THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

SECOND SEMESTER EXAMINATIONS – 2022

CEME538 - MINING WASTE MANAGEMENT

MASTER IN SOLID WASTE & RESOURCE MANAGEMENT

THURSDAY 3rd NOVEMBER 2022 – 10:00 AM to 12.00 NOON

VENUE: PG CLASSROOM

TIME ALLOWED: 2 HOURS

INSTRUCTIONS FOR STUDENTS:

1. **WRITE YOUR NAME AND ID NUMBER CLEARLY ON THE FRONT PAGE OF THE ANSWER SHEET.**
2. All answers must be written on the answer booklet provided. No other written material will be accepted.
3. In numerical, write your answers upto 3 decimals.
4. Notes and handouts are not allowed. MOBILE PHONE is not allowed.
5. Maximum Marks: 100.
6. Each question carries equal marks i.e., 10 marks.
7. Assume suitable data wherever necessary.
8. Number of pages is 2 including Cover page.

QUE 1: Define: Cyanidation waste, Radioactive waste, Tailings, Phosphate mine waste, Beneficiation plant, Gangue, Sodicity, Saturation percentage (SP), Sulfidic waste and Sodium Adsorption Ratio (SAR).

QUE 2: Write a note Tailings Dam.

QUE 3: Explain various types of mine water.

QUE 4: Discuss the methods of destruction of cyanide present in mining waste.

QUE 5: A mining waste core of 15 cm X 15 cm X 12 cm has been taken for analysis. Determine the gravimetric water content (dry weight basis), bulk density and volumetric water content from the following dada:

1) Wet weight of sample = 1080 g,
2) Oven dry (at 105 °C) weight = 985 g and
3) The density of water = 1000 kg/m^3

QUE 6: What are the methods of control of sulfidic waste oxidation? Explain any two.

QUE 7: Determine the loss of ignition, organic and inorganic matters in a mine sample from the following data:

1) Weight of sample after oven drying (at 105 °C) = 595 g
2) Weight of sample after ignition at 450 °C for 16 h = 70 g

QUE 8: Discuss the environmental impact of acid mine drainage (AMD).

QUE 9: A 200 g of air-dried and sieved (<2 mm) mine waste sample is taken in a plastic jar screwed and weighed as 350 g. The deionized water has been added in the jar to saturate the mine waste sample and kept for 2h. The whole assembly of saturated mine waste has been weighed after 2 h as 420 g. Determine the saturation percentage of the sample if the oven dried weight of the assembly is 285 g. Also determine sodium adsorption ratio (SAR) of the sample, if the concentration of Na, Mg and Ca in the extract is 30, 35 and 55 mmol/L.

QUE 10: Discuss how the acid generation potential risk can be assessed for a mining waste.