CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2008/09

WRITTEN SECTION

Module Title: Linear Surveying & Levelling (C/A)

Module Code: **CIVL 6012**

School: School of Building & Civil Engineering

Programme Title: Bachelor of Engineering in Civil Engineering – Stage 1

Programme Code: **CCIVL_7_Y1**

External Examiner(s): **Mr Joe Kindregan and Mr John Lapthorne**

Internal Examiner(s): **Mr. J. O'Byrne, Mr. Tim Buckley, Mr. Darren Kenneally, Mr. Daniel Goulding, Mr. Sean Carroll, Mr. Sean Harrington.**

Instructions: **Answer both Section A and Section B.**

Duration: **2 HOURS**

Sitting: Autumn 2009

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Section A

Q1. (a) List the preliminary information that must be recorded in a field book of a linear survey, give one example to illustrate each item.

(b) Describe and illustrate using a typical sketch from a survey field book, how detail is tied in when carrying out a linear survey.

(c) Describe the steps involved in plotting a linear survey from field notes.

Q2. An existing sewer ends at manhole 200, the invert level of which is 22.58 m A.O.D. Shown below are the field notes taken for a longitudinal section along the existing ground line;

(a) Reduce the levels
(b) Draw the longitudinal section to a horizontal scale of 1:1000 and a vertical scale of 1:50.

BS	IS	FS	Distance	Remarks
3.99				Invert level MH 200 @22.580m
	2.19		0	Ground level MH 200
	1.22		25	Ground level
	1.50		50	Ground level
1.53		1.24		Change point on kerb
	1.02		75	Ground level
	0.87		100	Ground level MH 201
1.42		0.59		Change point on step
	1.66		130	Ground level
	1.73			160 Ground level MH 202
1.38		1.42		Change point on step
0.85		2.32		Change point on kerb
		3.60		Invert MH 200

Section B

Q3. (a) Describe how the working adjustment of a level may be checked in the field.(2 peg test) (4 Marks)

(b) Is there a similar test or tests for a theodolite, if so describe how it may be completed. (7 Marks)

(c) The use of a theodolite differs greatly from that of a level, outline the common uses of theodolites in general engineering / surveying work. (4 Marks)

(d) In using a theodolite, for most applications the instrument must be set up exactly over a predetermined station point. Describe how this may be achieved. (10 Marks)

Q4. (a) In the establishment of a traverse such as that shown in figure 5, how might the angular error be determined. (4 Marks)

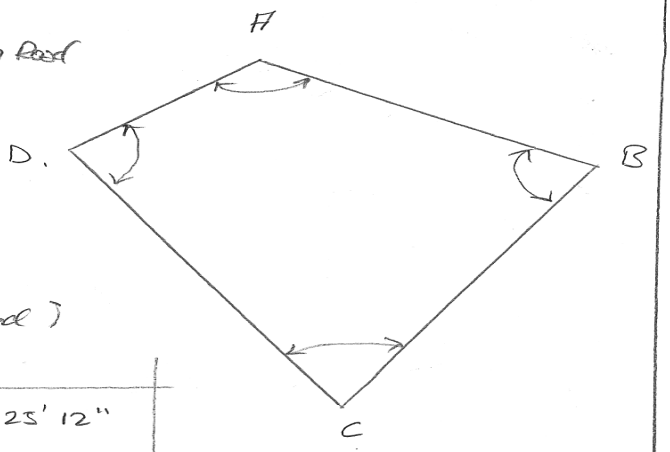
(b) In figure 5 what should the theoretical angular measurement be. (4 Marks)

(c) For the traverse outlined below, calculate the angular error. (12 Marks)

(d) Comment on the result as calculated in part c above. (5 Marks)

Field Notes from Traverse Survey June 2009.

Weather → Wet / Cold / Windy
Location → CIT Gr Park / Main Road



Angular Readings (Recorded)

st.	1st	2nd
A	116° 50' 30"	116° 25' 12"
B	83° 47' 06"	83° 46' 54"
C	65° 29 42"	65 30' 00"
D	96° 17' 05"	96° 16' 56"

Note: Battery changed @ st C, 2nd Reading.