UNIVERSITY OF JOHANNESBURG

PROGRAM	:	**BACHELOR'S DEGREE MINE SURVEYING**
SUBJECT	:	**MINERAL RESERVE EVALUATION A2**
CODE	:	**MREMSA2**
DATE	:	SUPPLIMENTARY EXAMINATION 16 JULY 2019
DURATION	:	(SESSION1) 08:00 - 11:00
WEIGHT	:	40 : 60
TOTAL MARKS	:	100

ASSESSOR	:	MR. K.S.PHOGOLE	
MODERATOR	:	MS. Z MDLULI	5017
NUMBER OF PAGES	:	4 PAGES	

INSTRUCTIONS :

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

INSTRUCTIONS TO CANDIDATES:

1. PLEASE ANSWER ALL THE QUESTIONS.
2. MARKS WILL BE ALLOCATED FOR NEATNESS AND CHECKS.
3. NUMBER THE QUESTIONS CLEARLY.

QUESTION 1

The following tabulation shows the results of five boreholes drilled from a footwall drive :

BOREHOLE	DIST FROM START (m)	WIDTH OF BOTTOM BAND(cm)	VALUE (g/t)	INTERNAL WASTE WIDTH (cm)	WIDTH OF TOP BAND(cm)	VALUE (g/t)
1	5.0	11.0	90.40	16.0	17.0	32.10
2	13.0	14.0	101.30	14.0	11.0	26.30
3	19.0	10.0	86.70	17.0	15.0	40.20
4	29.0	12.0	121.60	15.0	13.0	28.40
5	39.0	13.0	114.5	13.0	16.0	36.70

Calculate :

1.1) The average reef width, channel width and channel value for the 39m stretch.

1.2) If the average stoping width is 95.00cm, calculate the average stoping value.

1.3) Using a density of 2.78t/m³ and the area stoped 12 100m² measured on plan, calculate the expected tonnage and the gold content mined. Reef dips 23° south. **[20]**

QUESTION 2

The monthly report of operations of a gold mine showed that Ore reserve blocks, which were estimated to contain 9.60g/t at a block width of 175.0cm actually averaged 163.0cm at 10.05g/t when stoped. Ore from Not in Reserve(NIR) stoped produced 35604 tons at a value of 7.50g/t and a width of 168.0cm. Other sources of ore before sorting, were:-

Reclamation ore	21171t	4.30g/t
Development ore	17946t	1.70g/t
Waste sorted and packed underground	17865t	0.50g/t
From stockpile sent to sorting station	21270t	3.50g/t
Waste sorted in plant	6.02%	0/30g/t
Discrepancy (Shortfall)	18000t	

The monthly tonnage milled amounted to 250000t with a recovery factor of 95.8%.

Density of ore 2.75t/m³.

Calculate:

2.1 The total area of reef stoped during month.

2.2 The block factor

2.3 Gold produced for the month.

2.4 Residue value in g/t

[20]

QUESTION 3

The available ore reserve of a gold mine as 3 June 2016 were as follows :

RD = 2.75 t/m³

AREA	Ore Reserve Tons	Block Width (cm)	Block Value (g/t)
A	550 000	125.0	22.78
B	749 000	112.0	8.49
C	1 730 000	98.0	15.40
D	2 640 000	115.0	9.74

Results, based on current sampling, of stoping from payable ore reserves for 12 months period ended 30 June 2016 were.

AREA	m² BROKEN	Average Stoping Width (cm)	Average Value cmg/t
A	130 420	123.7	2 561
B	85 425	114.2	1 096
C	104 720	105.6	1 518
D	296 430	114.4	1 190

Calculate :

3.1 The total tons mined in available ore reserve.

3.2 The block factor for each area and for total mine.

3.3 The overall under or over-mining in g/t and as %.

3.4 The ore reserve mining factor. **[20]**

QUESTION 4

A raise was developed 40m during a period of three months. If the average width of the raise was 2.0m and the average height was 3.0m, the average channel width 25.0cm and the average channel value was 12.0g/t.
RD = 2.78t/m³ (rock in situ)
RD = 1.67/m³ (broken rock), Calculate :-

4.1 The total tons broken in the raise.
4.2 The total channel tons broken.
4.3 The total contents of gold in the ore broken.
4.4 The average gold value of the total broken ore.

If fines to a average depth of 15.0cm were evenly distributed on the footwall over the total distance developed in the raise mentioned above (a), and these fines had an average value of 16.0g/t calculate:-

4.5 The tons of fines left on the footwall.
4.6 The contents of gold in the fines left behind.
4.7 The total tons trammed from the raise.
4.8 The average tramming value of the ore.

[10]

QUESTION 5

During a routine sampling of a pair of stope faces, it was decided to check for density of the rock being mined because of the presence of pyritic quartz bands. A representative section of each face was selected; the tabulation below indicates the Densities, Widths and composite values of each sample.

STOPE A		STOPE B	
Sample Width (cm)	Density t/m³	Sample Width (cm)	Density t/m³
15	2.65	20	2.80
25	2.80	25	3.03
25	3.11	20	3.08
30	2.68	40	2.74
20	3.12	15	3.11
15	2.74	20	2.70

Average gold values Stope A = 8.11g/t Stope B = 10.96g/t

During the current month an area of 468 m² was broken in stope A and 522 m² in stope B.

You are required to calculate:-

5.1 The tonnage broken and the gold content of each stope.

5.2 The error which would have occurred if average density of 2.75 t/m³ had been used.

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QUESTION 6

On a coal mine a single seam was sampled at regular intervals with the following values being recorded.

Sample No.	Seam Width m	Ash %	Calorific Value mj/kg	Volatiles %
10	1.60	10.60	30.0	8.1
11	2.30	10.40	31.3	7.9
12	2.60	10.70	30.6	7.8
13	3.00	10.40	29.9	8.2
14	2.80	9.90	32.0	8.5
15	2.40	10.00	29.8	7.9
16	2.00	10.30	30.4	8.0
17	1.60	10.60	30.0	8.1
18	2.00	10.80	31.9	7.9
19	1.80	10.30	31.4	8.3
20	2.00	10.00	30.3	8.3

Calculate the average width and values for full sampling stretch
And the stretch values for section 10 to 17, 12 to 20, 14 to 19

[15]