



PROGRAM : BACHELOR'S DEGREE MINE SURVEYING AND
NATIONAL DIPLOMA IN MINE SURVEYING

SUBJECT : MINE VALUATION I
: MINERAL RESERVE EVALUATION 2A

CODE : MREMSA2/MVN 1111

DATE : FINAL EXAMINATION
07 JUNE 2019

DURATION : (08:30 – 11:30)

WEIGHT : 40: 60

TOTAL MARKS : 100

EXAMINER : MR K S PHOGOLE

MODERATOR : MS Z MDLULI

NUMBER OF PAGES : 5 PAGES

INSTRUCTIONS

1. ANY CALCULATOR IS ALLOWED.
 2. SKETCHES ARE NOT DRAWN TO SCALE.
 3. WORK TO THE ACCURACY AS SHOWN IN THE QUESTIONS.
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INSTRUCTIONS TO CANDIDATES:

1. PLEASE ANSWER ALL THE QUESTIONS.
 2. NUMBER THE QUESTIONS CLEARLY.
 3. SHOW ALL THE STEPS IN THE CALCULATIONS.
 4. WHERE A DENSITY IS NOT GIVEN, USE A DENSITY OF 2.75m³/t
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Question 1

- 1.1 What is the difference between contamination and fraud?" (2)
- 1.2 What are the objectives of sampling? (3)
- 1.3 Give three types of mineral bodies that need to be sampled. (3)
- 1.4 Name four sources of contamination. (2)

[Total = 10 marks]

Question 2

A raise advanced for 250 metres on the bottom band of a multi reef horizon. Sampling results for the developed reef band averaged 8.5 g/t over an average reef width of 90 cm and the average stoping width of 120 cm.

Prospecting was done to evaluate an upper reef band by means of boreholes directed upwards normal to the plane of the reef.

The following results were obtained:

Borehole Position From Start of Raise(m)	Parting between Upper and lower bands (cm)	Reef Width cm	Reef Value g/t
10	44	38	25,5
40	38	36	37.0
80	40	40	41.5
140	34	44	39.0
160	38	38	45.0
210	50	30	41.5

Stoping is done with 10 cm hangingwall and the parting below the reef is mined with a minimum stope width of 100 cm. (eg $SW = HW \text{ waste} + RW + \text{Parting between Upper and lower band with the minimum stoping width equalling 100 cm}$)

Calculate:

- a) The average stope width and value of the upper band.
- b) The average parting between the upper and lower bands.
- c) If average face advance for the month on the upper band is 9.8m calculate tons and content mined during this month.
- d) The average stope width and value if the two bands are combined.

[Total = 20 marks]

Question 3

In the following tabulation, certain information has been omitted. Draw up a similar tabulation and fill in the missing information. Show your FORMULAE. R.D. = 2,68 t/m³

Panel	m ²	RW	Ch.W	SW	Reef t	Ch t	Stope t
A	?	?	60	98	189	?	515
B	141	42	71	?	?	?	393
C	?	?	?	124	322	538	?
D	430	?	?	?	599	1060	?
E	176	31	?	?	?	283	443
Total	1188				1415		3663
AV		?	?	?			

[Total = 20 marks]

Question 4

A copper deposit is being worked by opencast mining. The mining and sampling results for one months operations are shown below.

Bench Number	Area mined	Bench height	Ore Density	Copper content
51	7 680m ²	6m	3.46 t/m ³	11.5%
52	9 240m ²	5m	3.21 t/m ³	9.4%
53	6 590m ²	4m	3.24 t/m ³	10.1%
54	7 700m ²	5m	3.35 t/m ³	10.7%

CALCULATE :-

- The total tonnage mined.
- The total tons of copper contained in the ore mined.
- The average density of the ore mined.
- The average copper content of the ore mined.

[Total = 15 marks]

Question 5

The available payable ore reserves of a gold mine as at 31st December 2010 were as follows:-

AREA	P.O.R BLOCK TONS	AVERAGE BLOCK WIDTH (cm)	AVERAGE BLOCK VALUE (g/t)
A	700 000	109.50	23.68
B	1 625 000	92.75	15.72
C	921 000	137.80	12.67
D	2 754 000	115.20	18.50

Results based on current sampling of stoping from these payable ore reserves for 12 months ended 31st December 2012 were:-

AREA	m² Broken in Available P.O.R	AVERAGE STOPE WIDTH (cm)	AVERAGE Cm.g/t
A	124 308	107.80	2 472
B	308 921	93.65	1 528
C	96 220	129.94	1 831
D	282 776	114.82	2 270

Calculate :

- The total tons mined in available Ore Reserves, based on current sampling.
- Block Factor for each area and for the total mine
- Ore Reserve Mining Factor for the total mine

[Total = 20 marks]

Question 6

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.

<u>STOPE A</u>		<u>STOPE B</u>	
<u>Sample</u>	<u>Width</u>	<u>Sample</u>	<u>Width</u>
<u>(cm)</u>	<u>t/m³</u>	<u>(cm)</u>	<u>t/m³</u>
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 = 8.11 g/t	Stope B = 10.96 g/t	
Area mined	Stope A = 468 m ²	Stope B = 522 m ²	

You are required to calculate:

- The tonnage broken and the gold content of each stope.
- The error, which would have occurred if average density of 2.75 t/m³ had been used.

[Total = 15 marks]
