

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

SECOND SEMESTER EXAMINATION

CH322 –INDUSTRIAL INORGANIC CHEMISTRY

FRIDAY 29<sup>th</sup> OCTOBER 2021 – 8:20 AM

**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) What is the range of chemical composition of Portland cement? [3 marks]
- (b) Describe the chemical reactions involved in setting and hardening of cement. [5 marks]
- (c) Explain the manufacturing of Portland cement by the wet process. [4 marks]
- (Total = 12 marks)
2. (a) Explain the manufacturing process of glass using block diagram. [5 marks]
- (b) What are the raw materials and chemical composition of each in the production of glass? [2 marks]
- (c) Write short notes on the following types of glass:  
(i) soda lime glass (ii) pyrex glass (iii) glass wool [6 marks]
- (d) Annealing process is important in glass manufacturing. Why? [3 marks]
- (Total = 16 marks)
3. (a) Write the chemical reactions involved during the firing process of clay in ceramics. [4 marks]
- (b) With the help of a neat sketch, explain the following fabricating techniques in ceramics.  
i) Injection moulding.  
ii) Slip casting.  
iii) Tape casting. [6 marks]
- (Total = 10 marks)
4. (a) Write in detail about the classification and characteristics of semiconductors. [3 marks]
- (b) Describe the properties and applications of superconductors. [3 marks]
- (c) Write the properties and raw materials of ammonium nitrate fertilizer. [4 marks]
- (d) Differentiate between organic and inorganic fertilizer with ONE example each. [2 marks]
- (Total = 12 marks)