsoid
b) Intersection & Resection
c) Control survey & detail Survey
d) Meridian radius of curvature (M) & Prime vertical radius (ρ)   **(4 Marks)**

3-c) Compute the geodetic coordinates of the following Points from known
Cartesian coordinates when all data are observed in WGS84.   **(8 Marks)**

Point	X	Y	Z
A	4766417	2818986	3154556

The WGS84 ellipsoid parameters are:
     Semi- Major Axis (a) = 6378137   meters
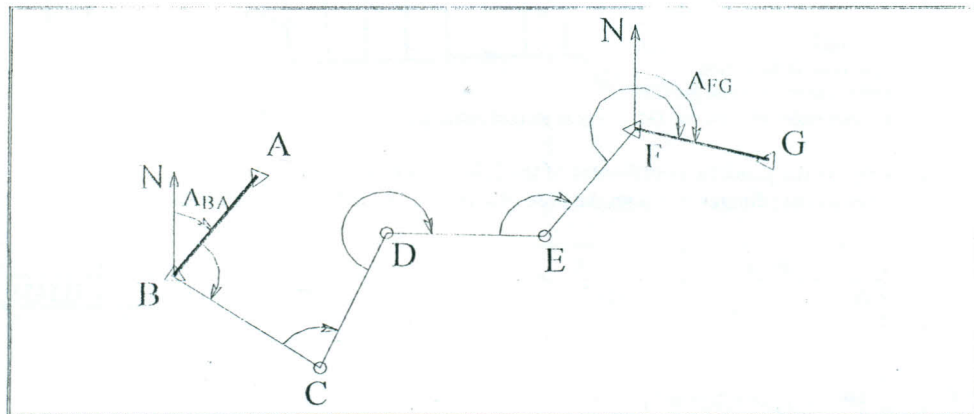   Semi- Minor Axis (b) = 6356752.3142 meters

4-a) Field measurements for a small construction site triangulation are shown in the following table. Using this data, calculate the coordinates of station S and W by using equal shift method. (12 Marks)

Angle	Observed value			Station	Coordinates	
					E	N
1	26°	10'	48"	F	719.37	250.00
2	27	37	16	B	250.00	447.15
3	35	46	10	N		
4	32	57	52			
5	28	23	12			
6	29	04	37			
7	126	11	59			
8	111	15	52			
9	122	32	02			

4- b) In the above figure compute the relative strength between the two sides RS and SF. (8 Marks)

Good luck   1- Prof. dr. M. Mewafi   2- Dr. Abd El Manaim baker

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طلاب الصف الثاني مدني نظام قديم

1-a) Compute the corrected coordinates of points C and D for the shown traverse. If the data from observations are as follow: (10 Marks)
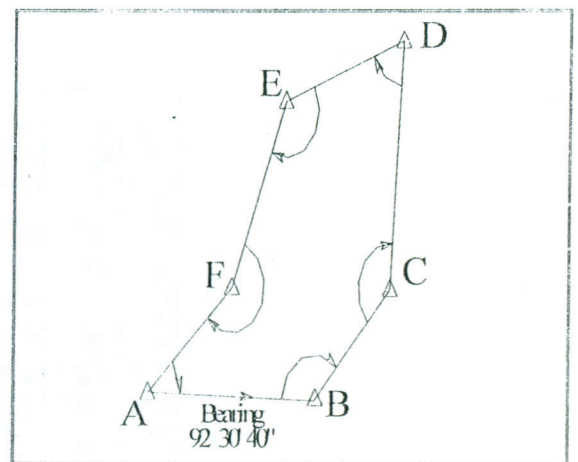
No.	Observed angles	Line	Length (m)		Azimuth	
1	104° 00' 30"	BC	1000	BA	43° 31' 30"	
2	63° 20' 00"	CD	2500	FG	106 17' 30"	
3	258° 11' 00"	DE	2000			
4	120° 45' 20"	EF	1200			
5	236° 30' 30"			coordinates		
Σ	782° 47 00"			X		Y
			B	50		150

1-b) The following are the interior angles of the closed loop traverse ABCDEF. If the observed azimuth of the line AB is 92° 30 ' 40", compute the corrected coordinates of Traverse points.

(10 Marks)

line	Length	Point	Observed angles
AB	2315	A	31° 09' 20"
BC	760	B	166° 15' 40
CD	841	C	127° 55' 40"
DE	870	D	64° 06' 20"
EF	540	E	123° 04' 20"
FA	2480	F	207° 26' 40"
Σ	7806		719° 58' 00"

2-a) State the different steps and procedures that are taken into consideration to construct triangulation network.
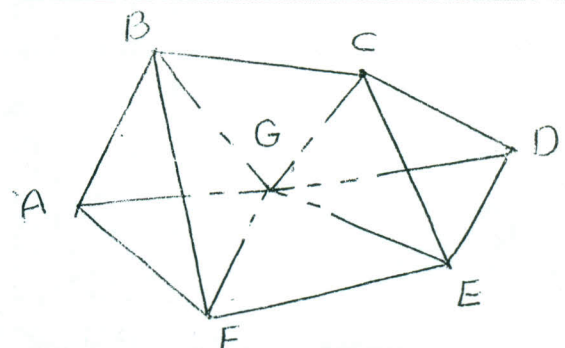
(4 Marks)

2-b) In the shown figure, determine the number and type of condition equations, and write down only one of each type of condition equations. (8 Marks)

	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65	70	75	80	85
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	95	67	50	39	30	25	20	17	14	12	8	5	4	2	2	1	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	4	3	2	1					
125	127	86	61	45	35	27	23	18	14	14	12	10	7	5	4	3						
130	125	84	59	44	34	26	21	17	14	12	10	7	5	4								
135	122	82	58	43	33	26	21	17	14	12	10	8	6									
140	119	80	56	42	32	25	20	17	14	12	10	9										
145	116	77	55	41	32	25	21	17	15	13	11	13										
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	148																					

Table (1): Factors for determining the values of $(\delta_i^2 + \delta_i\,\delta_j + \delta_j^2)$

	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65	70	75	80	85
10	428	359																				
12	359	295	253																			
14	315	253	214	187																		
16	284	225	187	162	143																	
18	262	202	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	9	8	5					
60	159	112	83	64	51	42	35	30	25	22	19	14	11	9	8	7	5					
65	155	109	80	62	49	40	33	28	24	21	18	13	10	7	6	5	4	4				
70	152	106	78	60	48	38	32	27	23	19	17	12	9	7	6	5	4	3	2			
75	150	104	76	58	46	37	30	25	21	18	16	11	9	7	5	4	3	2	2	1		
80	147	102	74	57	45	36	29	24	20	17	15	11	8	6	4	3	2	2	1	1	1	
85	145	100	73	55	43	34	28	23	19	16	14	10	7	5	4	3	2	1	1	1	0	0
90	143	98	71	54	42	33	27	22	19	16	13	9	6	4	3	2	1	1	0	0	0	0