

REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERAL RESOURCES

**EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF
 COMPETENCY**

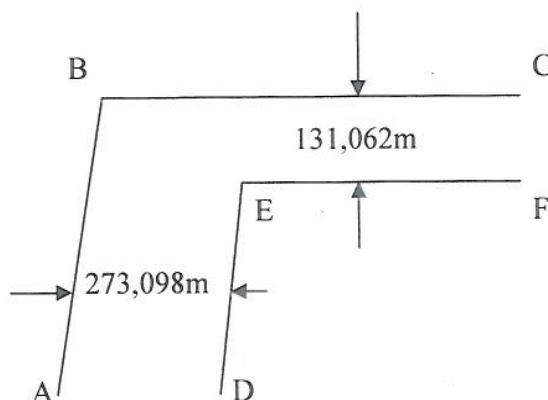
DATE: 15th October 2010 (Friday)
 TIME: 8:30 to 11:30 (3 Hours)

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



AB and BC form the Western and Northern boundary lines of a mine, B being the North – West corner.

The railway administration is expropriating an area inside the mine boundary bordered by lines DE and EF. DE is parallel to and 273,098 metres East of AB and EF is parallel to and 131,062 metres South of BC.

Y X

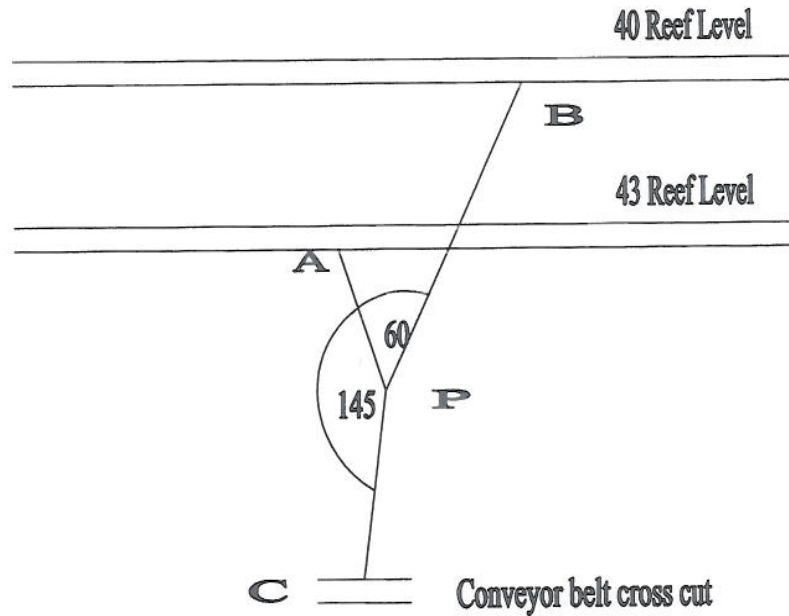
The co-ordinates of B are :- - 217,900 - 5 720,576

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



Proposed ore passes AP from 43 Reef level and BP from 40 Reef level could pass ore as required to the grade control ore pass PC which feeds on to the vertical shaft loading chute conveyor belt. The fixed points A, B, C and the proposed point P are in the same vertical plane and the angles at P as shown in the sketch above have been determined graphically.

It is required to define point P so that a cross cut could be driven from the shaft to this control point.

Given:

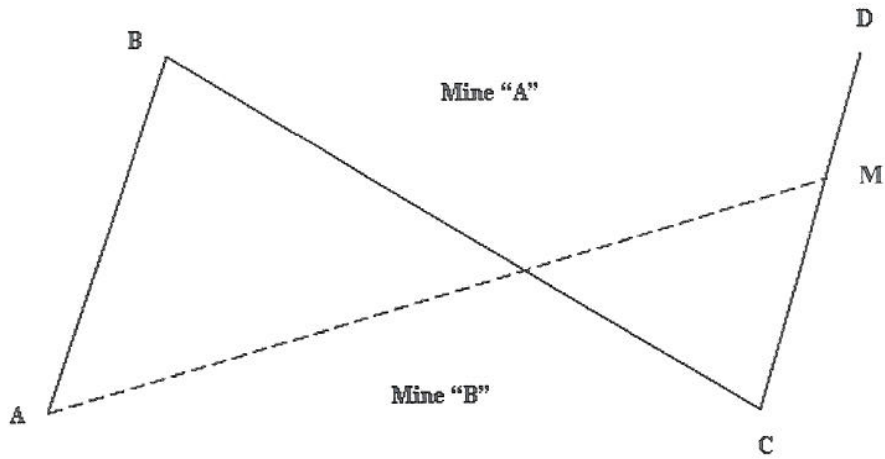
Co-ordinates (metres)		Elevation
Y	X	metres A.M.S.L
A + 1591,695	+ 705,432	481,493
B + 1561,219	+ 705,432	496,733
C + 1584,079	+ 705,432	435,773

Angles APB = 60°
 APC = 145°

Calculate the co-ordinates and elevation of point P and the dip of the three ore passes.

[25 marks]

QUESTION 3



It has been decided to enter into a ground swap agreement between Mine "A" and Mine "B". Points A, B, C and D are beacons along a portion of the boundary line between the two properties.

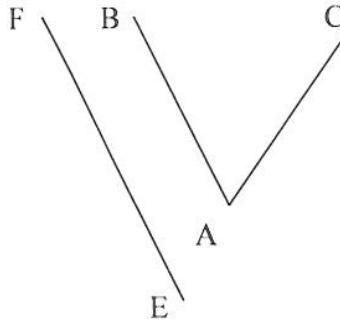
Given:

	<u>Co – ordinates</u>	
	Y	X
A	+ 429,364	+ 1284,924
B	+ 461,752	+ 1261,296
C	+ 415,472	+ 1206,140
Direction C-D =	120°00'00"	

Calculate the co-ordinates of beacon M on the line CD so that the new boundary line defined by beacon A, M and D will not alter the areas of either mining company.

[15 marks]

QUESTION 4



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:	+588,504	-52,110
Co-ordinates of A:	+559,680	-77,712

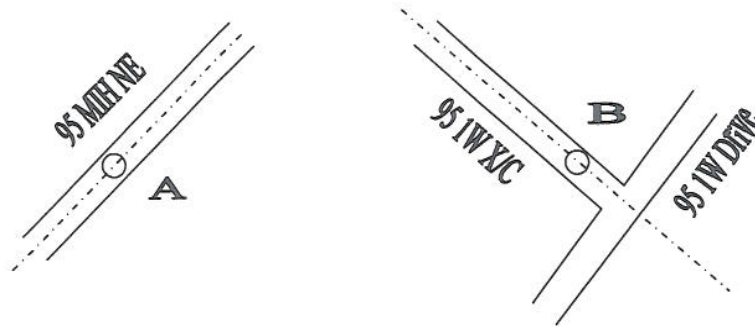
Direction AB or EF	=	154°00'00"
Horizontal angle BAC	=	70°00'00"
Dip of the line AB	=	43°15'00"
Dip of the line AC	=	38°13'00"

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 metre boundary pillar on the plane of the reef.

[17 marks]

QUESTION 5



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 120.0 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:

$$Y + 32\,555,064 \qquad X + 6\,221,856$$

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

$$Y + 32\,222,538 \qquad X + 6\,129,948$$

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:

$$A + 12,0 \text{ metres}$$

$$B + 6,3 \text{ metres}$$

[25 marks]

[Total 100 marks]