



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

## **MINE SURVEYOR'S CERTIFICATE OF COMPETENCY EXAMINATION**

### **SURVEY II**

**DATE:** 03 May 2017

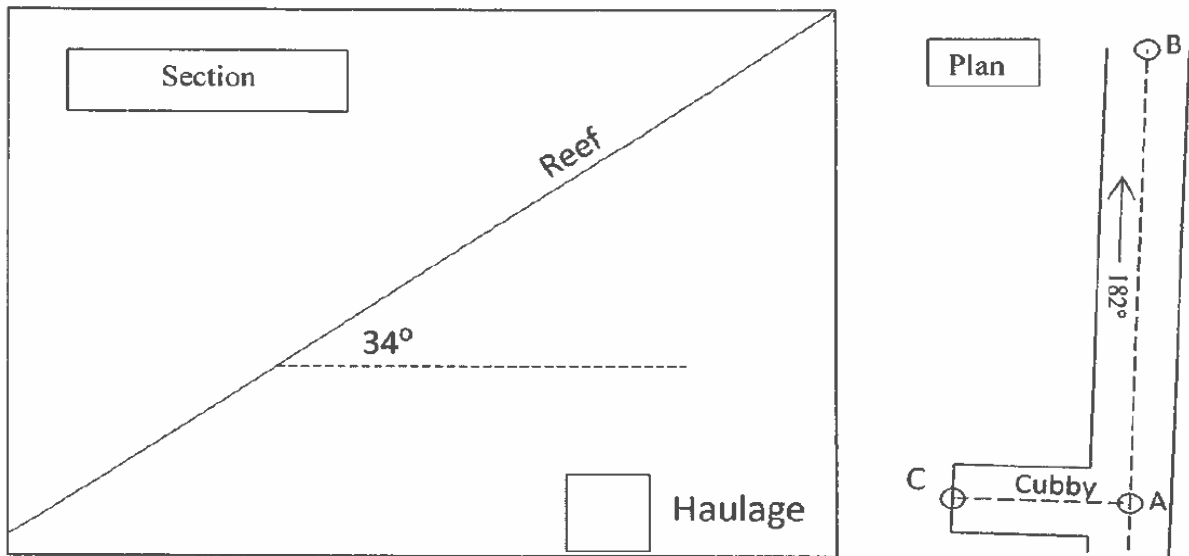
**TOTAL MARKS:** 100  
**TO PASS:** 50

**TIME ALLOWED:** 3 HOURS  
(08h30 to 11h30)

**NOTE:**

- This question paper consists of **SIX** pages including cover page.
- All questions must be answered.
- All answers and sketches to be presented in a neat and decipherable manner. Papers will not be marked if not decipherable.
- Restrict the use of highlighters.
- Do not use a red pen.
- Read the instructions on the front page of your answer book carefully.
- No cellular phones shall be allowed in the examination venue.
- The use of computers, laptops and palmtops is prohibited.
- All steps and CHECKS must be done.
- The make and model number of your calculator must be written on the front cover of your answer book.

Question 1



Peg	Y Coordinate	X Coordinate	Roof Elevation (A.M.S.L)
A	-2249,302	6269,988	
B	-2250,000	6250,000	1051,000

Join Information

Dir. A – B = 182° 00' 00"

AB = 20,000m

Reef Information

True Dip of reef = 34° and direction of true dip = 90°

Reef Strike: South to North = 180°

Ave. Width of Reef = 220cm

Roof elevation of the reef directly above Peg B = 1083,1

Survey Information

Grade of haulage in the direction of development = 1 : 100

Depth of cubby = 5,0m

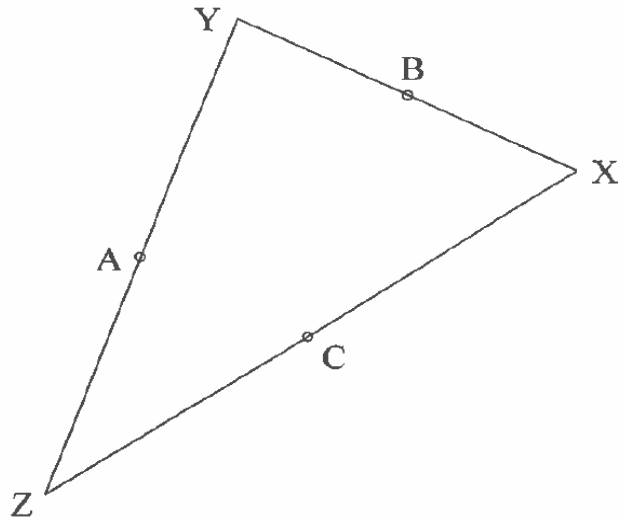
Height and Width of the haulage and cubby = 3,0m

It can be assumed that the roof of the haulage is at an even grade and that the cubby is flat in gradient and at right angles to the haulage.

Calculate the coordinates of the position where the shortest borehole, as drilled from C, will intersect the floor of the reef plane.

[22 marks]

Question 2



In triangle XYZ A, B and C are midpoints of the sides YZ, XY and XZ respectively. If,

$$BC = 3m$$

$$YX = 3m + \left(\frac{m}{2} + 3,027\right)$$

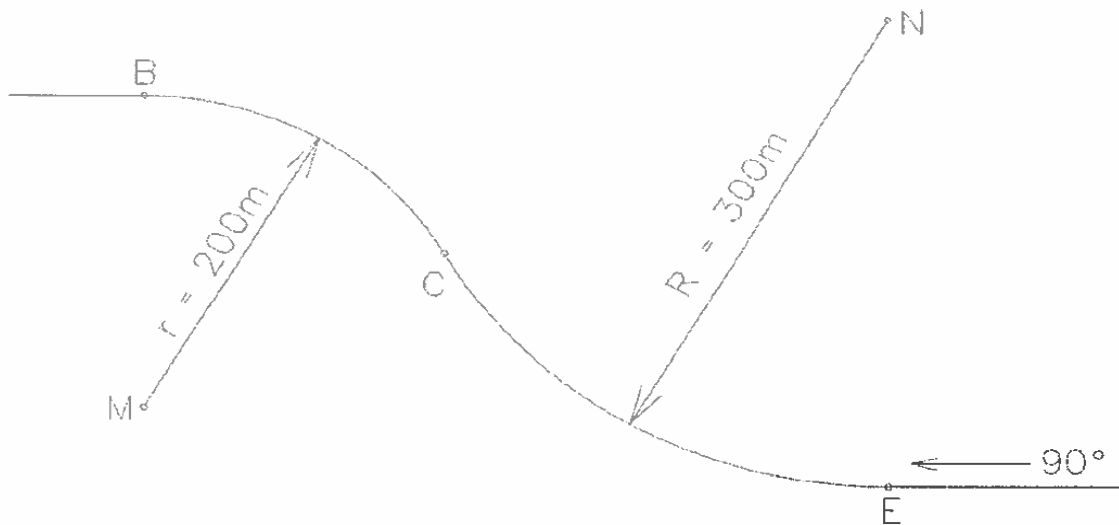
$$AB = \sqrt{59,8753m}$$

$$YZ = 4m + 10$$

Calculate the surface area of triangle XYZ.

[12 marks]

**Question 3**



It is required to connect two haulages, which are parallel to each other and 250m apart, by means of reverse curves consisting of two circular simple curves.

Coordinates of E:  $-50,000$        $+ 627,000$

Direction of development from E =  $90^\circ 00' 00''$

$r = 200\text{m}$

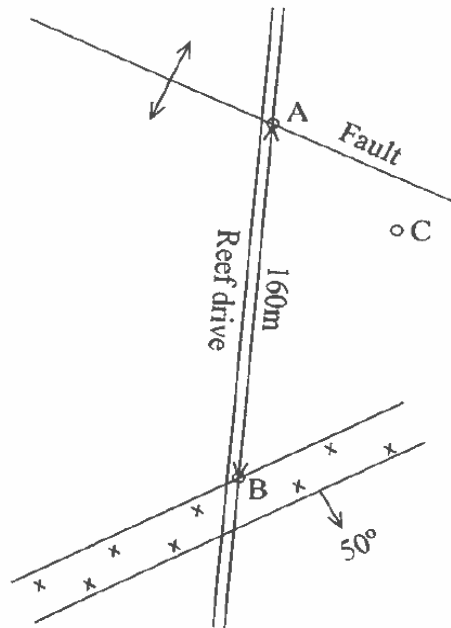
$R = 300\text{m}$

Calculate:

- the coordinates of the transit point C,
- the coordinates of the point of intersection (P.I.) of both curves
- and the chords for both curves.

[22 marks]

Question 4



Station	Y	X	Z (A.M.S.L.)
A	-1013,945	840,609	894,000
B	-1000,000	1000,000	894,000
C	-1065,022	888,567	928,407

Direction of strike of reef             $185^{\circ} 00' 00''$   
 Direction of strike of dyke             $63^{\circ} 00' 00''$   
 Direction of strike of fault            $115^{\circ} 00' 00''$   
 Direction A - C                             $313^{\circ} 11' 46''$

Distance of reef drive A - B = 160,00m  
 Distance A - C = 70,063m

Dip of dyke =  $50^{\circ}$

Density of rock = 2,75

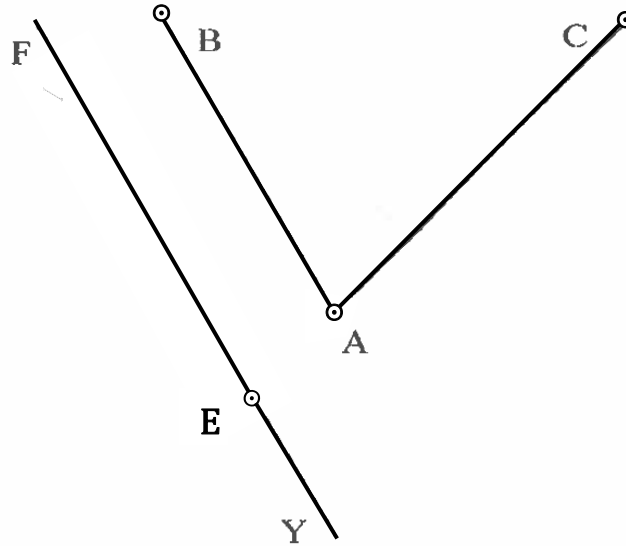
Average reef width = 102cm

Calculate:

- a) The area available for mining between the reef drive, the dyke and the fault.

[22 marks]

Question 5



Stations **A, B, C** are survey stations in a stope. The line **AB** is parallel to the boundary **EF**. Stations **B** and **C** are on the same elevation.

Station	Y	X
E	+ 294,252	- 26,055
A	+ 279,840	- 38,856

Direction EF =  $154^{\circ} 00' 00''$   
 Horizontal angle BAC =  $70^{\circ}$

Dip of the line AB =  $43^{\circ}$   
 Dip of the line AC =  $38^{\circ} 13' 00''$

From the information given, calculate

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

[22 marks]