

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

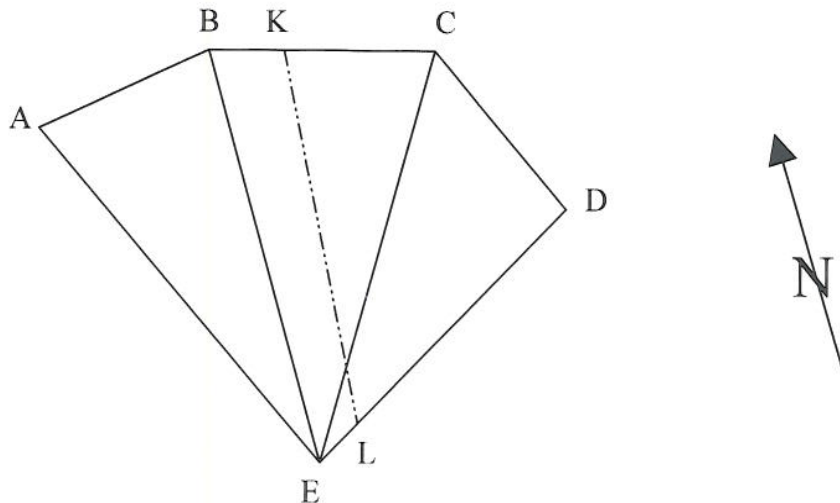
DATE: 11 April 2003 (Friday)
TIME: 08:30 to 11:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

SURVEY II

- Note:**
- (1) Work to 1 second of arc and 0.001m.
 - (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



SIDE	DIRECTION		ZERO WEST		AREA
			Y	X	
AB	146:03:00	B	+ 72,700	- 157,300	ABE = 1 211,7m ² BCE = 1 785,2m ² CDE = 1 721,2m ²
BC	169:10:00	C	+ 82,800	- 210,100	
CD	216:46:00	D	+ 54,700	- 247,700	
DE	324:52:00	E	+ 10,300	- 184,600	
EA	36:22:00	A	+ 52,500	- 127,300	

The above information is contained in a surveyor's diagram of a piece of ground A B C D E, made up of 3 triangular portions ABE, BCE, and CDE.

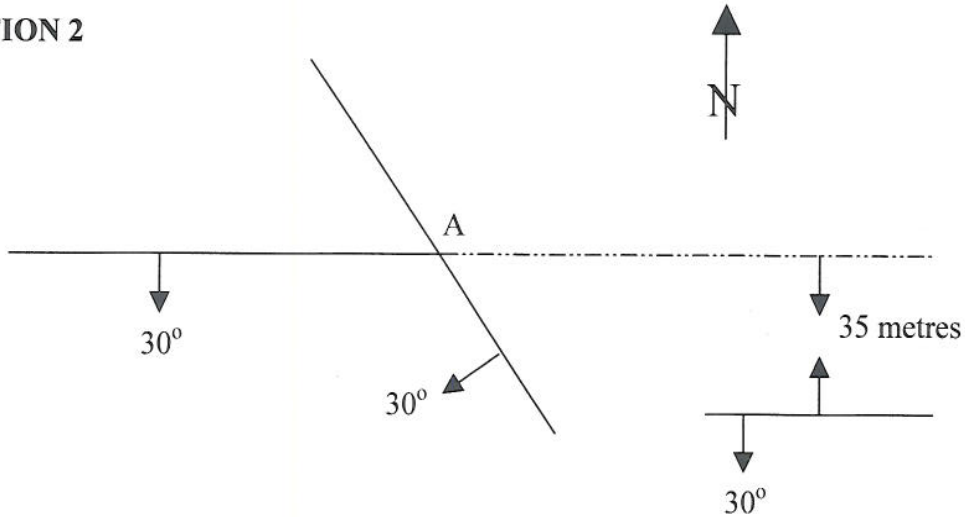
It has been decided to divide the area into two equal portions by a line KL, which is to have a true north-south direction. Preliminary survey has disclosed that point K will fall on BC and point L on DE.

Calculate the following,

- a) The co ordinates of point K
- b) The length of line KL

[28 marks]

QUESTION 2



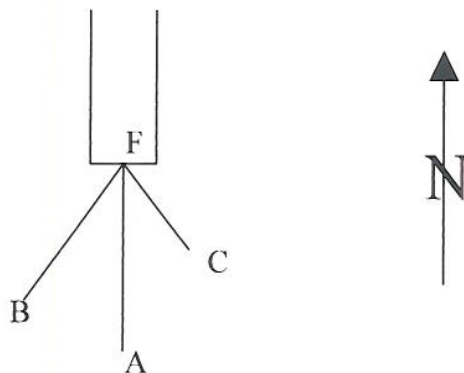
A drive proceeding on strike in a direction due East (zero south), encounters a fault at point A with a dip and strike shown in the above sketch plan. The reef which dips due south at 30° is displaced a horizontal distance of 35 metres to the south by the fault.

Calculate the inclination, direction and length of the shortest borehole that can be drilled from point A to intersect reef on the Eastern side of the fault.

[10 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,

- The direction of strike of the fissure
- The true dip of the fissure

[20 marks]

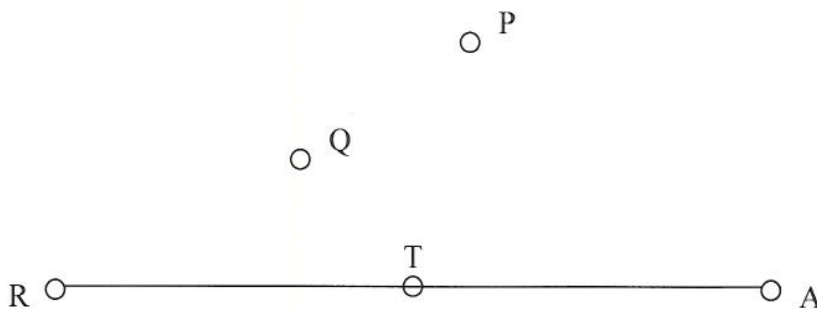
QUESTION 4

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

- Pass through the two points P & Q
- Have the straight AR as tangent.

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

Direction AR = 04:50:00



Calculate:

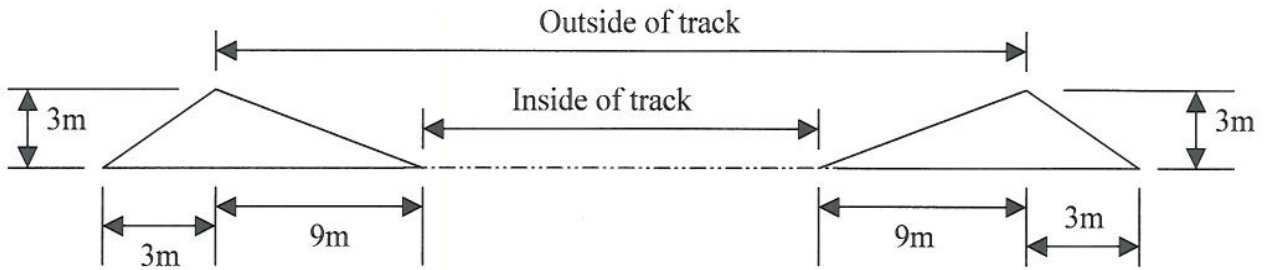
- The co ordinates of point T on straight line AR
- The radius of the curve

[30 marks]

QUESTION 5

A circular track is laid out on level ground. The inside circumference is 400m and the sides slope 1 to 3 on the track and 1 to 1 towards the outside of the bank. The base of the bank is 12m wide.

Sketch not to scale



Calculate the volume of the bank in cubic metres.

[12 marks]

[Total 100 marks]