NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE & QUANTITY SURVEYING
BACHELOR OF QUANTITY SURVEYING [HONOURS] DEGREE
PART II FIRST SEMESTER SUPPLEMENTARY EXAMINATIONS – JULY 2005

ENGINEERING SURVEYING I – AQS 2102

TIME: 3 HOURS   **TOTAL MARKS**: 100

INSTRUCTION

Answer any **FOUR** Questions.
Carry Out all necessary checks

QUESTION 1

a) Define Surveying   (5 marks)
b) List the classes of survey that you have learnt and give a brief description of each class, giving
    examples of types of work carried in each class (give two examples per class).   (10 marks)

c) How would you set up a right angle using a prism square?
d) A planimeter was used to obtain the area of a circle 20cm in diameter. If the planimeter
    reading obtained was 5,236 revolutions, what was the setting in square centimetres of the
    planimeter?

QUESTION 2

a) What do you understand by standardisation of tapes and why is it important?   (5 marks)
b) What is the difference between a map and a plan?   (4 marks)
c) It is required to set out a base line exactly 650,000 metres in length, using a 60m steel tape
    having a coefficient of expansion/contraction of 0,000012/^{0}C, which was standardised at 20^{0}C.
    What measurement must be made at a temperature of 12^{0}C to set out the baseline?   (5 marks)
d) A base line was measured with a tape and found to be 327,250m long. It was subsequently
     found that the tape used was incorrect. What would the correct distance be if the tape was:

(i)   1% too long   (3 marks)
(ii) 0,5% too short   (3 marks)

e)   List five precautions under care and maintenance of steel tapes that you have learnt. (5 marks)

QUESTION 3

a) Fig. 3a shows a contoured plan of an area in which it is proposed to build a reservoir. A
    planimeter was used to measure the plan areas contained between the proposed position of the
    dam wall and several contour lines and the results obtained are shown below. The proposed

mean water level of the reservoir is 257m and the volume below the 230m contour can be neglected. Calculate the volume of the reservoir using any two methods you learnt.

(15 marks)

Results

Planimeter area (m^2)   Level (m)

85312,500   257
77937,300   255
69375,000   250
47587,500   245
 7193,750   240
 1100,000   235
  693,750   230

b) From two points opposite a conical rock dump 30m high, and in a straight line at the base of the dump two men observed the angle of elevation to be 35^0 and 40^0. How for apart are the men?

(7 marks)

c) Define scale of a plan.   (3 marks)

QUESTION 4

a) Reduce the following observations taken along

B.S.	I.S.	F.S.	R.L	REMARKS
				B.M.A
1,067			1000,000	
	1,981			IS_1
	2,591			IS_2
0.610		5,029		CP_1
	3,048			IS_3
	4,877			IS_4
	2,438			IS_1
5,029		0,305		CP_2
	3,200			IS_6
	2,286			IS_7
		1,372		B.M.B

b) Reduce the following levels by the height of collimation method.   (12 marks)

B.S.	I.S.	F.S.	R.L	REMARKS
1,740			1522,730	B.M.I
	1,560			Stn. A
	2,720			Stn. B
2,990		3,260		Stn. C
	2,730			Stn. D
	3,450			Stn. E
0,78		4,460		Stn. F
	2,120			Stn. G
	2,530			Stn. H
	3,210			Stn. J
		4,690		B.M.I

QUESTION 5

A road is to be constructed on an even grade from station A to station J. The existing ground elevations at stations A and J will remain unchanged.
Complete the levelling observations from the road below using the rise and fall method.
Calculate the even grade from station A to J and determine the amount of cut or fill at each station.
                                                                        (25 marks)

STN.	B.S.	I.S.	F.S.	R.L	HORIZONTAL DISTANCE BETWEEN STATIONS (m)
A	2,630			1270,480	-
B		2,290			90
C		2,480			96
D		1,340			104
E	2,180		0,760		92
F	1,830				112
G	1,630				102
H	0,590				92
J			0,150		92

QUESTION 6

Calculate the total area of a small farm shown in fig. 6, using any two methods you have learnt for the irregular bounded area.
                                                                        (25 marks)

END OF EXAMINATION