



NATIONAL OPEN UNIVERSITY OF NIGERIA
DEPARTMENT OF PURE AND APPLIED SCIENCES
2021_1 EXAMINATIONS

COURSE CODE: CHM417

CREDIT UNIT: 2

COURSE TITLE: INDUSTRIAL CHEMICAL PROCESSES 11

TIME: 2 HRS

INSTRUCTION: ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS

Question 1

- 1ai. What is mineral? **5 marks**
- aii. Outline five physical properties of minerals. **5 marks**
- b. What is the difference between sintering and smelting? **4 marks**
- c. Using equations, outline the three main steps in extraction of iron from its ores. **5 marks**
- d. In comparison of hydrometallurgy and its traditional counterpart (pyrometallurgy), what are the advantages of hydrometallurgy?
- e) State the two main sources of sodium carbonate **2 marks**

Question 2

- a) Show schematically how HCl can be produced **10 marks**
- b. Explain briefly the Bayer Process. **5 marks**

Question 3

- (a) State the four advantages and one disadvantage of electrochemical methods. **4 marks**
- (b) What processes are employed in the manufacture of HCl? **11 marks**

Question 4

- 4a. Describe the Arc process for manufacturing nitric acid. **10 marks**
- b. How are phosphate products classified? **5 marks**

Question 5

- 5a. Discuss the steps involve in ore dressing. **10 marks**
- b. What are the results of calcination as a process of metal extraction? **5 marks**