Mansoura University
Faculty of Engineering
Public Works Department
Plane Surveying

BCE Program
Final Term Exam
Exam date: 21 / 6 / 2014
Time: 3 hours.

Answer all questions and please illustrate your answer with figures

Max. grade (50 marks)

First question *(10 marks)*

A base line AB was measured in three parts AC, CD and DB with a steel tape, which was exactly 30 m at 15° C at pull of 10 kg and has weight 0.75 kg and cross sectional area 0.03 cm^2. The field observations are given as following:

Section	*Measured slope length (m)*	*Temperature (° C)*	*Applied tension (kg)*	*Ground slope (vertical : horizontal)*
AC	313.28	20	15	1: 20
CD	292.82	15	10	1: 20
DB	494.06	?	10	With angle +5°

The adjusted plane coordinates of points A and B are as following:

A= (500.6 m, 713.6 m) and B = (1537.25 m, 1074.30 m).

The coefficient of linear expansion is 2.511 * 10^{-6} m /° C, and the modulus of elasticity is 2.10 x 10^7 kg/cm^2. ***Calculate the field temperature must be read for part DB.***

Second question *(10 marks)*

In a closed traverse ABCDE, the following data are available:

Point	*East*	*West*	*North*	*South*
A	350	-----	-----	85
B	670	-----	235	-----
Line	*True bearing*		*Length in meter.*	
BC	S 54° E		400	
CD	In the South direction exactly		550	
DE	In the West direction exactly		450	

If point Q is located at middle of line AB and point F is on the line DE and divided it by the ratio DF: FE = 1 : 2 respectively. ***Find the length and bearing of line QF.***

Third question *(10 marks)*

The following observations were taken in leveling work: 1.66, 1.88, 0.77, 2.94, (2.17), (0.81), 2.77, 1.68, 2.17, (0.87), 1.46, 1.18, 2.64, 2.51, 2.92, 2.54, (2.86), 1.14, 1.67, 0.88, 1.19 and 2.94. The position of instrument is changed after the second, fourth, seventh and eleventh points. The third, sixth, tenth points were taken where the staff reversed. The readings between brackets were soundings. The distance between points equals 50 m apart. The reduced level of water surface is the reduced level of the fifth point and the reduced level of the eighth point is 3.5 m. ***Find:***

1. The reduced levels of all points and check your results.
2. The reduced levels of all soundings.
3. The rate of gradient between the first and last points.

Fourth question *(10 marks)*

A simple circular curve have radius 400 m is to be set out by theodolite and tape. The chainage of the first tangent point, which has coordinates (2014.25 m, 1542.17m), is (52 + 11.5). If the coordinates of the point of intersection are (2115.372 m, 1653.19 m), ***calculate:***

1. The necessary data for setting out the curve. ***(Only first five points)***
2. The coordinates of the second tangent point. (***take 1 chain = 30 m***).

Fifth question *(10 marks)*

For the purpose of constructing a swimming pool حمام سباحة (30 m*١٠٠ m), a longitudinal levelling was made as follows:

Distance, m	0	١٠	20	30	40	50	60	70	80	90	100
Ground level (m)	12.5	12.8	12.2	12.6	12.7	13.0	12.8	13.1	13.2	12.7	12.5

If the level of pool bed at the zero distance was 11.30 m and the bed of the pool has down slope 1:50 from 0 to 30 m and horizontal from 30 to 70 m and with down slope 1:40 from 70 to 100 m.

It's required to

1. Draw the longitudinal section for the ground and bed of the swimming pool with suitable scale.
2. Determine the volume of cut necessary to construct the swimming pool.

مع أطيب التمنيات بالنجاح والتوفيق ..... ،،،،

Examiners:

Prof. Dr. Zaki Zeidan ***Dr. Ashraf Beshr***