

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF MINERALS AND ENERGY

EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF COMPETENCY

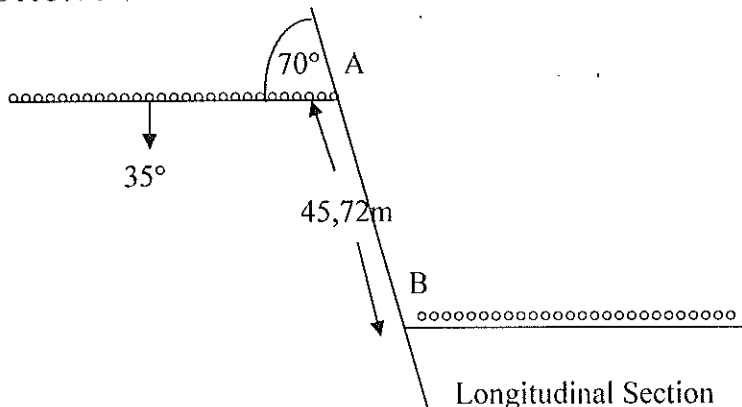
DATE: 18 April 2008 (Friday)
TIME: 8:30 to 11:30 (3 Hours)

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) 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



The above sketch is a longitudinal section of a reef – fault dislocation, the section being drawn parallel to the strike of the reef, which is due East and West.

The strike of the fault is N 30° E, by S 30° W, and the dip of the reef is 35° South.

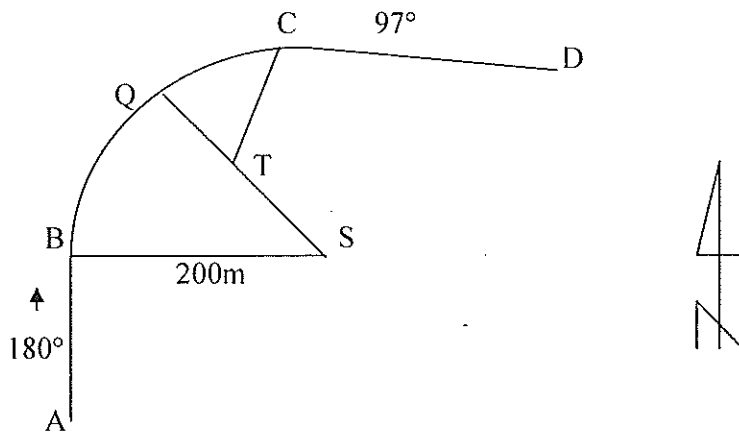
The reef is thrown down to the East a distance AB equal to 45,72 metres along the fault, which dips 70° in the direction of the section.

Calculate:

1. The distance from A of a level crosscut along the fault to the reef on the East side of the fault.
2. The true dip of the fault.
3. The direction of the line of intersection of the reef and the fault.

[18 marks]

QUESTION 2



AB and CD are the centre 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"

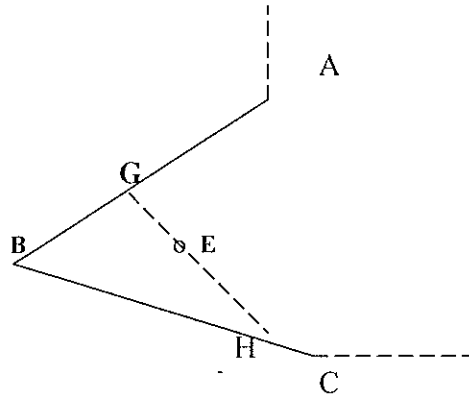
Radius of curve BQ is 200,000 metres

Calculate:

1. The co-ordinates of Q
2. The radius of the circular curve QC (i.e. the length of TC).
3. The co-ordinates of T, the centre of the circular curve QC.
4. The total length of the curve BQC.

[20 marks]

QUESTION 3



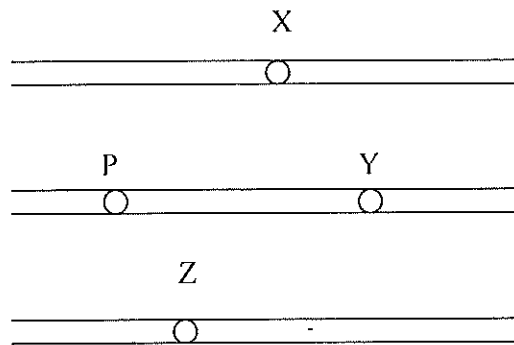
Given the co-ordinates in metres of the points A, B, C and E, it is required to cut off Area BGH equal to half Area ABC with a line GH passing through E

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.

[25 marks]

QUESTION 4



A portion of a mine plan is shown in the above sketch. X, Y and Z are pegs in the immediate hanging of three reef drives and P is a fourth peg also in the immediate hanging of the reef drive. Peg P has exactly the same elevation as Y and the horizontal distance Y to P is 151,592 metres.

Given :

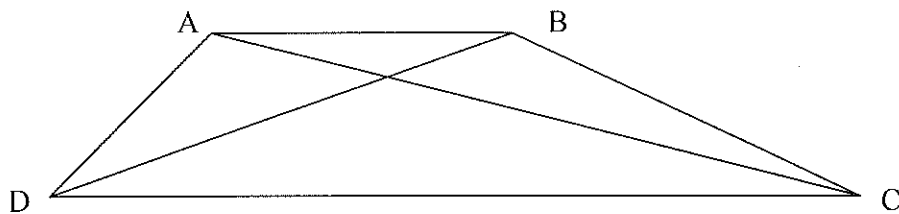
Co-ordinates (metres)		Elevation A.M.S.L (metres)
Y	X	
X – 644,796	+657,174	1 109,121
Y – 746,789	+743,355	1 037,518
Z – 613,929	+822,423	976,729

Calculate:

1. The co-ordinates of point [P]
2. The tonnage of the reef to be mined per hectare if the expected stope width is 150cm and assuming that the dip is constant throughout the area shown and the density of the ore is $2,72 \text{ t/m}^3$.

[20 marks]

QUESTION 5



The above sketch shows beacons A, B, C and D

Given :

	Co-ordinates (metres)		
	Y	X	
A	+ 99,231	+ 37,021	Angle ADB = $34^{\circ}22'10''$
B	+ 75,757	+ 36,889	Angle BDC = $26^{\circ}54'30''$
			Angle DCA = $19^{\circ}35'00''$
			Angle ACB = $17^{\circ}19'30''$

Calculate the co-ordinates of C and D.

[17 marks]

[Total 100 marks]