

THE PAPUA NEW GUINEA UNIVERSITY OF TECHNOLOGY

FIRST SEMESTER EXAMINATION

APPLIED CHEMISTRY – THIRD YEAR DEGREE

CH391 – INDUSTRIAL INORGANIC CHEMISTRY

WEDNESDAY 17th JUNE 2020 – 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 paper 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 60 marks

1. (a) Explain the manufacturing of Portland cement by the wet process [4 marks]
- (b) Describe the chemical reactions involved in setting and hardening of cement. [5 marks]
- (c) What are the reasons for deterioration of cement concrete? How do you prevent the decay of cement? [3 marks]

(Total = 12 marks)

2. (a) Write the steps involved in the manufacturing of glass in detail. [4 marks]
- (b) Mention the raw materials and chemical composition of pyrex glass [2 marks]
- (c) Write short notes on the following types of glass:
(i) laminated glass (ii) toughened glass (iii) photochromic glass [6 marks]

(Total = 12 marks)

3. (a) During the firing of ceramic products, what types of physicochemical processes take place? [6 marks]
- (b) What are the differences between traditional and advanced ceramic materials? [4 marks]
- (c) What are refractories? Write any ONE characteristic. [2 marks]

(Total = 12 marks)

4. (a) What are zeolites? Write any TWO characteristics. [4 marks]
- (b) Describe the method that is used for regeneration of zeolites. [3 marks]
- (c) Discuss the advantages and disadvantages of zeolite process. [5 marks]

(Total = 12 marks)

5. (a) Explain n -type and p -type semiconductors [5 marks]
- (b) Differentiate between intrinsic and extrinsic semiconductors. [4 marks]
- (c) Describe the properties and applications of superconductors. [3 marks]

(Total = 12 marks)

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