NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING
BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE
PART II SECOND SEMESTER EXAMINATIONS – MAY 2006

ENGINEERING SURVEYING II – AQS 2204

TIME: 3 Hours   **TOTAL MARKS:** 100

INSTRUCTIONS:

Answer any <u>four</u> Questions.

QUESTION 1

Two roads AB and CD are to be joined by a curve CA of radius 40m as shown in fig. 1.
B and C are points on the centre of the roads having the same reduced levels.
Given
Bearing of road C-D = $281^0\ 12^/\ 00^{//}$

Coordinates (m)

B + 6487,270   +1561,910
C + 6539,580   +1476,520

Calculate the coordinates of A.

(25 marks)

QUESTION 2

Fig. 2 shows a triangulation network at a construction site.

<u>Given</u>

<u>Coordinates (m)</u>

U + 600,584   + 615,620
V + 744,236   + 502,487
X + 769,266   + 814,307

<u>Measured horizontal angles</u>

WUV   = $43^0\ 03^/\ 30^{//}$
UVW   = $61^0\ 39^/\ 10^{//}$

YWX   = $35^0\ 42'\ 20''$
WXY   = $91^0\ 01'\ 50''$

Calculate the coordinates of Y.

(25 marks)

QUESTION 3

The centre point pentagon PQRST with centre station C as shown in fig. 3, is to be used as a horizontal control network. Using the observed angles, adjust the figure for geometrical consistency using any method you learnt.

(25 marks)

Angle	Observed Value
1	$50^0\ 04'\ 02''$
2	$51^0\ 11'\ 17''$
3	$51^0\ 28'\ 57''$
4	$50^0\ 20'\ 48''$
5	$63^0\ 35'\ 47''$
6	$69^0\ 05'\ 54''$
7	$46^0\ 45'\ 11''$
8	$53^0\ 14'\ 47''$
9	$57^0\ 09'\ 34''$
10	$47^0\ 04'\ 09''$
11	$82^0\ 51'\ 55''$
12	$77^0\ 19'\ 52''$
13	$66^0\ 03'\ 28''$
14	$64^0\ 08'\ 58''$
15	$69^0\ 35'\ 42''$

QUESTION 4

a) Three points A,Z and B are collinear. A $01''$ reading theodollite having a multiplying constant of 100 and additive constant of (0) zero was correctly centred and levelled up a height of 1,620m above Z of reduced level 1300m. A levelling staff was held vertically at points A and B in turn and the following readings were obtained:

STAFF POSITION	STAFF READINGS (m)	VERTICAL ANGLE
A	2.140, 1.956, 1.774	$87^0\ 42'\ 33''$
B	2.082, 1.815, 1.546	$93^0\ 16'\ 14''$

Calculate
(i) the horizontal length AB and the reduced levels of A and B.   (15 marks)
(ii) the gradient A to B   (4 marks)

b) List the instrumental errors normally associated with E.D.M. instruments.

(3 marks)

c) List three classes of E.D. Ms based on the type of carrier wave.   (3 marks)

QUESTION 5

Point D was surveyed by sighting the following trigonometrically beacons: A, B and C. (see fig. 5). The following mean observed horizontal angles were obtained;

Mean observed horizontal angles

ADB   = $138^0 \, 06' \, 45''$
BDC   = $98^0 \, 36' \, 25''$
CDA   = $123^0 \, 17' \, 05''$

Given
Coordinates (m)

A + 670,830   + 147,080
B - 484,950   - 276,640
C - 385,720   + 590,550

Calculate the provisional coordinates of D.   (25 marks)

QUESTION 6

Briefly explain the following processes involved in setting out.
a) aims of setting out   (5 marks)
b) care of instruments   (5 marks)
c) plans   (10 marks)
d) regular site inspection   (3 marks)
e) maintaining accuracy   (2 marks)

END OF EXAMINATION