



NATIONAL OPEN UNIVERSITY OF NIGERIA
DEPARTMENT OF PURE AND APPLIED SCIENCES
SEPTEMBER, 2020_1 EXAMINATIONS

COURSE CODE: CHM 417

CREDIT UNIT: 2

COURSE TITLE: INDUSTRIAL CHEMICAL PROCESSES 11

TIME: 2 HRS

INSTRUCTION: *Answer question 1 and any other 3 questions*

QUESTION ONE

- (a) Explain Smelting method using examples and equations (6marks)
- (b) Briefly discuss the major steps involved in metallurgy. (6marks)
- (c) State with chemical formular the main constituent of hydraulic cement. (4marks)
- (d) With the aid of chemical equation only, state how ammonium phosphate is prepared. (4marks)
- (e) Explain how HCl is produced from the chlorination process, indicating its concentration. (5marks)

QUESTION TWO

- (a) With respect to metallurgy, write short notes on
 - i. Reduction with carbon (3 ½ marks)
 - ii. Reduction of complex salts 5mks
 - iii. Auto reduction method (2 ½ marks)
- (b) What is the importance of a regenerative system? (1mark)
- (c) List the physical methods of purifying metals. (3marks)

QUESTION THREE

- (a) Mention the qualities of a good electrode. (2 ½ marks)
- (b) Discuss the industrial application of magnesium by electrolysis of Magnesia. (6marks)
- (c) Considering what happens at the cathode in the Chlor-alkali process, differentiate between the mercury cell, diaphragm and membrane cell processes. (3marks)
- (d) Using chemical equations only, show the reactions in the chlor-alkali process. (3 ½ marks)

QUESTION FOUR

Using a schematic diagram only, describe the process used in the manufacture of Phosphate fertilizers. (15marks)

QUESTION FIVE

- (a) Discuss in detail the production and use of Urea as a fertilizer. (10marks)
- (b) Show with a well labeled diagram the Chlorination process of HCl production.
(5marks)