

THE PAPUA NEW GUINES UNIVERSITY OF TECHNOLOGY
DEPARTMENT OF MINING ENGINEERING
2020 SECOND SEMESTER EXAMINATION

Second Year Mining Engineering
MN223 – MINING TECHNOLOGY

DATE: **Friday 30th October 2020**

TIME: **8:20 A.M.**

TIME ALLOWED: **3 HOURS**

INFORMATION FOR CANDIDATE:

1. You have ten minutes to read this question paper. You **SHOULD NOT** begin writing during this period.
2. There are **3 Parts altogether**. You are to answer **ALL** questions
3. Marks for each question is as indicated. Total of **100 marks**
4. **ALL** answers must be written on the answer booklet provided. No other written materials will be accepted.
5. Write your **NAME** and **STUDENT NUMBER** clearly on the **ANSWER BOOK. DO THIS NOW.**

PART A

Question 1.

The Mining Industry relies heavily on technology for exploitation of mineral resources. Future of Mining Engineering in the evolving/changing technology can change the way mines are designed and operated.... (7 marks)

Discuss the effect of changing mining technology in the following.

- i.) Productivity
- ii.) Safety
- iii.) Economics

Question 2.

Discuss and give advantages and disadvantages of Open pit and underground mine and briefly discuss their selection criteria. (5 marks)

Question 3.

Define the following with equation and diagram to aid your definition;...

(8 marks)

- i. Ore
- ii. Waste
- iii. Grade
- iv. Cut-off grade
- v. Resources
- vi. Inferred resources
- vii. Reserve
- viii. Sampling

Question 4.

- a) Define ore reserve estimation and its importance in the mining industry
- b) Define the drill hole compositing with illustration (Equation sketches where applicable)
- c) Define the drill hole compositing with illustration
..... (5 marks)

Question 5.

Give three traditional ore reserve estimation method and discuss the procedures. Use sketches and diagrams to aid in your explanation.
.(5 marks)

PART B

Question 1.

The operating costs for a gold mine are 75 \$/ton. The recovery at the mill is 90%. At a gold price of \$520/oz, what is the break- even cutoff grade in oz Au/ton?..... **(10 marks)**

Question 2

The operating costs for a gold mine are 45 \$/ton. The recovery at the mill is 87% and the mining dilution is 10%. At a gold price of \$490/oz, what is the break-even cutoff grade in oz Au/ton?**(10 marks)**

Question 3

The operating costs for a gold mine are 55 \$/ton. The recovery at the mill is 89%. The smelting and refining costs are \$10/ oz Au. At a gold price of \$680/oz, what is the break-even cutoff grade in oz Au/ton? **(15 marks)**

PART C

You are engaged as a consultant by the MESSA Gold company to evaluate the gold deposit of their exploration program to calculate the gold deposit from the diamond drill results given below. (40 marks)

Drill Hole ID Number	1	2	3	4	5	6	7	8
Collar elevation	1000	1050	1060	1070	1010	1020	1050	1000
East Coordinate	1000	1500	2000	2500	1000	1500	2000	2500
North Coordinate	1000	1000	1000	1000	1500	1500	1500	1500
Depth of Mineralization	100	150	160	110	120	170	150	100
Incremental sequence of Gold grade (in g/t) samples taken from mineralized zone								
	Gold sample Grade in g/t							
12	4.8	4.7	4.6	4.5	4.6	4.8	5.6	4.5
11	5.3	6	4.2	4.3	4.7	5.8	5.9	6
15	6	5.5	6	5.5	4.8	6	6	5.5
12	6.5	5.2	7.5	6.2	5.2	6	6.3	6.2
12	6.8	5.5	7	6	5.6	6.5	6.6	6.1
8	6	6	6.5	6.5	5.9	6.9	7	6.3
12	5.7	6.3	6	6.8	5.8	8	7.2	6.2
18	7.5	6.5	6.3	6.9	5.9	7	7.1	6.4
10	6.6	6.6	7	7	4.2	6.8	6.8	6.1
15	6.3	6.3	6.8	6.5	4	6.4	6.6	6
12	5.5	4.8	5.6	5.2	3.3	5.8	6	5.4
18	4.8	4.2	5.9	4.2	2.1	4.2	6.1	4.2
10	4.1	4	4.2	3.3	2	2	4	3

North boundary of exploration license: 2500 N
 South boundary of exploration license: 1000 N
 East boundary of exploration license: 2500 E
 West boundary of exploration license: 1000 E

Question. 1

- Determine the composite grade values of each drill hole if the cut-off grade is gold 5 g/t.
- Based on problem to above, Calculate the total ore reserve of the deposit using the triangular method or Polygonal method.

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Third Year Mining Engineering

MN314 – GEOMECHANICS II

DATE: Friday 30th October 2020

TIME: 8:20 A.M.

TIME ALLOWED: 3 HOURS

INFORMATION FOR CANDIDATE:

1. You have ten minutes to read this question paper. You **SHOULD NOT** begin writing during this period.
2. There are **5 (Five) Questions** altogether. You are to answer **ALL 5 (Five)** questions
3. Marks for each question is as indicated. Maximum of **100 marks**.
4. **ALL** answers must be written on the answer booklet provided. No other written materials will be accepted.
5. Write your **NAME** and **STUDENT NUMBER** clearly on the **ANSWER BOOK. DO THIS NOW.**