



**RAJARATA UNIVERSITY OF SRI LANKA**  
**FACULTY OF APPLIED SCIENCES**

**B.Sc. (General Degree) in Applied Sciences**  
**Third Year - Semester I Examination – September/October 2019**

**CHE 3201 – INDUSTRIAL INORGANIC MATERIALS**

**Time: Two (02) hours**

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Answer any four (04) questions.

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1. a) Briefly describe the following types of glass:
    - i. Laminated glass.
    - ii. Heat strengthened glass.
    - iii. Tempered or toughened glass.
    - iv. Annealed glass.

(40 marks)
  - b) Discuss the following ways of fabrications used in glass industry:
    - i. Blowing.
    - ii. Casting.
    - iii. Drawing.
    - iv. Rolling.

(32 marks)
  - c) Explain the effect of two major components of borosilicate glass.

(28 marks)
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2. a) Discuss the term ceramics in chemistry. Give four properties of ceramics.

(30 marks)

- b) Explain the following three different types of pottery/ceramics.
- i. Earthenware.
  - ii. Stoneware
  - iii. Porcelain.
- (30 marks)
- c) List four applications of ceramics and briefly discuss the environmental challenges of the Ceramic Industry.
- (40 marks)
3. a) List the four major components of Portland cement and their roles in hydration process.
- (25 marks)
- b) Write down the balanced main chemical reactions during the calcination and the other changes during the productions of cement.
- (20 marks)
- c) Describe the functions of  $\text{CaO}$ ,  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{Fe}_2\text{O}_3$  present in ordinary Portland cement. Draw the flow chart of wet process used in the production of Portland cement. Give two disadvantages of wet process over dry process.
- (55 marks)
4. a) Write short notes on applications of graphite.
- (30 marks)
- b) Write down the flow charts of extraction of titanium dioxide from ilmenite and rutile. Give three uses of titanium/titanium dioxide.
- (30 marks)
- c) Explain the following optical properties of gem minerals, and name one type of gem mineral which shows each optical property.
- i. Isotropic gems.
  - ii. Pleochroism.
  - iii. Allochromatic gems idiochromatic gems.
- (40 marks)

5. a) Write short notes on N, P, K, organic and inorganic fertilizers in agriculture. Farmers prefer inorganic fertilizers than organic fertilizers. Explain. Give two advantages of organic fertilizers over inorganic fertilizers.
- (45 marks)
- b) Draw the flow chart to produce urea and state a method to estimate the percentage of nitrogen in urea.
- (25 marks)
- c) Give the method to produce Rhenania phosphate from phosphate rock and write down the hbalanced chemical equation for this production.
- (30 marks)

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