

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF MINERALS AND ENERGY

EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF COMPETENCY

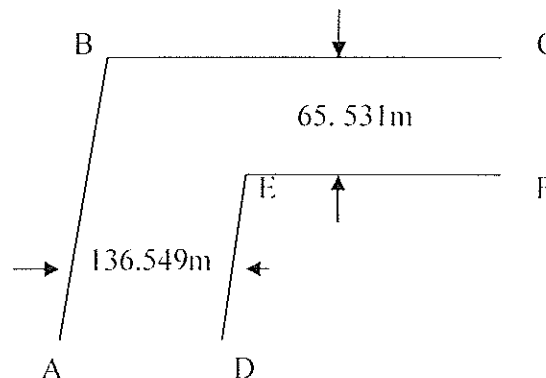
DATE: 21 April 2006 (Friday)  
TIME: 8:30 to 11:30 (3 Hours)

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 I



AB and BC form the Northern and Western boundary lines of a mine. B being the south – west corner.

The railway administration is expropriating an area inside the mine boundary bordered by lines DE and EF. DE is parallel to and 136.549 metres east of AB and EF is parallel to and 65.531 metres south of BC.

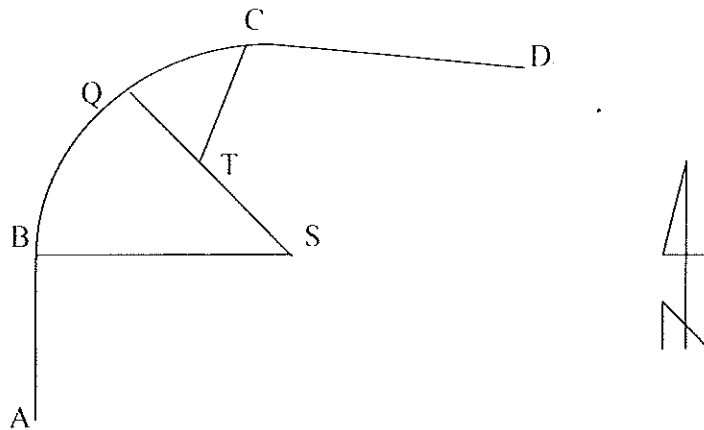
The co-ordinates of B: Y - 108.950 X - 2 860.288.

The directions BA and BC are  $4^{\circ}01'30''$  and  $267^{\circ}25'00''$  respectively

Calculate the co-ordinates of E.

[18 marks]

QUESTION 2



AB and CB are the center lines of two straight stretches of a railway which are to be connected by means of a double curve BQC. BQ is the one and QC the other circular curve.

Given:

	Co-ordinates		Directions
	Y	X	
B ±	0,000	± 0,000	AB = 180°00'00"
C -	140,000	- 166,667	DC = 97°00'00"

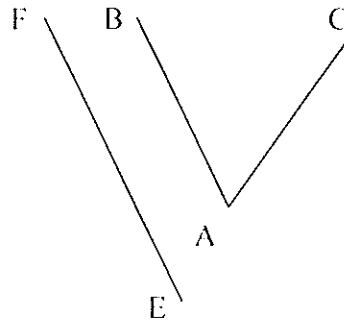
Radius of curve BQ is 200,000 metres

Calculate:

1. The co-ordinates of Q
2. The radius of the circular curve QC.
3. The co-ordinates of T
4. The total length of the curve BQC.

[20 marks]

QUESTION 3



Stations A, B, C have been surveyed in a stope. The line AB is parallel to the boundary EF and B and C are on the same elevation

Given :	Y	X
Co-ordinates of E:	+294,252	-26,055
Co-ordinates of A:	+279,840	-38,856

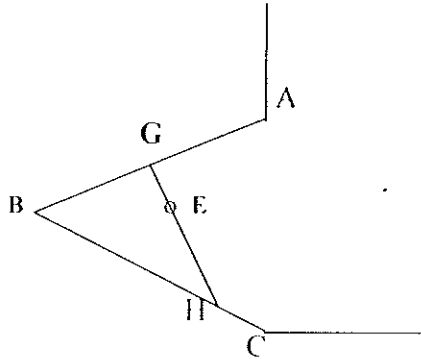
Direction AB or EF	=	154°00'00"
Horizontal angle BAC	=	70°00'00"
Dip of the line AB	=	43°00'00"
Dip of the line AC	=	38°13'00"

Calculate:

1. The strike and dip of the reef in the stope.
2. The distance at right angles to the line AB to which stoping can proceed so as to leave a 9 meter boundary pillar on the plane of the reef.

[20 marks]

QUESTION 4



Given the co-ordinates of the points A, B, C and E, it is required to cut off Area BGH equal to half Area ABC with a line GH passing through E

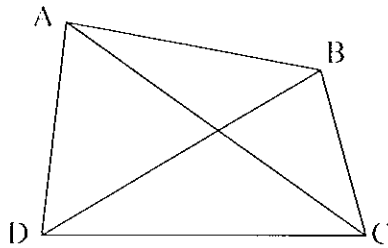
Co-ordinates

	Y	X
A	-336.990	+ 70.692
B	- 83.580	+ 92.719
C	-326.789	+307.854
E	-242.608	+114.369

Calculate the co-ordinates of G and H.

[30 marks]

QUESTION 5



The results of a survey of area ABCD in which a sludge disposal dam is situated are recorded as follows:

Direction AC =	329°58'37"	Distance AC =	192.396m
Direction BD =	80°22'45"	Distance BD =	174.323m

Calculate area ABCD

[12 marks]  
[Total 100 marks]