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

DATE: 15th October 2010 (Friday)
TIME: 08:30 – 11:30 (3 Hours)

TOTAL MARKS: 100
TO PASS: 50

MINING ECONOMICS I

NOTE:

1. Any pocket calculator may be. The make and model number of the calculator used must be noted on the front cover of the answer book.
2. Tables that may be used are attached hereto.
3. Your examination number must be written on all graph paper and loose sheets that are handed in with your examination script.
4. Assume Density of in situ rock = 2,75 t/m³ unless stated

Question 1

Explain the following terms used in mine valuation:

a) Block factor (3)
b) Block width (2)
c) Sweeping (2)
d) Vamping (2)
e) Tonnage discrepancy (3)
f) Payable development (2)

[14 Marks]

Question 2

List 9 variable components of the Mine Call Factor.

[9 Marks]

Question 3

List the major sources of unreported waste in ore flow Shortfall.

[5 Marks]

Question 4

A mine consists of two lead ore bodies, A and B. Both ore bodies have been estimated as follows:

A: 120 000 000 tons at an average grade of 3,7% lead.

B: 40 000 000 tons at an average grade of 5,1% lead.

The ore bodies will be mined in proportions equal to their estimated mass to ensure that both ore bodies are mined out simultaneously. The ore extracted will be sent to a single plant for treatment. The following design assumptions apply:

- Extraction rate = 80%
- Dilution from internal and external waste is 15% (Not in reserve)
- Plant recovery factor = 95%
- The required rate of production = 10 000t of lead per month

Calculate:

a) The grade or ore sent to the plant.
b) Monthly tonnage of ore to be mined from each ore body.
c) The annual depletion of ore reserve
d) The life of mine in months

[22 Marks]

Question 5

Given the following information, calculate the stoping pay limit for a gold mine:

Gully waste	6% of ore broken at stope face
Development to mill	8 000 tons at 6,0 g/t
Block factor	105%
Shortfall	6% of tons hoisted
Surface sorting	7% of ore hoisted at 0,5 g/t
Tons milled	300 000 tons
Mine call factor	85%
Recovery factor	97,5%
Planned working cost	R1 520 per ton milled
Price of gold	$1 243 per ounce (1 oz. = 31,103 48 g)
Currency exchange rate	1$ = R7,45

The balance of the tonnage is mined from the stope faces.

[25 Marks]

Question 6

The monthly report of operations of a gold mine shows that ore reserve blocks were estimated at a value of 7,0g/t at a block width of 100cm actually averaged 6,0g/t and 110cm when stoped. Ore from unblocked sources (not in reserve) produced 40 000 tons at a value of 5,5g/t and a stoping width of 105cm.

Additional information:

Source	Tons	Value
Ore from reclamation	25 000	9,0
Ore from development	10 000	5,0
Waste sorted and packed underground	5 500	0,5
Ore from stockpile sent to sorting station	6 000	6,0
Shortfall	10 000	0,0

Waste sorted in the plant = 5%
The monthly tonnage milled was 330 000 tons
Plant recovery factor = 97,5%

Calculate:

a) The total area of reef stoped during the month
b) The stope tramming width
c) The block factor for the month
d) The gold produced for the month
e) The residue value

[25 Marks]