



NATIONAL OPEN UNIVERSITY OF NIGERIA
DEPARTMENT OF PURE AND APPLIED SCIENCES
2020_2 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*

1. (a) What is the role of the silicates and the aluminates in Cement? Indicate which minerals are the silicates and the aluminates. 6mks
(b) Mention and explain in detail the most convenient chemical method of refining metals. 8mks
(c) In Contact process, what effect does Arsenic oxide have and how can its absence be confirmed? 4mks
(d) Identify the catalysts used in the Lead-chamber and Contact processes. 2mks
(e) State the importance of the use of membrane in the Membrane cell process and enumerate the disadvantages of the process. 5mks
2. (a) On what principle(s) or condition(s) are the following based:
 - i. Hand picking 1mk
 - ii. Levigation 2 mks
 - iii. Froth floatation 2mks
 - iv. Magnetic concentration 1mk
(b) Why is Coke used in the Smelting of Iron? 4mks

(c) When is reduction by heating in air applicable to an ore? With the aid of chemical equations only, show how this is applied to Cinnabar. 5mks
3. (a) Is it practicable to prepare Nitric acid from sodium nitrate? Explain. 11mks
(b) How can the product in (a) be applied? 4mks
4. (a) Using balanced equation(s) only, show how hydrochloric acid is produced
 - i. Using sodium chloride 4 ½ mks
 - ii. As by-product of chlorination 3mks
 - iii. From incineration of chlorinated organic wastes 2mks
 - iv. By decomposing Iron(iii) chloride 2mks
(b) If HCl is labeled 38% by weight, list its expected physical characteristics. 2 mks
(c) Which factor is considered in selecting a leaching agent for a metal ore? 1½ mk

5 (a) You are expected to extract a metal from its ore. List six (6) possible leaching agents that may be used. 6mks

(b) Explain leaching process in terms of

i. formation of PbCl_4^{2-}

4 ½ mks

ii. Cyanidation process of Gold recovery

4 ½ mks