

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

DATE: 16 April 2009
TIME : 8:30 to 11:30

TOTAL MARKS: 100
TO PASS: 50

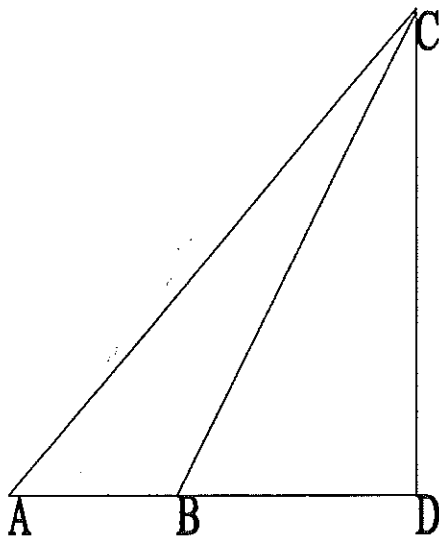
SURVEY 1

QUESTION 1

A crushed stone dump is to be constructed on a level piece of ground. If the base of the stone dump is to be 60m long by 40m wide, the sides sloping uniformly at 37° and the top is to be flat and level, calculate the volume of crushed stone contained in the dump if the vertical height is to be 10m. Answer to the nearest m^3 .

[10]

QUESTION 2



Given: Angle CAB = 35°
 Angle CDA = 90°
 Angle CBD = 50°
 Distance AB = 120m

Calculate height CD

[6]

QUESTION 3

Sketch and briefly describe two digital planimeters used in the mining industry.

[14]

QUESTION 4

Briefly describe the following instruments:

- a) Optical plummet
- b) Stereometer
- c) Gyro-theodolite
- d) Auxillary telescope
- e) Optical square

[10]

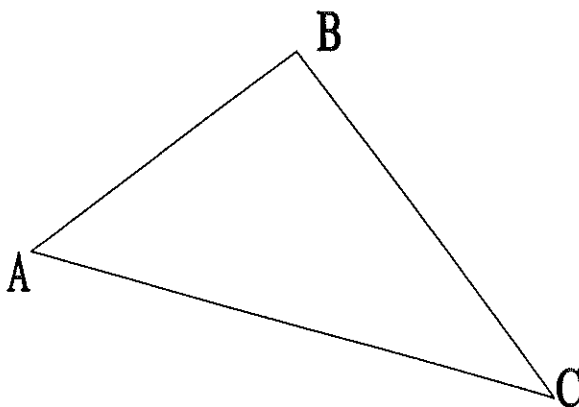
QUESTION 5

Describe in full, step by step, the method used when extending the side grade pegs in a development end with a gradient of + 1:200. Your description must include; office procedure, underground procedure, grade calculation and all relevant checks.

[15]

QUESTION 6

Derive a formula to calculate the area of a triangle shown below from co-ordinates.



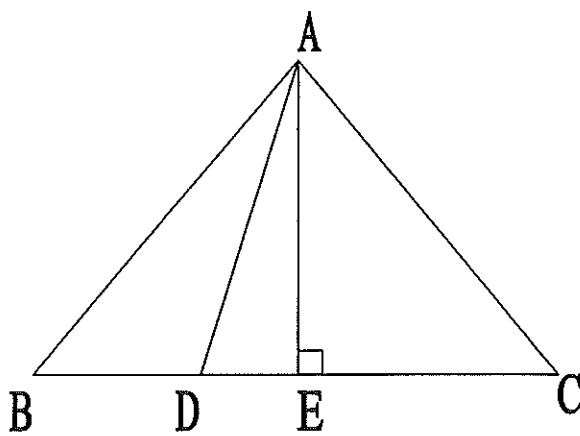
[15]

QUESTION 7

When adjusting a theodolite, there are two categories of adjustment made, namely temporary and permanent. Under these two categories name the different adjustments made and briefly describe the procedure.

[18]

QUESTION 8



Given: Angle ABE = $37^{\circ} 14' 53''$
 Angle DAE = $15^{\circ} 53' 47''$
 Distance BE = 62,663m
 AE = 47,647m
 AC = 77,105m

Calculate:

- 1) Sides AB, AD, BD and DE
- 2) Angles BAC and ACE
- 3) Area of triangle ABC

[12]

TOTAL [100]