PROGRAM	:	B.ENG.TECH *MINING ENGINEERING*
SUBJECT	:	**MINING ECONOMICS VALUATION 2B**
CODE	:	**MEVMS 2B**
DATE	:	SUPPLEMENTARY EXAMINATION 09 JANUARY 2020
DURATION	:	(SESSION 2) 11:30 - 14:30
WEIGHT	:	40 : 60
TOTAL MARKS	:	100

ASSESSOR	:	MR K S PHOGOLE
MODERATOR	:	MISS Z MDLULI
NUMBER OF PAGES	:	5 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

The following is a record of the sampling of the core and sludge recovered from a borehole sunk through a copper-bearing lode at right-angles to its plane.

Calculate the average width and average value of the lode from the following information:

Record of Core	**Pull 1**	**Pull 2**	**Pull 3**
Length of Core	7.6 m	6.9 m	8.2 m
Mass of Core	160 kg	143 kg	171 kg
Mass of Sludge	175 kg	159 kg	189 kg
Assay Value of Core (% Cu)	4.7 %	4.3 %	3.6 %
Assay Value of Sludge (% Cu)	4.9 %	4.1 %	3.8 %
Core Recovery	100 %	100 %	100 %

(13)

QUESTION 2

A gold mine records the following results:-

Tons milled	=	90 000 t
Surface sorting	=	10% at 1.4 g/t
Development	=	7 000 t at 12.0 g/t
Stoped from pay blocks	=	77 840t at 16.00 g/t
Unpay blocks	=	3 336t at 5.00 g/t
N.I.R	=	1 751t at 14.00 g/t
Other sources	=	751t
Waste broken in stopes	=	8 000t
Packed underground in stopes	=	2 000 t at 2.00g/t
Headgear bins:		
Beginning of month	=	2 000t at 14.00g/t
End of month	=	2 900t
Mill Bins :		
Beginning of month	=	3 000t at 13.00g/t
End of month	=	4 000t

3/…

Gold Recovered	=	945.296 kg
Residue value	=	0.30 g/t

Calculate:

a) Tonnage discrepancy
b) Recovery factor
c) The MCF

(20)

QUESTION 3

A reef drive has advanced 32m during the month.

Using the following information **calculate**:

a) The tonnage trammed if 30cm of ballast was left behind to grade the tracks for 30m. The last two metres of the face does not have ballast
b) The gold content of the rock trammed
c) The value of all the rock broken.

Information:

Reef Width = 24cm

Reef Value = 19.7g/t

Dimentions of the reef drive are 3.0m Wide and 2.8m High

Dip of the reef = 16°

RD of rock in situ = 2.83t/m³ and RD of broken rock = 1.7t/m³

(12)

Question 4

A gold mine milling 150 000 tons per month intends to increase both the amount of development ore to the mill and the rate of surface sorting. It is also intends to reduce the amount of external waste in stoping operations underground. **The mine also intends to increase the milling rate to 180 000 tons by drawing additional tons from a surface stock pile**. The amount drawn from the stock pile is 20 000 tons at a value of 6.25 g/t. To further enhance the value of tons broken in stopes, 5% was sorted and packed underground at a value of 0.11g/t.

By how much will the milling grade and the recovery grade be affected if the milling rate of 180 000 tons/month is maintained but the following changes are made.

Does the mine have to increase or decrease the area stoped and if so by how much area?

a) The average stoping width is reduced from 129cm to 119cm.

b) Ore hoisted from development is increased from 5000 t/month at a value of 5,50 g/t. to 9000 t/month at a value of 5,00 g/t.

c) Surface sorting is increased from 15% of the ore received at a value of 1,2g/t. to 20% of the total ore received at a value of 1,5 g/t.

GIVEN:

Present ore reserve stope value = 12,55g/t at a block width of 125 cm

Block Factor is 90%

There is no tonnage discrepancy.

M.C.F. = 95%, Plant recovery Factor = 97,5% neither will change.

Reclamation tonnage of 6000 t/month at a value of 7,5 g/t will be maintained.

Calculate the final values correct to 0,001 g/t. **(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)**

QUESTION 6

A gold mine is working three different reefs and mines a total of 150 000 tons per month from the stope faces on these reefs.

Information regarding the reefs is shown below.

Reef	Tons Available (t)	Stope width (cm)	Stope value (g/t)
A	6 560 000	160	6,8
B	7 840 000	140	8,4
C	2 400 000	125	11,6

14% of the total tonnage must be mined from reef C.

Calculate what tonnage must be mined from the reefs A and B in order to achieve an average of 8,0 g/t for the 150 000 tons mined each month. **(15)**

[TOTAL : 100]

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

QUESTION 2

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

QUESTION 2

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

QUESTION 4

SURNAME AND INIT:……STUDENT NO.:……

QUESTION 4
