00217

The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Civil Engineering

Study Programme	: Bachelor of Technology Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	**: CVX 5530 Engineering surveying II** /CEX5230
Academic Year	: 2019/2020
Date	: 11 th October 2020
Time	: 0930-1230hrs
Duration	: **03 hours**

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **SIX (06)** questions on **EIGHT (08)** pages.
3. Answer **Any FIVE (05)** questions.
4. Answer for each question should commence from a new page.
5. Necessary additional information is provided.
6. This is a Closed Book Test (CBT).
7. Answers should be in clear hand writing.
8. Do not use Red colour pen.

From a surface survey the coordinates of A and C with respect to the SLD99 coordinate system was found to be as follows.

Table 2

Point A	556 821.630 m East	447 219.420 m North
Point C	557 020.820 m East	447 224.543 m North

Find the swing of the underground traverse and the coordinates of its stations with respect to the SLD99-coordinate system. (12 Marks)

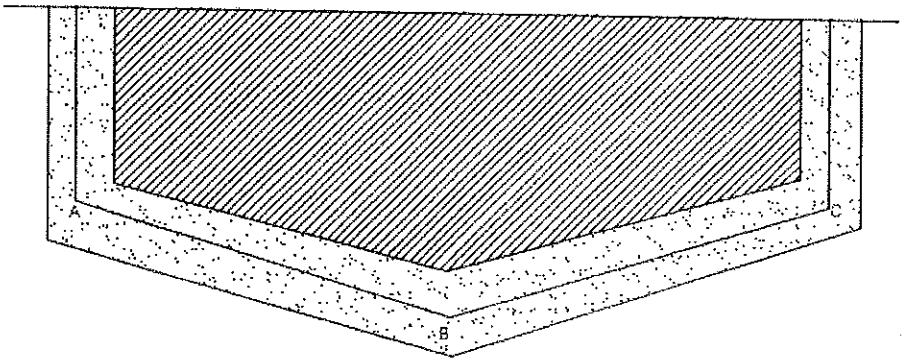


Figure 4

Question 3

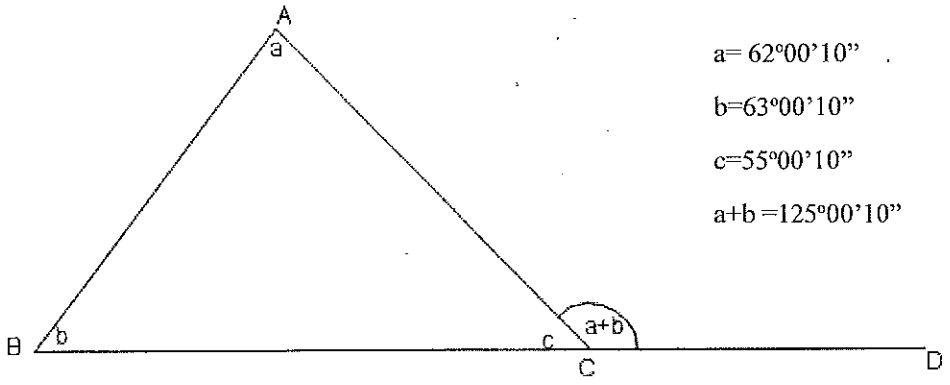
3.1. Explain the methodology of obtaining the normal equations from following listed residual equations (6 marks)

$$a_1r_1 + b_1r_2 + c_1r_3 + l_1 = 0$$

$$a_2r_1 + b_2r_2 + c_2r_3 + l_2 = 0$$

$$a_3r_1 + b_3r_2 + c_3r_3 + l_3 = 0$$

3.2. The observations were made on the angles of a,b,c and (a+b) in the Figure 5 shown below. If the observation of the angle <ACD was measured twice to obtain the averaged value, determine the most probable values of the conditioned quantities of angles a.b and c. (14 Marks)



a= 62°00'10"

b=63°00'10"

c=55°00'10"

a+b =125°00'10"

Figure 5

Question 4

4.1.

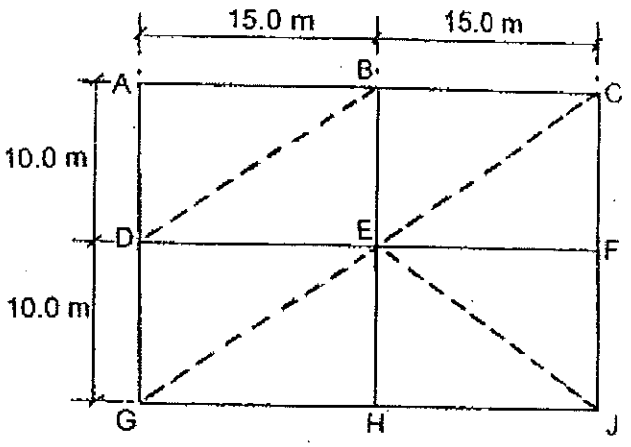


Figure 6

Figure 6 shows a rectangular plot which is to be excavated to a level of 10.0 m. The existing ground levels are given in Table 3. Assuming the sides of excavation to be vertical, calculate its volume, considering it to be made up of prisms of triangular section as indicated by broken lines.

(10 Marks)

Table 3

Station	A	B	C	D	E	F	G	H	J
Level (m)	13.20	13.75	14.30	14.00	14.75	15.05	15.25	16.20	14.60

4.2. Figure 7 shows a section of the mass haul diagram for a project. The free haul distance is stipulated as 300 m, and the charges for earth moving are as follows.

Cost of free haul = Rs. A per m^3

Cost of over haul = Rs. C per m^3

Cost of waste = Rs. E per m^3

Determine the cost of the material wasting at chainage 900 m in terms of A, C, and E

(10 Marks)

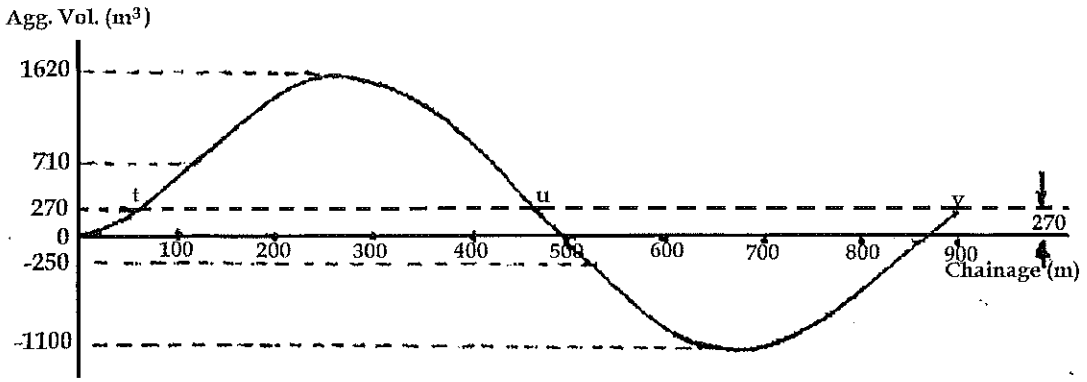


Figure 7

Question 5

5.1. Define Geographic Information Systems and usage in modern world. (4 Marks)

5.2. Describe the two main characteristics of Geographic Information Systems with examples. (4 Marks)

5.3. Describe the two formats that the GIS uses to store spatial feature data. (4 Marks)

5.4. Schematically Describe the components and their relationships of a geographic database. (4 Marks)

5.5. Briefly describe the functions of spatial analysis in GIS. (4Marks)

Question 6

6.1. It is essential to conduct a flight planning before any exercise of aerial photography. Explain briefly how to plan an exercise of aerial photography on a flat terrain. (8 Marks)

6.2. The Figure 8 shows a tilted photograph taken on a flat terrain. The photograph possess a tilt of θ. Derive the following basic equation for scale along the principle line.

(12 Marks)

$$S = [f \pm y \sin\theta]/[H - h]$$

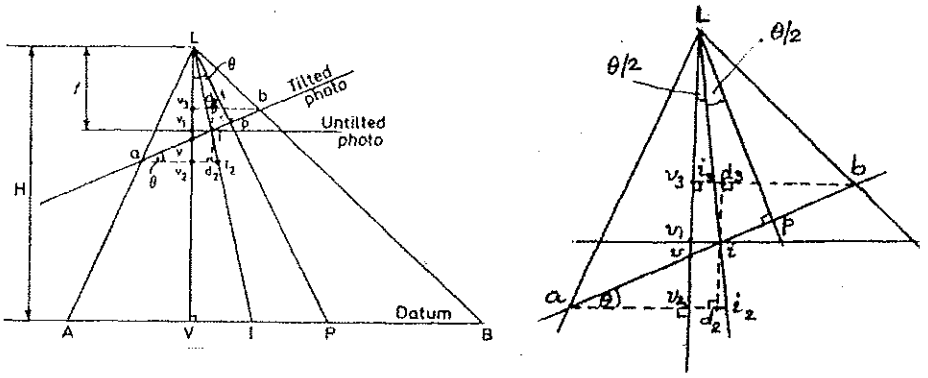


Figure 8