Mansoura University
Faculty of Engineering
Public Works Department
Plane Surveying

<u>*BCE Program*</u>
Final Term Exam
Second term (2014 / 2015)
Time: 2 hour (120 min.)

<u>Answer all questions and please illustrate your answer with figures</u>

<u>Max. grade (50 marks)</u> *<u>Exam date: Sunday 14/6/2015</u>*

<u>First question:</u> *<u>(10 marks)</u>*

To measure a base line AB, a steel tape 30 m long standardized at 15°C under a tension 10 kg was used. The measured distance AB was found to be 175.80 m. **Find the corrected distance AB** if the field temperature was 25°C and the tension exerted was 15 kg. The weight of the steel was 7.80 gm/cm^3 and the weight of the tape was 0.80 kg, modulus of elasticity was 2.10×10^7 kg/cm^2 and coefficient of expansion was 7.10×10^{-6} °/C.

A theodolite was set up at station A with instrument height 1.6 m and a staff was set up at Station B. The recorded staff intercept (S) equals 1.82 m with middle cross hair reading 2.04 m. **Find the vertical angle recorded at point B and the difference in elevation between the two stations.**

<u>Second question:</u> *<u>(12 marks)</u>*

Two straights AB and CD meet at an inaccessible point P. A circular curve is to be set out joining the two straights. The following observations were made using a theodolite (constants 100, 0).

Theodolite at	*Staff at*	*Bearing*	*Vertical angle*	*Staff readings, m*		
				Lower	*Middle*	*Upper*
A	B	137° 20′	+ 2° 20′	0.67	1.57	2.47
B	C	In the East direction exactly	zero	1.45	2.25	3.05
C	D	39° 40′	+ 3° 27′		3.76	
			?		0.91	

The points A and D will be tangent points of the curve. *Determine:*

1. The radius of the curve connecting the two straight lines PA, PD
2. The [illegible] other vertical angle reading recorded at point D

<u>Third question:</u> *<u>(10 marks)</u>*

The survey coordinates of stations A, B and C in traverse ABCDE [illegible]

[illegible]

[illegible] south direction exactly. The line DE is parallel to line BA with the same length. Calculate the length and bearing of line EA.

Fourth question: ***(12 marks)***

The following observations were taken on engineering project in Mansoura city: 2.75, 1.95, 1.56, 3.24, (2.17), , 2.77, 1.68, 3.17, 1.46, (1.18), 2.64, 2.61, 2.92, 1.54, (2.86), 0.14, 0.67, 0.94 and 0.87. The position of level is changed after the second, fifth readings and the turning points also were seventh and tenth points. *The fourth, seventh and the last points were taken where the staff reversed.* The readings between brackets are soundings. The reduced level of water surface is the reduced level of the fifth point. The reduced level of the third point is 4.45 m.

It is required to:

1. Find the reduced levels of all points and check your results. (6 marks)
2. calculate the staff reading for point on the fourth level position which gives the reduced level of this point equals 6.10 m. (3 marks)
3. Find the reduced level of all soundings. (3 marks)

Fifth question: ***(10 marks)***

The following readings were taken when constructing a new road:

Chainage (m)	0.00	100	200	300	400	500	600
Reduced level (m)	17.50	15.60	14.80	13.40	17.80	17.80	18.70

The width of the new road equals 12.0 m, starts from chainage (0 00) at level 19.0 m with down slope 1% and have side slope 2 horizontal and 1 vertical in cut and fill area. ***It is required to:***

1. Draw the longitudinal section with suitable scale. (4 marks)
2. Compute the volume of cut and fill. (6 marks)

مع أطيب التمنيات بالتوفيق والنجاح .....

Prof. Dr. Zaki Zeidan Dr. [illegible]