

REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERALS AND ENERGY
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY

DATE : 17 APRIL 2008
TIME : 08h30 To 11h30

TOTAL MARKS : 100
TO PASS : 50

SURVEY 1

QUESTION 1

a) Define the following terms

- i) Magnetic declination
- ii) Grid North
- iii) Isogonic lines
- iv) Meridian convergence
- v) Azimuth
- vi) Agonic lines
- vii) Prime Meridian
- viii) Mercators Projection

b) Name the three methods of projection .

[14]

QUESTION 2

- a) What does WGS84 stand for ?
- b) Describe what is WGS84 and why was there a need for it ?

[15]

QUESTION 3

- a) Sketch a coradi planimeter and name parts thereof.
- b) Briefly describe the difference between a coradi planimeter and a digital planimeter.
- c) A planimeter set to read 25cm^2 gives a reading of 28,24 when traced over a reef-bearing area plotted on a plan drawn to a scale of 1 : 200. Given the average dip of the reef as 34° , relative density of rock $2,75\text{ t / m}^3$ and the stopping width 104cm. Calculate the tonnage available for stoping in this area.

[15]

QUESTION 4



A, B and C are three points in a straight line, the distance AB and BC being 150m and the points are all at the same elevation. S is a point on the top of a sand dump. A theodolite is set up over point S at a height of 1,489m and observations made of vertical angles to the three points A, B and C as follows

Instrument at S	Vertical angles (negative)		
to A	30°	10'	06"
to B	27°	15'	33"
to C	17°	47'	21"

Calculate the height of point S above point A.

[15]

QUESTION 5

- Name the corrections applied to Electronic Distance Measurements.
- Calculate the instrument constant for an EDM that measured the following :

AD	=	271,512 m
AC	=	150,405 m
AB	=	50,476 m
BC	=	100,066 m
CD	=	121,252 m

A, B, C, D is a straight line

[8]

QUESTION 6

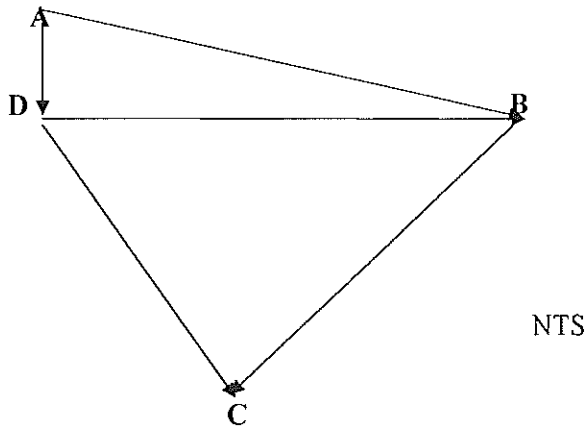
An abandoned gold mine in which a considerable amount of development work had been done, is completely flooded. No records of the mine are available, but a rock dump on level ground and containing all the development rock hoisted from the mine has been left intact. A contour plan of this 5 metre high dump has been plotted to a scale of 1 : 1000. Given the following information, calculate the estimated period required to dewater the mine, pumping at the rate of 0,15 megalitres per hour for 15 hours per day.

Area : top of dump	=	31 cm ² measured on plan
Area : base of dump	=	234,8 cm ² measured on plan
Area : at 2,5 m contour	=	107,7 cm ² measured on plan
Density of rock in situ	=	2,75 t/m ³
Density of broken rock	=	1,65 t/m ³

Assume there is no further inflow of water

[15]

QUESTION 7



Given :

$$\begin{bmatrix} \text{A} \\ \text{B} \end{bmatrix} \begin{matrix} -962,694 & + & 3\,915,607 \\ -1\,944,214 & + & 3\,999,504 \end{matrix}$$

It is impossible to take observations from A but at D which is 10,001 metres away from A, the angle ADB is found to be $88^{\circ} 20' 00''$.

Also given angle BDC $58^{\circ} 25' 00''$

angle CBD $66^{\circ} 30' 00''$

Calculate co - ordinates of C

[18]

TOTAL [100]