

**REPUBLIC OF SOUTH AFRICA  
DEPARTMENT OF MINERAL RESOURCES  
EXAMINATION FOR THE MINE SURVEYORS CERTIFICATE OF COMPETENCY**

**DATE: 14<sup>th</sup> April 2011  
TIME: 8:30 to 11:30**

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

**SURVEY 1**

### Question 1

(a) Briefly describe photogrammetry with reference to the following

- application
- ground control
- pre-marking
- post-marking

Use sketches where applicable. (14)

(b) Mention ten sources of errors and mistakes when taping. (10)

[24]

### Question 2

A development haulage with cross-sectional dimensions of 3,5m wide and 3,0m high has an arched roof which is 4,5m above the footwall of the haulage. If the haulage is developed for a distance of 52,5m calculate the tonnage of rock broken. Density is  $2,70\text{t/m}^3$ .

[10]

### Question 3

(a) Explain very briefly the following terms:

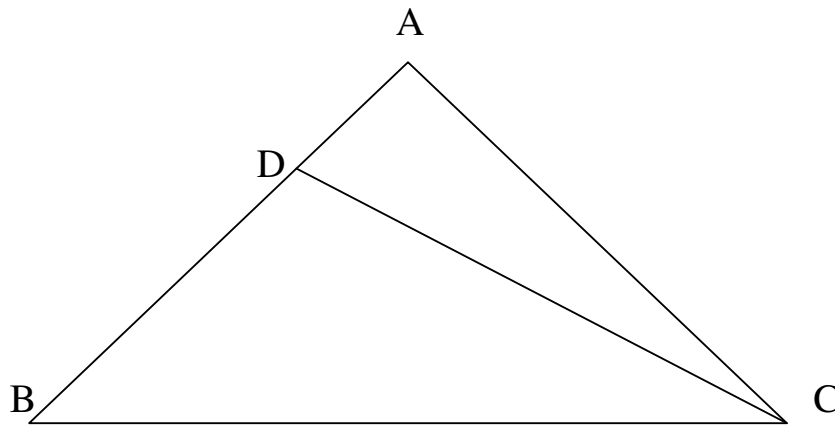
- (i) Isogonic lines
- (ii) Equator
- (iii) Azimuth
- (iv) Great circles

- (v) Pantograph
- (vi) Graticule
- (vii) Magnetic meridian
- (viii) Contour line
- (ix) Poles
- (x) Meridian (10)

(b) Name six characteristics of contours. (6)

[16]

#### Question 4



ABC represents a triangular piece of ground and it is required to lay out a fence from point C to D, so that the area ACD is one third of the area ABC.

Given :

	Y co-ordinates	X co-ordinates
[A]	+3 257,526	+4 623,311
[B]	+3 223,814	+4 672,778
[C]	+3 205,746	+4 625,900

Calculate the co-ordinates of point D.

[20]

## Question 5

Name Of Instrument	Uses
Transit theodolite	
Vernier	
Pantograph	
Laser	
Chains	
Spirit level	
Distomat	
Gyro	
Planimeter	
Plane table	

[10]

## Question 6

A line peg has been placed on direction in an ore pass (box hole) about 2,0m to 3,0m up from a peg in a cross-cut. The theodolite used got damaged and became useless. Show how you would determine the horizontal distance and the elevation difference between these two pegs, using a short steel tape and plumb bobs.

Clearly state the underground and office procedure. As a check in the survey office, graphically show how to determine the chain lengths at a grade of  $+55^\circ$ .

[20]

TOTAL MARKS [100]