

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

FIRST SEMESTER EXAMINATION

CH212 – APPLIED INORGANIC CHEMISTRY

THURSDAY 10<sup>th</sup> JUNE 2021 12:50 PM

**TIME ALLOWED: 2 HOURS**

**INFORMATION FOR CANDIDATES:**

1. You will have 10 minutes to read the question paper. You **MUST NOT** begin writing in the answer book during this time.
2. **ANSWER ALL QUESTIONS.**
3. All answers **MUST** be written on the answer book provided
4. Calculators are permitted in the examination room. Lecture notes, notebooks plain papers and textbooks are **NOT** allowed.
5. Mobile phones are not allowed. **SWITCH OFF THE MOBILE PHONES.**
6. Show all workings and calculations in the answer book.
7. **DRAW the STRUCTURES** clear and visible.
8. **DO NOT** over write.
9. Write your name and number clearly on the front page. **DO IT NOW.**

**MARKING SCHEME:** Total 50 marks

1. (a) Draw the structure of  $[\text{Na} (15\text{-crown-5})]^+$
- (b) Amongst Gallium, Indium and Thallium, which one possesses the most stable +1 oxidation state and Why?
- (c) Suggest any TWO properties of saline hydrides.
- (d) What are interhalogen compounds? Give ONE example.

(8 marks)

2. (a) Calculate the spin only magnetic moment  $[\mu (s.o)]$  for  $\text{V}^{2+}$  and  $\text{Co}^{3+}$  ions.
- (b) Explain Down's process for the extraction of sodium.
- (c) What are feldspars and how are they classified?
- (d) Draw a simple diagram of graphene and explain its structure.
- (e) Explain the KROLL process for the extraction of Titanium metal.
- (f) Give any FOUR *similarities* between hydrogen and alkali metals.
- (g) Complete the following equations (*may have more than one product*) and balance them:



- (h) Starting from chromite ( $\text{FeCr}_2\text{O}_4$ ), explain how chromium metal is extracted.

(32 marks)

3. (a) What do you mean by 'diagonal relationship' in the periodic table? Give ONE example. What are the factors that contribute to the existence of diagonal relationship?

