PROGRAM	:	B.ENG.TECH *MINING ENGINEERING*
SUBJECT	:	**MINING ECONOMICS VALUATION 2B**
CODE	:	**MEVMS 2B**
DATE	:	FINAL EXAMINATION 23 NOVEMBER 2019
DURATION	:	(SESSION 2) 12:30 - 15:30
WEIGHT	:	40 : 60
TOTAL MARKS	:	100

ASSESSOR	:	MR K S PHOGOLE
MODERATOR	:	MISS Z MDLULI
NUMBER OF PAGES	:	9 PAGES

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

INSTRUCTIONS TO CANDIDATES:

1. PLEASE ANSWER ALL THE QUESTIONS.
2. NUMBER THE QUESTIONS CLEARLY.
3. SHOW ALL STEPS IN THE CALCULATIONS.
4. **MARKS WILL BE ALLOCATED FOR NEATNESS AND CHECKS**

QUESTION 1

In order to calculate the correct stope tonnage broken in two stopes, A and B, an average section on each stope was measured off and sampled according to the appearance of the rock. The relative density of each sample was obtained and recorded in the tabulation below

STOPE A			*STOPE B*		
Stope width (cm)	Sample width (cm)	RD t/m³	Stope width (cm)	Sample width (cm)	RD t/m³
110	22	2.69	126	30	2.72
	25	2.80		26	2.90
	30	3.05		22	3.10
	20	3.01		30	3.05
	13	2.77		18	2.92

If 300 m² was broken during the month in stope A and stope B respectively,

Calculate:

1.1 The average relative density for each stope

1.2 The stope tons broken in each stope at an Relative Density of 2.78 t/m³

1.3 The error in the total stope tonnage if a Relative Density of 2.78 t/m³ had been used to calculate the total monthly tonnage

(12)

QUESTION 2

The information was extracted from the monthly tonnage return of the mine:

MILLING

Tons Milled	=	120 000t
Ore in Mill bins at the end of current month	=	3 000t
Ore in Mill bins at the start of current month	=	1 000t @ 7.71 g/t
Waste sorted on surface	=	8.23% @ 0.69 g/t
Recovery value	=	7.05 g/t
Residue value	=	0.51 g/t

3/…

HOISTING

Hoisted from development	=	7.5% of total hoisted
Hoisted from reclamation	=	13.5% of total hoisted
Value of development rock hoisted	=	5.55 g/t
Value of reclamation rock hoisted	=	5.78 g/t

MINING

Waste sorted from all stopes and packed underground	=	8.556% @ 0.69 g/t

From stopes not included in Ore Reserves 30% of total stoped at 6.10 g/t

Actual Stoping Width of ore mine from Ore reserve	=	153 cm
Block Width	=	144 cm
Mine Call Factor	=	92%
Block Factor	=	90%

Assuming no tonnage discrepancy and a density of 2.70 t/m³, calculate:

a) The area broken from Ore reserve Blocks
b) The block value of the Ore reserve tons broken

(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 Stoping Pay Limit

3.3 Development Pay Limit

3.4 Sub Economic Pay Limit and the tonnage to be mined in stopes.

(**28)**

QUESTION 4

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	=	R55 812.0886 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: -

1. Any tonnage shortages will be drawn from stopes to maintain the milling rate.
2. The amount of ore and value from reclamation will not change.
3. The ore from development to the mill will decrease in proportion to the decreased advance but the value will not change.
4. Cost of stoping additional tonnage will be R52.50 per ton broken

5. Development costs will remain constant at R900/m advance and overall costs are also expected to remain constant.
6. The price of gold R55 812.0886 per 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 and how much more tons has to be mined to make up for development tons reduction.

(20)

QUESTION 5

Make use of the information to calculate the life of mine to the nearest year as from April 1989.

Undevelopment areas of the mine	2744 Ha.
Estimated payability of these area	81%
Estimated stoping width	140 cm
Estimated loss due to geology	11%
Average reef dip	32º
Waste sorted on surface	14% of total tons
Tons milled per month	350 000
Relative Density	2,80 t/m³

The fully developed payable mineral reserves as at 31 March 1989 are 6 200 000 tons
Other sources of tonnage are estimated as:
Mined from unpayable blocks 600 000 ton per year.
Waste from other sources 900 000 tons per year.

(20)

[TOTAL : 100]

Student Name:-…….Student No.:- …….....

QUESTION 2

Student Name:-…….Student No.:- …….....

QUESTION 2

INIT& SURNAME : ………………………………………….. **STUDENT NO.: ………………………………**

QUESTION 3

INIT& SURNAME : ……………………………………………. **STUDENT NO.: ………………………………..**

QUESTION 3

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

QUESTION 4

SURNAME AND INIT:……STUDENT NO.:……

QUESTION 4
