SLIATE

SLIATE

SRI LANKA IN   E OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Engineering (Civil)
First Year, Second Semester Examination – 2016
CE 1204 - Engineering Surveying II

Instructions for Candidates:

Answer five questions only

State any assumptions you made.

No. of questions : 06

No. of pages   : 03

Time   : 3 hrs

Q1: A and B are two points situated at opposite sides of a river. The distance between A and B is 500m. Reduced level of A point is 100.00m. Levelling instrument was set up at point A and the staff reading at B was observed as 2.567m.

a. If the instrument is perfect in adjustment state two types of possible natural errors due to long distance in levelling? (4 Marks)

b. Propose a suitable levelling method to determine these errors along with collimation error and write down the steps involved in this method with sample calculation.

(6 Marks)

c. If the diameter of the earth is 12,734km calculate the value of combined error stated in part a. (5 Marks)

d. Calculate the true level of point B. (5 Marks)

(Total 20 marks)

Q2. Two sets of Tacheometric readings were taken from an instrument station A having the reduced level of 15.05m to a staff station B. The relevant data are as follows:

Ins	Multiplying constant	Additive Constant	Staff position	At	To	Height of instrument	Vertical Angle	Stadia reading
P	100	360mm	Normal to line of sight	A	B	1.38m	+30°	0.714/1.007/ 1.300
Q	95	380	Normal to line of sight	A	B	1.36m	+30°	-

What should be the stadia reading with instrument Q? (20 Marks)

Q3.

a. The table given below is a page from an old level book which had been damaged and some of the entries marked as 'x' are missing. Reproduce the page with your knowledge in levelling. And perform necessary arithmetic checks for correctness. (12 Marks)

Distance (m)	Back sight (m)	Inter sight (m)	Foresight (m)	Height of Collimation (m)	Reduced level (m)	Remarks
	x			101.627	100.000	BM
0		0.985			x	
20		x			101.354	
40	x		0.916	x	100.787	C.P
x		1.627			x	
80		x			99.569	
100	x		0.882	x	x	x
120		1.925			98.795	

b. During levelling process what are the measures to be taken into account in determining the new location of the instrument at a change point? (4 Marks)

c. What are the broad classification of direct levelling. (4 Marks)

(Total 20 marks)

Q4.

a. Briefly explain followings.
   i. Local attraction
   ii. Magnetic declination (06 marks)

b. The fore bearings and back bearings of the lines of a closed compass traverse are as follows:

Line	Fore Bearing	Back Bearing
AB	32°30'	214°30'
BC	124°30'	303°15'
CD	181°00'	1°00'
DA	289°30'	108°45'

Correct the bearings for local attraction and determine the true bearings of the lines if the magnetic declination at the place is 3°30'W. (14 Marks)

(Total 20 marks)

Q5.

A five sided closed traverse (ABCDEA) has the following angles. Angle A=101°24'00",
Angle B=149°13'00", angle C = 80°58'30", angle D = 116°19'00", angle E = 92°04'30".
The lengths of the sides AB = 40.158m, BC = 38.220m, CD = 36.828, DE = 57.903, EA =
35.010.

    a. Determine the angular error.   (3 Marks)

    b. Assuming error is within the acceptable limit, distribute the error and calculate the
        latitudes and Departures   .(10 Marks)

    c. Compute the error of closure.   (2 Marks)

    d. Distribute the closure error and calculate the independent co-ordinates of traverse
        stations taking A≡(0,0).   (5 Marks)

                                               (Total 20 marks)

Q6. There is a proposal to lay a sewer (wastewater pipe) along the side of the road. By using a
level, the existing ground levels were taken in 20m intervals and A and B are two points with
200m gap along the proposed route. Following are the staff readings of existing ground.

BS= Back sight, IS= Intermediate sight, FS= Foresight

BS= 0.824m (on the TBM = 98.755m), IS = 1.628m (on A, 0m),IS = 0.790m (20m from A),
IS= 0.383m(40m from A), FS= 1.224m(60m from A and changing point 1), BS= 2.154m (60m
from A), IS= 2.336m (80m from A), IS = 2.757m(100m from A), FS= 0.461m(Changing point
2), BS= 2.555m (Changing point 2), IS = 2.275m(120m from A), IS= 0.436m(140m from A),
IS= 0.227m(160m from A), IS= 0.716(180m from A) , FS= 0.652m (200m from A).

    a. Prepare level sheet from A to B and calculate reduced level of existing ground surface
        using Rise and fall method.   (10 marks)

    b. Do the arithmetic checks   (02 marks)

Laid pipe will be evenly graded (1:200) from A to B and maintained a minimum height of 1.0m
from the existing ground level to the trench bed.

    c. Calculate the reduced levels of trench bed and cut & fill heights at the given chainages
                                                 (08 marks)

                                               (Total 20 marks)