NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND PROCESS ENGINEERING

QUALIFICATION : BACHELOR OF ENGINEERING IN METALLURGY, CHEMICAL ENGINEERING & MINING ENGINEERING	
QUALIFICATION CODE: BSc.	LEVEL: 7
COURSE CODE: MPT721S	COURSE NAME: MINERAL PROCESSING TECHNIQUES AND APPLICATIONS 324
SESSION: OCTOBER 2022	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY QUESTION PAPER	
EXAMINER(S)	Dr. Clement K. Owusu Mr. Thomas Moongo
MODERATOR:	Prof. Godfrey Dzinomwa

INSTRUCTIONS

1. Answer all questions.
2. Read all the questions carefully before answering.
3. Marks for each question are indicated at the end of each question.
4. Please ensure that your writing is legible, neat and presentable.

PERMISSIBLE MATERIALS

1. Examination paper.

THIS QUESTION PAPER CONSISTS OF 3 PAGES (Including this front page)

Question 1

a. During a routine check at the plant, it was observed that the oxygen and cyanide concentration were far below the set point. The oxygenation and cyanide supply system when checked was functioning very well. A check from the mineralogical data supplied by the geologist revealed the presence of iron and copper sulphide minerals. As a metallurgist on site discuss the possible cause for observed drop in oxygen and cyanide concentration. What will the effect when the problem is not rectified? ***(10 marks)***

b. Mention five (5) operating variables that regulate the flotation minerals ***(10 marks)***

c. Tin ore assaying 10% Sn is fed to a concentration plant at the rate of 100 tons/hr. If the grades of concentrate and tailing are 40% Sn and 1% Sn, calculate the recovery of tin and tin lost in tailing in tons/hr. ***(15 marks)***

Question 2

a. Develop a simple beneficiation flow chart for uraninite ***(15 marks)***

b. Explain the following terms as applied in froth flotation

i. Entrainment ***(2 marks)***

ii. Induction time ***(2 marks)***

iii. Contact time ***(2 marks)***

c. 100 g of graphite with 60% carbon is fed to a flotation cell in the laboratory. By using proper reagents 50 g of concentrate assaying 90% carbon is obtained. Calculate the percentage recovery, ratio of concentration and ratio of enrichment, ***(10 marks)***

Question 3

a. Mention 3 purposes for thickening in the minerals industry **(6 marks)**

b. Explain briefly the mode of operation of a dense medium cyclone (DMC) (support with a diagram) **(5 marks)**

c. Dense medium separation of diamondiferous ore was carried out to evaluate the economic cut point. The various floats and sinks fractions after the test work were assayed for diamond content and the distribution of diamond in the various density fractions is presented in the table below.

Specific gravity of test	Nominal SG	Fractional weight (wt.%)	Cum. (%wt)	Assay (Carats/Hundred tonnes	Wt% * Assay	Cum (wt%*Assay	Assay
-2.65	1.325	1.5		0.008			
+2.65-2.70	2.675	9.29		0.040			
+2.70-2.75	2.725	26.11		0.036			
+2.75-2.80	2.775	19.67		0.042			
+2.80-2.85	2.825	11.91		0.172			
+2.85-2.90	2.875	10.92		0.340			
+2.90-2.95	2.925	7.87		0.371			
+2.95-3.00	2.975	2.55		1.300			
+3.00		10.18		7.800			

i. Complete the above table **(8 marks)**

ii. What is the cut point density? **(3 marks)**

iii. Estimate Calculate Ep **(12 marks)**

End