Name_____Surname_____Student ID_____Seat number_____

King Mongkut's University of Technology Thonburi

Midterm Examination

Semester 1 Academic Year 2014

CVE 221 SURVEYING 2nd Year International Program

Date: Monday 29 September 2014 Time 13.00 – 16.00

Instructions:

1. There are 6 questions, total of 10 pages (includes cover, 100 points).
2. Write your answers in the question sheets **ONLY.**
3. An approved calculator is **allowed** in the examination room.
4. **Not allowed** any documents or textbooks in the examination room.

Examiner: Thongchai Phothong

(Tel. 0–2470–9147)

This examination paper has been approved by the Department of Civil Engineering

(Associate Professor Dr. Sutat Leelataviwat)

Head of the Civil Engineering Department

Name_____Surname_____Student ID_____Seat number_____

1. Table 1.1 shows 10 times of radius's measurement.

   1.1 Calculate most probable value area of the radius, calculate standard deviation and value of radius at 95 % confidence will occur. (10 marks)

   1.2 Calculate area of the circle with error propagation.(5 marks)

Table 1.1 Observed radius's distance

Number	Distance, m.
1	179.523
2	179.463
3	179.457
4	179.493
5	179.497
6	179.443
7	179.490
8	179.489
9	179.516
10	179.510

Answer

Name_____Surname_____Student ID_____Seat number_____

2. From Table 2.1 shows slope distance (not horizontal and lift in the air) between points, temperature at field , forced to be applied and % slope in each sections. Calculate horizontal distance from A to D with steel tape 30 m. and at temperature 20 °C tape length = 30.0046 m., with tension 10 kg. (with full supported), expansion coefficient 0.0000116 / 1 °C, area 1.2 mm^2, weight 0.015 kg./m., E 1.93x10^5 N/mm^2 , g = 10 m/sec^2. (15 marks)

Table 2.1 Observed distance

Sta	Observed Distance, m.	Air Temperaturer, oC	Tension. kg.	Slope. %
A				
B	27.586	30	19	15
C	26.015	40	18	20
D	28.960	32	20	10

Answer

Name_____Surname_____Student ID_____Seat number_____

3. Figure 3.1 Find elevation of all points (30 marks)

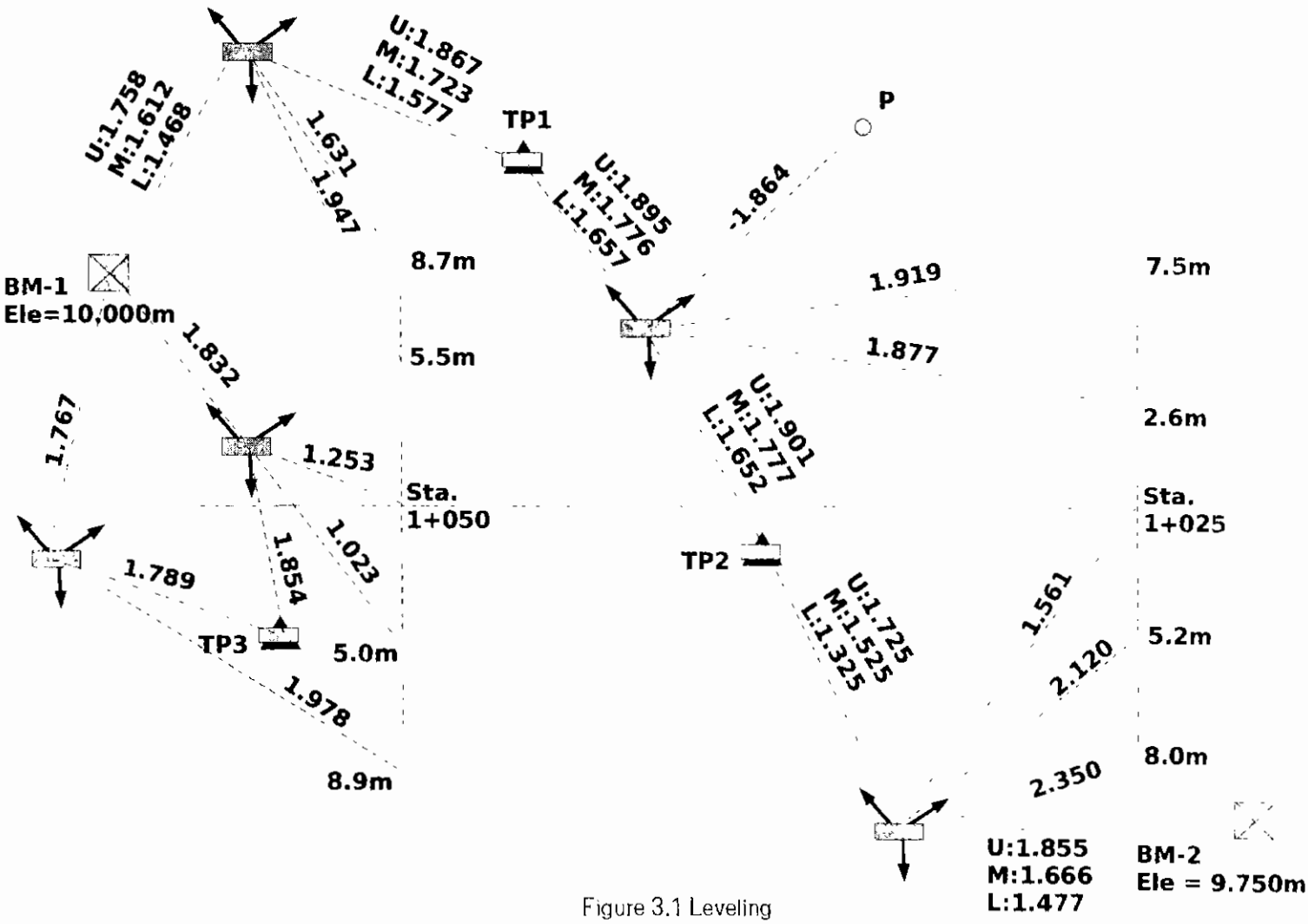

Figure 3.1 Leveling

Answer

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Name_____Surname_____Student ID_____Seat number_____

4. Find elevation of all points 4.1 by Successive method. (20 marks)

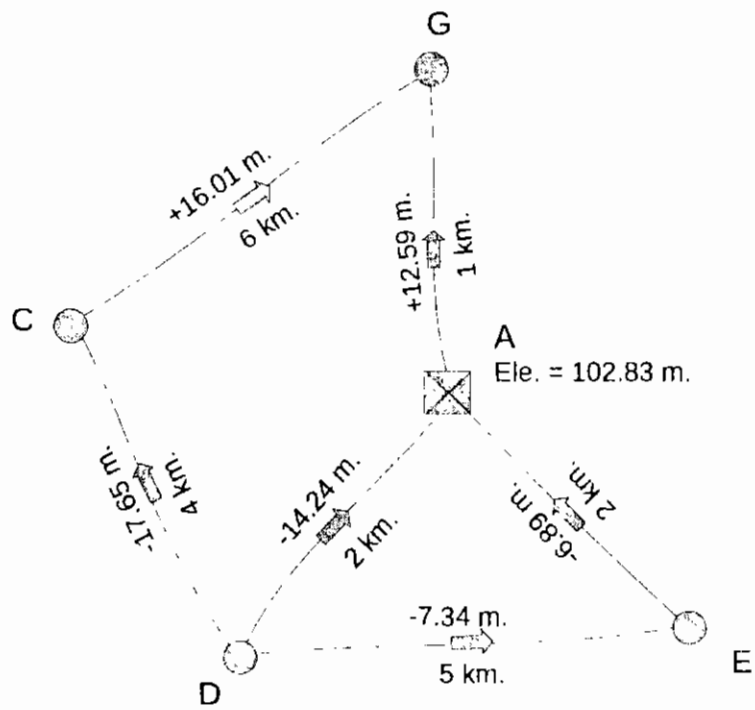

Figure 4.1 Level network

Answer

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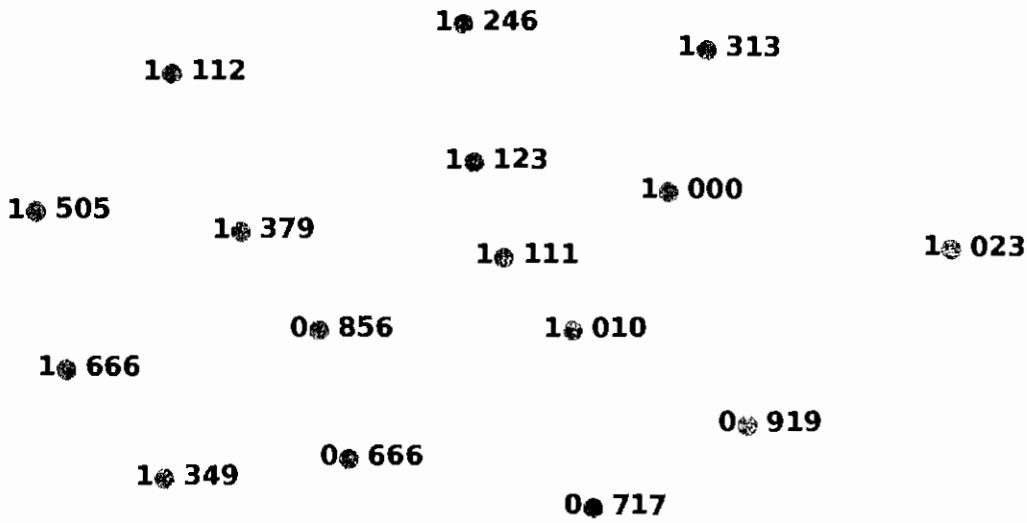
Name_____Surname_____Student ID_____Seat number_____

5. Draw contour lines at 0.90, 1.00, 1.10 and 1.20 meter. (5 marks)



Scale 1:250

Answer

Name_____Surname_____Student ID_____Seat number_____

6. Explain the method to check the error of line of sight (Two peg test), give an example of calculation and find the correction. (15 marks)

Name_____Surname_____Student ID_____Seat number_____

Equations

$$C_t = L_m \alpha (t_m - t_s)$$ Temperature correction

$$C_{sa} = -\frac{L_m^3}{24}\frac{(mg)^2}{p_m^2}$$ Sag correction

$$C_p = \frac{L_m (P_m - P)}{AE}$$ Tension correction

$$y = f(x_1, x_2, x_3, .., x_n)$$

$$E_y = \pm\sqrt{\left(\frac{\partial f}{\partial x_1}\right)^2 E_{x_1}^{\ 2} + \left(\frac{\partial f}{\partial x_2}\right)^2 E_{x_2}^{\ 2} + \left(\frac{\partial f}{\partial x_3}\right)^2 E_{x_3}^{\ 2} + ... + \left(\frac{\partial f}{\partial x_n}\right)^2 E_{x_n}^{\ 2}}$$

standard deviation

$$\sigma = \pm\sqrt{\frac{\sum v^2}{n-1}}$$