



PROGRAM : BACHELOR'S DEGREE MINE SURVEYING
SUBJECT : MINERAL RESERVE EVALUATION A2
CODE : MREMSA2
DATE : FINAL EXAMINATION
26 MAY 2018
DURATION : (SESSION1) 08:30 - 11:30
WEIGHT : 40 : 60
TOTAL MARKS : 100

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MODERATOR : D.WILSON
NUMBER OF PAGES : 7 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.
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QUESTION 1**a)**

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 :-

- 1.1 The total tons broken in the raise.
- 1.2 The total channel tons broken.
- 1.3 The total contents of gold in the ore broken.
- 1.4 The average gold value of the total broken ore.

b)

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:-

- 1b.1 The tons of fines left on the footwall.
- 1b.2 The contents of gold in the fines left behind.
- 1b.3 The total tons trammed from the raise.
- 1b.4 The average tramming value of the ore.

[10]

QUESTION 2

The available Payable Ore Reserves of a mine were calculated as follows :-

AREA	POR BLOCK TONS	AVE BLOCK WIDTH (cm)	AVE BLOCKVALUE (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 Payable Ore Reserves.

AREA	m ² BROKEN IN AVAILABLE POR	AVE STOPE WIDTH (cm)	AVE 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

$$RD = 2.78t/m^3$$

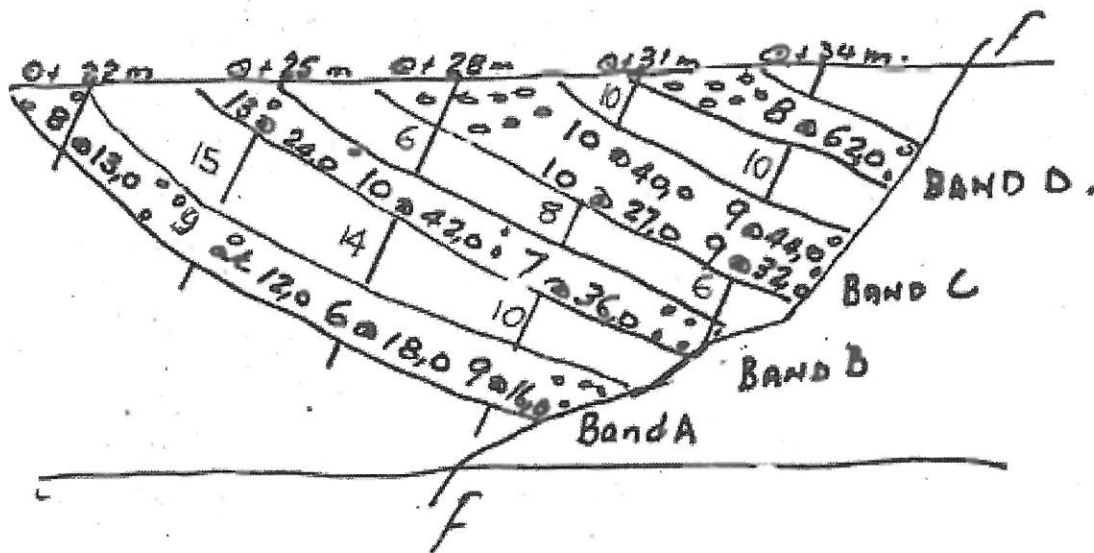
Calculate :-

- 2.1 The total tons mined in the available Ore Reserves.
- 2.2 The Block Factor for each area and for the total mine.
- 2.3 The Ore Reserve Mining Factor.

[20]

QUESTION 3

The following sketch shows the results of the sampling of the intersection of four bands of reef in a cross-cut. The reef is cut off by a fault.



Calculate:

- 3.1 The average reef width and reef value.
- 3.2 The average channel width and value.

[15]

QUESTION 4GIVEN :

DRIVE	METRES		SAMPLING		DIMENSIONS		BALLAST		DIP OF REEF °
	ADV m	SAMP m	CHW cm	VAL g/t	HEIGHT m	WIDTH m	DEPTH cm	VAL g/t	
A	40.8	40	44.6	30.0	3.2	3.0	15.0	60.0	30
B	44.6	48	38.9	60.1	3.1	3.2	28.0	40.0	28
C	38.1	50	60.1	28.23	2.8	3.3	26.2	38.33	33
D	36.8	30	48.2	24.66	3.6	3.6	30.1	40.19	28
E	40.9	40	44.3	33.42	3.2	3.2	28.2	38.42	30
F	45.1	44	46.2	34.12	3.1	3.8	18.3	28.12	29

NB. Reef is fully exposed on both sides of the drive.

Pay limit is 1400cmg/t.

RD = 2.78t/m³

Calculate:-

- 4.1 Average Channel width and Channel value of :
 - 2.1(a) Payable metres sampled
 - 2.1(b) Total metres sampled
- 4.2 Percentage payability
- 4.3 The average value (g/t) of the tonnes trammed in each drive and for all the drives combined

[20]

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.

<u>STOPE A</u>		<u>STOPE B</u>	
<u>Sample Width</u>	<u>Density</u>	<u>Sample Width</u>	<u>Density</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 = 8.11g/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.

[15]

QUESTION 6

The information given below shows the results of one month's operation on a gold mine:

Mined in stopes	Area mined (m ²)	Average stope width (cm)	Stope value (g/t)
From Reef A	44 300	141.0	9.86
From Reef B	6 900	168.0	5.83
From Reef C	9 800	143.0	7.42

Waste packed in stopes 8 500t at 0.45g/t
 Other sources 37 000t at nil value
 Reclamation 6 000 at 6.5g/t
 Reef development 14 000t at 3.10g/t
 Development 1 480metres at an average width of 1.70m
 Surface sorting was 20% of tonnage received at sorting station at 0.39g/t
 Residue value 0.22g/t
 Gold recovered amount to 2 108.414kg
 Total tons milled 240 000t
 RD = 2.78t/m³

Calculate:-

- 6.1 The tonnage discrepancy
- 6.2 The mine call factor
- 6.3 Sampler's mill value
- 6.4 Tramming width
- 6.5 Milling width

[20]

TOTAL 100