



PROGRAM : BACHELOR'S DEGREE MINE SURVEYING

SUBJECT : MINERAL RESOURCE EVALUATION 2B

CODE : MREMSB2

DATE : FINAL EXAMINATION
20 NOVEMBER 2019

DURATION : 8:30 - 11:30

WEIGHT : 40 : 60

TOTAL MARKS : 100

EXAMINER : K. S PHOGOLE

MODERATOR : Z MDLULI

NUMBER OF PAGES : 11 PAGES

INSTRUCTIONS :
1. ANY CALCULATOR IS ALLOWED.
2. SKETCHES ARE NOT DRAWN TO SCALE.
3. DRAWING INSTRUMENTS ARE ALLOWED.
4. SHOW ALL CHECKS

QUESTION 1

The following is an extract from the monthly report:

Mined From Stopes	Inclined Area	Current SW	Current Grade	Block Width	Block Grade
OR	27 933	133	21.0	129	21.6
NIR	7 251	137	17.1		

Sorted in Stopes	2%	@	0.90 g/t
Other sources trammed as reef	3 740 t	@	2. 60 g/t
Development trammed as reef	3 494 t	@	10. 40 g/t
Sorted on surface	15%	@	0. 50 g/t
Tonnage added to mill bins (after sorting)	1 361 t	@	23.62 g/t
Tons milled	110 680 t		
Extraction	97%		
Gold Recovered	2 276. 776 kg		
Density of ore	2. 75		

Calculate :

- Tonnage Discrepancy
- Mine Call Factor
- Block Factor
- Over- or undermining **(15)**

QUESTION 2

The information given shows the average results for a gold mine based on the last year's operation.

Development advance = 20 000m per year.

Milled from reef development - 210 000t/year at a value of 15.4g/t

Milled from reclamation = 300 000t at a value of 10.2g/t.

Mine Call Factor. = 90%

Extraction = 96%

Mill Yield = 20.1 g/t treated.

Price of gold R1800.00 per kg

Tons treated = 1 800 000 per year.

It has been decided to reduce the development rate for the following year to 15 000m.

Assuming that:

- i) Any tonnage shortages will be drawn from stopes to maintain the milling rate.
 - ii) The amount of ore and value from reclamation will not change.
 - iii) The ore from development to the mill will decrease in proportion to the decreased advance but the value will not change.
 - iv) Cost of stoping additional tonnage will be R2.5 0 per ton broken
 - v) Development costs will remain constant at R100/m advance and overall costs are also expected to remain constant.
 - vi) The price of gold R18 000/Kg.
- Other factors will not change.

Calculate by how much the value of ore mined in stopes can be lowered as a result of the decrease in development if working profit is to remain unchanged during the following year.

(20)

QUESTION 3

A mine has over the past 3 quarters milled on average 136 700 tons per month, the mill is rated at 150 000 tons per month (mill capacity)

The following are the details of the sources of ore and the production.

Milled: - 136 700 tons per month

Surface sorting: - 5% of the tonnage received at the sorting plant at 0,7 g/t.

The following are percentages related to the tonnage received at the sorting facility

Survey shortfall: - 7,5%

Development ore: 4,3% at 2,6 g/t.

3,2% of the tonnage broken on the stope faces is sorted and packed underground at 1,2 g/t.

Unpay blocks make up 14,8% at 3,1 g/t. of the total tonnage broken in the stopes, the remainder comes from Pay Ore Reserves.

Mine Call Factor = 96,7%

Residue Value = 0,21 g/t

Overall Costs = R279,00 per ton milled

Costs attributable to development = R92,25 per ton milled.

Fixed costs are 42% of the stoping costs.

Gold Price = R39 700 per kilogram

Surface costs = R47,32/t milled

CALCULATE:

- 3.1 Overall Pay Limit.
- 3.2 Stopping Pay Limit
- 3.3 Development Pay Limit
- 3.4 Sub Economic Pay Limit and the tonnage to be mined in stopes.

(25)

QUESTION 4

The life of a coalmine has been fixed at 10 years as at June 2015. This estimate was based on a mining rate of 250 000 tons per month at an average recovery value of 7.80g/t.

After four years at this rate, an additional 1860 ha. of mining area is acquired.

Of this area 15% is barren due to major faulting. The average dip of the reef is 20° and it is expected that there will be a further loss of 6% of the remaining area due to minor faulting. The last 10% has to be left unmined to support the railway line, the road and mine's infrastructure on surface. The percentage payability is expected to be 89% and the payable blocks only are expected to be mined at a block width of 140cm and value of 8 g/t.

Assuming that the average figures given below will apply to the future operation, you are required to calculate the expected monthly profit and the life of the mine.

120 000 tons treated per month.

Waste sorted on surface = 20% at 0,4 g/t.

Surface shortfall = 6% at nil value

Waste other sources = 17% at nil value

Mined from stope faces = 77% density of rock = 2,7 t/m³

M.C.F. = 92%

Recovery = 97%

Working costs = R274 per ton milled

Gold price = R1224 000/kg

(20)

QUESTION 5

A gold mine is reaching the end of its life and no longer does development, has the following fully exposed sources of ore.

Payable Mineral Reserves 3 680 000 tons at 6,2 g/t

Marginal Unpay Block 845 000 ton at 3,5 g/t

The following data is available:

Residue value 0,26 g/t

M.C.F. 98%

It is intended to mine total of 100 000 tons per month

Surface sorting 20% at 0,44 g/t

Shortfall 3%

Other sources waste 7%

Working costs R95 per ton milled

Price of gold R28 000/kg

It has been decided to mine the marginal Unpay blocks together with the payable blocks until they are exhausted, but a profit of R40,00 per ton milled must be maintained during this period.

Calculate:

1. How long will it take to exhaust the marginally unpay block?
2. For how long will the mine be able to continue at the same rate when only the payable blocks are available?

(20)

TOTAL 100

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STUDENT NO.:

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STUDENT NO.:

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SURNAME AND INIT:.....STUDENT NO.:.....

QUESTION 3

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INITS. & URNAME: :
STUDENT NO.: :

Question 5
