

REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF MINERALS AND ENERGY

EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF COMPETENCY

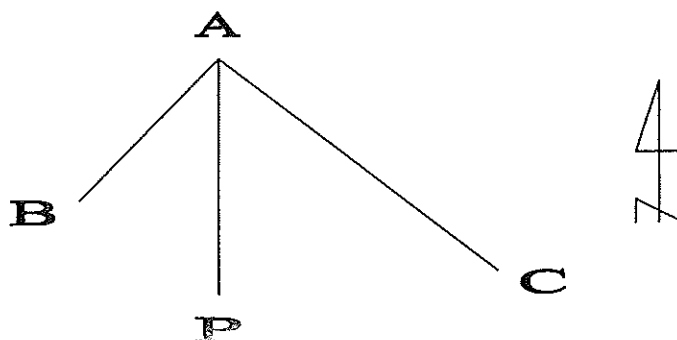
DATE: 13 October 2006 (Friday)
 TIME: 8:30 to 11:30 (3 Hours)

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 1



A, B and C are three vertical boreholes which have intersected a reef plane and it is proposed to sink an haulage at an inclination of -15° from point P on surface to meet this reef plane.

Given:

	Elevations Meters (A.M.S.L)	Horizontal Distances (metres)	Directions
Reef plane at A:	1 524,000	AB: 246.540	$\angle AB = 40^\circ 00' 00''$
Reef plane at B:	1 488,780	AC: 670,560	$\angle AC = 300^\circ 00' 00''$
Reef plane at C:	1 463,040	AP: 835,649	
Elevation of P:	1 543,148 metres A.M.S.L.		

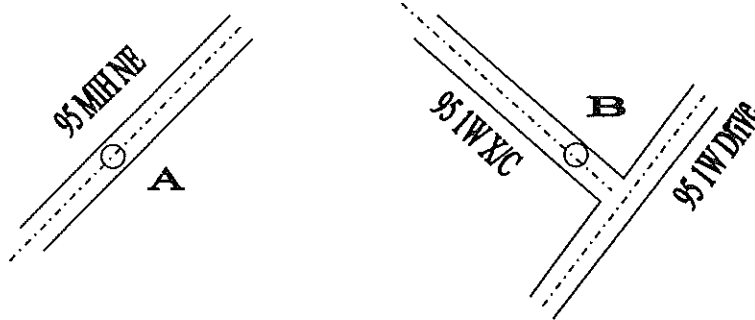
Direction AP = Direction of dip of reef plane
 Direction PA = Direction of inclined haulage

Calculate:

1. The direction of the dip of the reef plane
2. The true dip of the reef plane
3. The horizontal distance from P at which the inclined haulage will meet the reef plane and the elevation thereof.

[20 marks]

QUESTION 2



95 1W X/C , which has been set off from 95 1W Drive in the direction $131^{\circ}16'00''$ is to be connected by means of a circular curve having a radius of 60.0 metres with 95 MIH NE which is advancing in the direction $207^{\circ}28'00''$.

The co-ordinates of A, a station on the centre line of the Haulage, are:

$$Y + 16\,277,532 \qquad X + 3\,110,928$$

The co-ordinates of B, a station on the centre line of the cross-cut are:

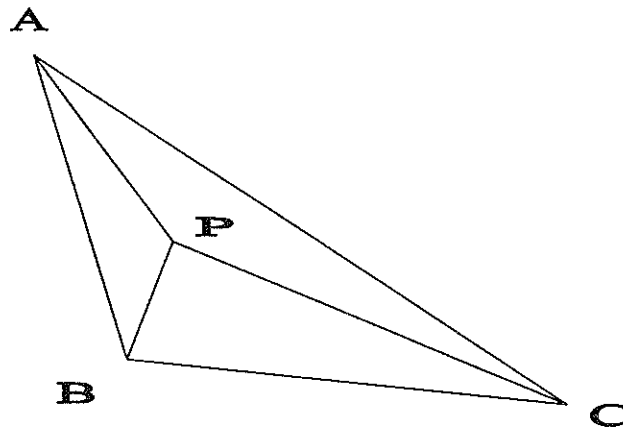
$$Y + 16\,111,269 \qquad X + 3\,064,974$$

Calculate:

1. The co-ordinates of the point which is common to both centre lines and the distances from this point to the beginning and end of the curve.
2. The distance remaining to be done to effect holing when the measurements to faces are:
A + 12.0 meters
B + 6.3 meters

[25marks]

QUESTION 3



It is required to sub-divide the Owners Reservation ABC from common point P so that the areas ABP, APC and BPC are in the ratio 1:2:3.

Y	X
A + 1 217,420	- 1 123,600
B + 963,322	- 1 037,840
C + 762,177	- 1 317,151

Calculate the co-ordinates of P.

[18 marks]

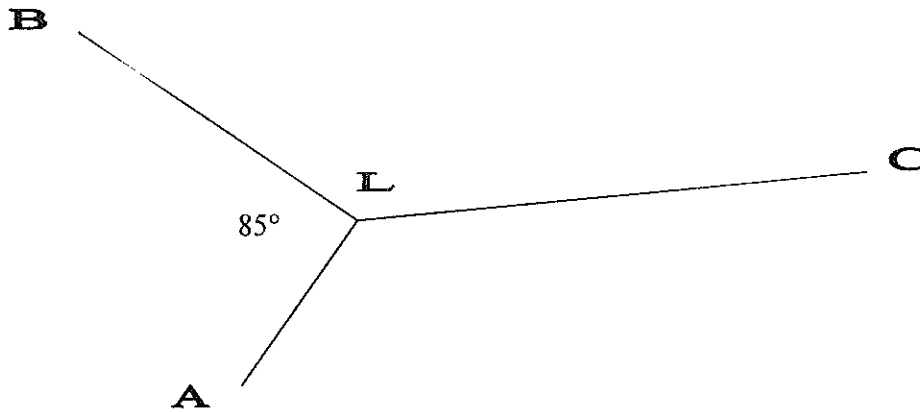
QUESTION 4

In the sketch below, L is an unknown point and only the angle ALB was surveyed.

Given,	Y	X
	A + 450,000	+ 150,000
	B + 400,000	- 120,000
	C + 158,560	- 93,970

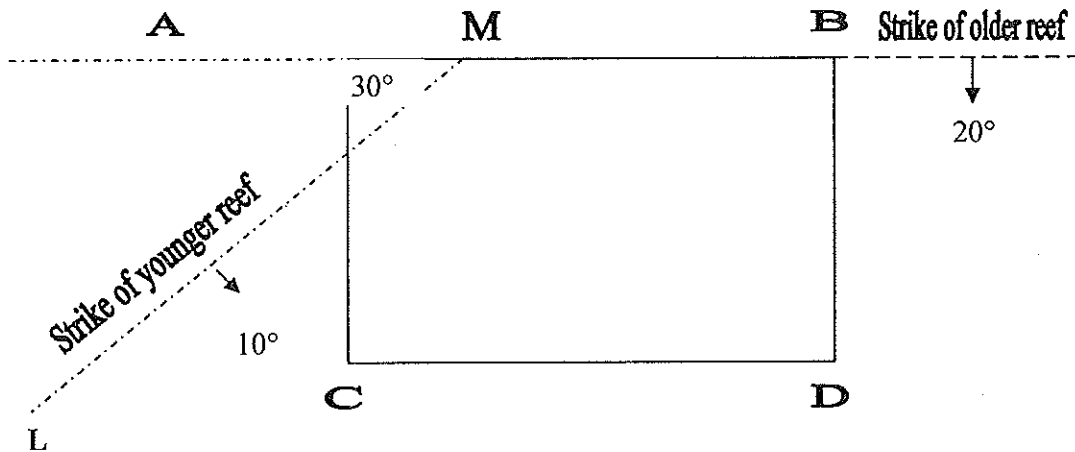
Angle ALB = $85^{\circ}00'00''$

Direction CL = $46^{\circ}19'20''$



[20 marks]

QUESTION 5



A rectangular block of ground ABCD contains two unconformable reefs. AB is the strike of the older reef at a certain elevation and LM is the strike of the younger reef at the same elevation, lying unconformably and cutting out on the older.

Given:

- AB = DC = 2 000 metres
- AD = BC = 1 000 metres
- AM = 400 metres
- Angle AML = 30°

Calculate:

1. The area ABCD in hectares
2. The area in hectares within the block ABCD underlain by both reefs

[17 marks]
[Total 100 marks]