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

**ENGINEERING SURVEYING II – AQS 2204**

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

**INSTRUCTIONS:**

Answer any four Questions.

## QUESTION 1

Describe the Zimbabwean survey coordinate question. (25 marks)

## QUESTION 2

Fig. 2 shows some triangulation network.
Given
Coordinates (m)
A + 469,720 +338,460
B + 268,140 + 116,190

Horizontal angles
BAC = $42^0\,00'\,00''$
ACB = $42^0\,00'\,00''$
ABC = $108^0\,00'\,00''$
CBD = $59^0\,00'\,00''$
BCD = BAC = $42^0\,00'\,00''$
BDC = $35^0\,00'\,00''$

Calculate the coordinates of C and D. (25 marks)

## QUESTION 3

AB represents a track which is required to change direction to C D by means of three equal chords of 120 metres each, the radius of the curve is to be 300 metres as shown in fig. 3. The ends of the chords are to be located by right-angled offsets from the line AB produced. Calculate the distance from B to the offset points, and the lengths of the offsets. by what amount has the direction of the track been changed?

(25 marks)

Horizontal angles

QPR = $36^0$
PQR = $44^0$
QRS = $35^0$
RSQ = $59^0$

Calculate the coordinates of R and S. (25 marks)

**QUESTION 4**

Two curve centres $O_1$ and $O_2$ have to be joined by a straight length of track $T_1$ and $T_2$ tangential to both curves (see gig. 4).

Given

| Coordinates (m) | | Radius (m) |
|---|---|---|
| $0_1$ + 173,955 | + 139,685 | 180 |
| $0_2$ + 220,665 | - 176,005 | 120 |

Calculate the coordinates of $T_1$ and $T_2$ and join $T_1$- $T_2$ (bearing and horizontal distance). (25 marks)

**QUESTION 5**

A closed polygon traverse was run from point A and back to A (see fig. 5).
Given

Bearing A-B = $270^0\ 00'\ 00''$ ,Coordinates: A +500,000 +500,000
From the given information on the diagram and above determine the linear misclosure. (25 marks)

**QUESTION 6**

See fig. 6.
Given
Coordinates
F + 194,800 +98,200
C + 204,200 +88,400

Width of road 3,200m
Bearing A-B = $1800^0\ 00'\ 00''$ = Bearing E - F

Calculate the radius of the inner curve and the coordinates of O. (25 marks)

**END OF EXAMINATION**