THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

SECOND SEMESTER EXAMINATION

CH322 –INDUSTRIAL INORGANIC CHEMISTRY

FRIDAY 28th OCTOBER 2022 – 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** overwrite
9. Write your name and number clearly on the front page. **DO IT NOW**

MARKING SCHEME: Total 50 marks

1. (a) Explain the types of hydraulic cement and its properties.

   (b) Describe the terms setting and hardening of cement? Write the chemical reactions involved during these process.

   (c) What are the chemical reactions that take place in rotary kiln during the dry manufacturing process of Portland cement?

(12 marks)

2. a) Explain the function of tank furnace in the manufacturing of glass with a block diagram.

[3 marks]

   (b) Discuss the following in detail:
   (i) manufacture of glass
   (ii) composition and properties of soft glass.

[6 marks]

   (c) Write short notes on the following types of glasses:
   (i) potash lime glass (ii) lead glass (iii) photo chromic glass

[6 marks]

(Total = 15 marks)

3. (a) What are refractory materials? How are they classified and give ONE example each?

[4 marks]

   (b) Differentiate between amorphous and crystalline ceramic materials.

[3 marks]

   (c) What are ceramic armour materials? Give their advantages.

[3 marks]

(Total = 10 marks)

4. (a) Explain *n*-type and *p*-type extrinsic semiconductors with suitable diagrams and examples.

[6 marks]

   (b) Describe the applications of superconductors.

[3 marks]

   (c) Write the raw materials and properties of urea fertilizer.

[2 marks]

   (d) Differentiate between soluble and insoluble fertilizer with ONE example each.

[2 marks]

(Total = 13 marks)

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