

CHUKA UNIVERSITY EXAMINATIONS (2021)

CHIN 221: INDUSTRIAL INORGANIC CHEMICALS

STREAMS: BSc (IND CHEM)

TIME: 2 HRS

INSTRUCTIONS

Answer question **One** (Compulsory) and any other **Two** questions

QUESTION ONE [30 MARKS]

- (a) Discuss the industrial manufacture of ammonia (**6 marks**)
- (b) Describe the industrial production of low strength and high strength nitric acid (**8 marks**)
- (c) Caustic soda is manufactured on an industrial scale using the membrane process.
 - (i) Describe, with a diagram and relevant equations, the membrane process (**6 marks**)
 - (ii) State four advantages of the membrane process (**2 marks**)
- (d) Describe the following methods of ore beneficiation (**8 marks**)
 - (i) Comminution
 - (ii) Froth flotation

QUESTION TWO [20 MARKS]

- (a) Describe the industrial manufacture of sulphuric acid (**6 marks**)
- (b) Explain the purpose of the following ore pretreatment processes (**4 marks**)
 - (i) Drying
 - (ii) Calcination
 - (iii) Roasting
 - (iv) Agglomeration
- (c) Discuss the production of titanium using the Kroll process (**10 marks**)

QUESTION THREE [20 MARKS]

- (a) State six uses of caustic soda (**3 marks**)
- (b) Describe the industrial manufacture of soda-lime glasses (**10 marks**)
- (c) Discuss, with the aid of relevant equations, the manufacture of steel using the basic oxygen converter (**7 marks**)

QUESTION FOUR [20 MARKS]

- (a) Describe, with the aid of relevant equations, the Solvay process for industrial production of soda ash (**6 marks**)
- (b) Discuss the industrial manufacture of Portland cement (**10 marks**)

(c) Describe industrial production and uses of argon (**4 marks**)