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

DATE : 15 October 2009
TIME : 8h30 to 11h30

TOTAL MARKS: 100
TO PASS : 50

SURVEY 1

Question 1

(a) Name and describe the four (4) different types of Levels

(b) With the help of notes and sketches describe how you would adjust a Level.

[15]

Question 2

The following observations were taken over ground which a furrow 3,5m wide and vertical sides has to be cut. The furrow will slope at an even grade between station A and B.

STATION	B/S	I/S	F/S	REDUCED ELEVATION	HD FROM A (m)
A	1,450			+ 217,350	0
1		1,910			60
2		2,160			120
3	1,520		2,780		180
4		1,715			240
5		2,085			300
6	1,050		2,710		360
7		1,710			420
8		1,970			480
B			2,980		534

Calculate the grade of the furrow and the volume in the excavation.
Use Simpson and Trapezoidal Rules. Show all checks.

[28]

Question 3

Complete the following table.

Name of instrument	Uses
1. Stereometer	
2. Sextant	
3. Optical square	
4. Gyro	
5. Plane table	

[10]

Question 4

An ore pass (box hole) is to be started at a required grade of +60°. From the information below, calculate the lengths of the chains to give the required inclination.

Given:

Instrument at Peg 123

Height of instrument = 0,551 m

Elevation of Peg 123 = + 1 653,212

Grade of elevation of Peg 123= +1 652, 389

	Vertical angle	Slope distance	Bob height
FLP top button	+ 56:45:30	2,758 m	0,555 m
FLP bottom button	+ 38:00:20	1,919 m	1,680 m

Show all checks.

[20]

Question 5

The following magnetic bearing in a closed traverse of a quadrilateral ABCD have been adopted.

A - B = N 39° 45′ E

A - C = S 81° 30′ E

C - B = N 37° 40′ W

C - D = S 25° 00′ W

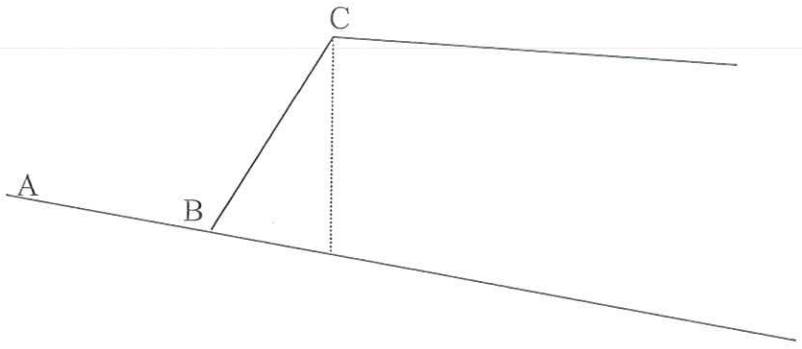
(a) Draw a sketch to indicate the quadrilateral.

(b) Calculate the internal angles at A, B, C and D.

(c) Show all checks.

[13]

Question 6



An instrument was set up at point A on the ground and the vertical angle taken to point C on top of a dump. The telescope was depressed and a mark B established on the ground in line with A and C. The vertical angle and the stadia readings were observed from A and B. At B the vertical angle was taken to C.

Given:

Multiplying constant of the instrument = 100

Addictive constant of the instrument = Nil

Elevation at point A = +1 712, 801m

Height of the instrument at A and B = 1,372m

Instrument at A:

Vertical angle to C = + 8:10:00

Vertical angle to B = - 7:00:00

Stadia readings to B = 2,387 and 0,357

Instrument at B:

Vertical angle to C = + 36:20:00

Assume the slope of the ground from A to B to continue vertically below C.

Calculate

(a) Elevation of point C

(b) The Vertical depth of the dump below C.

[14]

TOTAL [100]