

**REPUBLIC OF SOUTH AFRICA
DEPARTMENT OF MINERAL RESOURCES
EXAMINATION FOR THE MINE SURVEYOR'S CERTIFICATE OF COMPETENCY**

DATE: 12 April 2012 (Thursday)
TIME: 08:30 – 11:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

MINING ECONOMICS I

NOTE:

1. Any pocket calculator may be used. The make and model number of the calculator used must be noted on the front cover of the answer book.
2. Assume the Density of in situ rock = 2.75 t/m³ unless otherwise stated.
3. Answer all questions.

QUESTION 1

Define the following:

- | | |
|------------------------------|-----|
| a) Ore reserve mining factor | (3) |
| b) Development | (2) |
| c) Pay limit | (2) |
| d) Milling width | (2) |
| e) Trimming width | (2) |
| f) Tonnage discrepancy | (3) |
| g) Block factor | (3) |
| h) Block value | (2) |

[19 marks]

QUESTION 2

In a gold mine five stopes which have been worked by conventional stoping have been changed to the resuing method. Details are as follows:

Stope	Conventional stoping			Resuing	
	Broken m ²	SW cm	SV g/t	Broken reef & waste m ²	Total SW cm
A	305	176	28	222	260
B	245	152	24	178	200
C	366	144	20	267	200
D	183	160	32	133	240
E	122	168	22	89	220

Assume:

- No gold is lost in waste-fill
 - The density of broken rock is 1.65 t/m³
- a) Calculate the tonnage, average tramming width and value of the ore trammed from conventional stoping, allowing for 10% waste at nil value packed in stopes.
 - b) Calculate the tonnage, average width and value of the ore obtained from resuing, when the stoped out area (during resuing) is completely filled with waste rock.

[21 marks]

QUESTION 3

A borehole is drilled at 64° below the horizontal in a direction of 57° (Zero South) to intersect a reef which strikes North-South exactly and dips at 38° due east. Using the information in the core log below, calculate:

- a) The true reef width and value.
- b) The channel width and value.

Core log:

Length of core (cm)	Assay value (g/t)	Remarks
30	2.7	Scattered pebbles
40	Trace	Waste
35	8.3	Small well compacted pebbles
20	Trace	Waste
15	25.3	Highly mineralised
15	32.7	Highly mineralised

[14 marks]

QUESTION 4

State and briefly describe 9 variable components of a mine call factor.

[18 marks]

QUESTION 5

a) Use the information below to calculate the following:

(i) The tramming width and value (g/t)

(ii) The milling width and value (g/t)

Area stoped on reef	10 000m ²
Stope width and value	100cm @ 12.5 g/t
Waste mined from gullies	800 tons @ 0.0 g/t
Waste sorted in stopes	1 500 tons @ 2.6 g/t
Development advance on reef	105m @ 3.0m wide by 2.5m high
Value of development rock	9.5 g/t
Waste sorted on surface	5 000 tons @ 0.9 g/t
Rock density	2.75 t/m ³

b) Explain the difference between the tramming width and milling width.

[12 marks]

QUESTION 6

Explain how outcrops are sampled.

[8 marks]

QUESTION 7

A drive advances on the strike of a uniform reef band for 100m. The width of the drive is 3.0m. The average channel width is 45cm. The channel value is 27.0 g/t. The dip of the reef on the face is 35° and is fully exposed on both sides of the drive. Ballast at a value of 1.0 g/t is packed at a depth of 50cm throughout the drive. The density of broken rock is 1.65 t/m³

Calculate:

- Total tons trammed
- The average value broken
- The average value trammed

[8 marks]

[Total marks 100]