National Open University of Nigeria
Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science

APRIL, 2019 EXAMINATIONS

COURSE CODE: CHM417
COURSE TITLE: INDUSTRIAL CHEMICAL PROCESS II

CREDIT: 2 Units
TIME ALLOWED: 2 Hours
INSTRUCTION: Answer Question ONE (1) and any other THREE (3) Questions

QUESTION 1

a) What is fat lime? **2marks**

b) Define the term smelting with respect to chemical metallurgy **2 ½ marks**

c. The following abbreviations/acronyms are associated with aluminous cement. Give the chemical formula of each of them **3marks**

(i)'C_3A' (ii)'C_2S' (ii)'C_2AS'

d) List the five (5) major steps involved in the preparation of sulphuric acid. **2 ½ marks**

e. Describe the manufacturing of natural cement. **6 marks**

f) What does fertilizing a land stand to accomplish? **3 marks**

g) Give four functions of calcinations. **2 marks**

(h) With the aid of relevant balanced equations only, describe the smelting of ore (Fe_2O_3)

4mks

QUESTION 2

Reduction is an important process in extraction of metals from their ores. Outline the following reduction processes, illustrating each with relevant balanced chemical

equation(s). (i) Reduction by heating air (ii) Auto reduction (iii) reduction with coke or carbon monoxide (iv) reduction with hydrogen (v) reduction of complex salt. **15marks**

QUESTION 3

a. List four types of roasting. **4marks**

b. Give a brief discussion of roasting as applied to extraction of crude metal. **6marks**

c. What is an alloy? **2marks**

d. Explain alloying **3marks**

QUESTION 4

a. Outline four types of furnaces used in metallurgical operations. **8marks**

b. Give a brief description of the following methods of ore dressing.

(i) Handpicking (**2marks**) (ii) Magnetic concentration (**2marks**) (iii)Hydraulic washing **3marks**

QUESTION 5

a. Define the following:

a. Fertilizer **2marks**
b. Direct fertilizer **2marks**
c. Outline two disadvantages of urea fertilizer **2marks**
d. Describe with relevant equations, how the nutrients in Urea are made available to the plant **9marks**