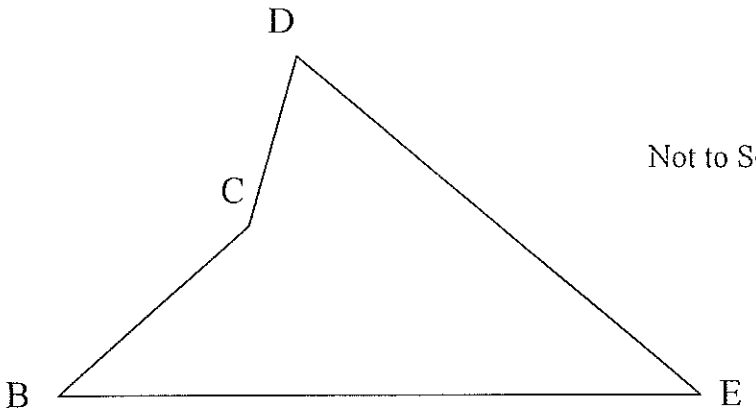
REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERALS AND ENERGY
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY

DATE: 14 October 2005 (Friday) TOTAL MARKS: **100**
TIME: 8:30 to 11:30 (3 Hours) TO PASS: **50**

SURVEY II

Note:
(1) Work to 1 second of arc and 0,001m except where stated otherwise.
(2) All steps and checks must be shown.
(3) Logs and functions must be shown to six (6) decimal places.
(4) Sketches are not drawn to scale.
(5) The make and model number of your calculator **must** be written on the front cover of your answer book.

QUESTION 1



Not to Scale

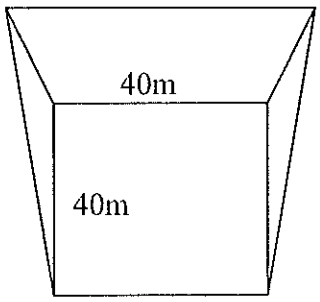
The Area of figure B C D E is 46 850,00m^2

From the information given in the table below you are requested to fill in the missing data.

Angles	Sides (m)	Co-ordinates Y X
B = 16:29:10	BC Missing	B) + 330,000 + 370,000
C = 210:35:50	CD Missing	C) Missing
D = 43:15:20	DE Missing	D) Missing
E = 89:39:40		E) + 490,000 - 70,000

[24 marks]

QUESTION 2



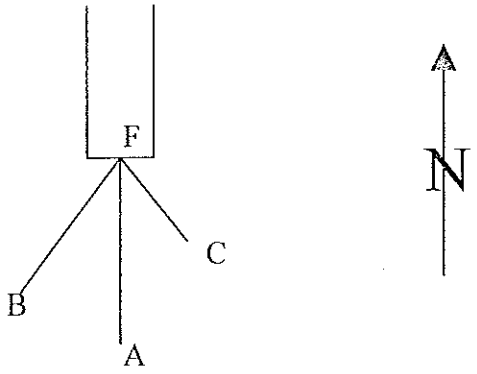
Not to Scale

A building site is to be excavated on a hill sloping at 10° to the horizontal. If the horizontal base of the site is to be 40m by 40m, and the sides of the excavation are to slope at 1m vertical to 1,5m horizontal, calculate the volume of earth to be excavated to the nearest cubic metre.

[13 marks]

QUESTION 3

From the face of a drive being developed in a direction due south, a borehole is drilled from the face in the same direction as the drive. A water fissure is encountered at a distance of 16,75m from the face. In order to determine the strike and dip of the fissure, two other boreholes were drilled and their dips and directions were observed. The 3 boreholes started from the same point F on the face of the drive.



BOREHOLE	DIRECTION	DIP	DISTANCE TO FISSURE
A	Due South	Flat	16,75m
B	S 35° W	+ 40°	14,87m
C	S 47° E	+ 55°	13,94m

Calculate,

(a) The direction of strike of the fissure
(b) The true dip of the fissure

[20 marks]

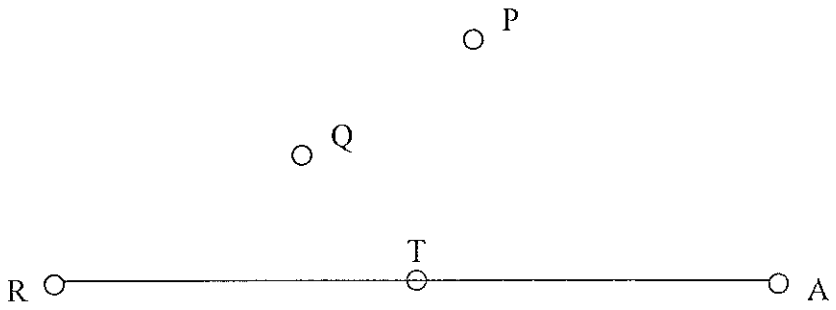
QUESTION 4

From the straight line of a track AR, it is required to lay out a curve which shall,

a) Pass through the two points P & Q
b) Have the straight AR as tangent at point T.

			Y	X
Given	Co ords	A	+ 15,000	- 1 350,000
		P	+ 948,000	- 853,000
		Q	+ 512,000	- 452,000

Direction AR = 04:50:00



Calculate,

i) The co ordinates of point T on straight line AR
ii) The Radius of the curve

[30 marks]

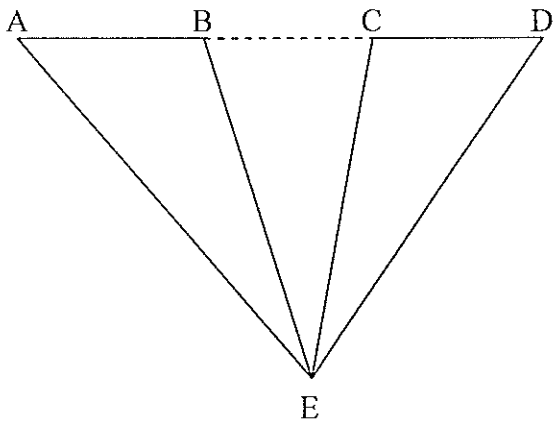
QUESTION 5

AB and CD are two portions of a base line separated by the portion BC that cannot be directly measured. An instrument is set up at E, and readings are taken to A, B, C and D (A, B, C and D are on a straight line).

Given.

Distance AB	=	152,989 m
Distance CD	=	126,473 m
Angle AEB	=	34° 09' 09"
Angle BEC	=	10° 46' 25"
Angle CED	=	33° 45' 23"

Calculate the distance BC.



[13 Marks]

[Total 100 marks]