



NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY,
JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2024 1 EXAMINATION

PROGRAMME: B.Sc.
COURSE CODE: CHM 303
COURSE TITLE: INORGANIC CHEMISTRY III
COURSE UNIT: 3
TIME: 3 HOURS
INSTRUCTION: Answer question one and any other three questions.

QUESTION ONE

- (1a) Why the reactions of Rb and Cs with water should not be attempted? (5 marks)
- (1bi). State at least two limitations of electrometallurgy method? (3 marks)
- (1bii). Give at least three uses of thiosulphate solution? (3 marks)
- (1c). Draw the molecular orbital energy level diagram of XeF_6 (4 marks)
- 1d. State five uses of group (V) element? 5marks
- 1e. State five uses of hydrogen? 5marks

QUESTION TWO

- (2a) Use chemical equation show how potassium and sodium react with oxygen? (5 marks)
- (2b). Describe gravity separation as used in extraction of metals? (5 marks)
- (2c). Explain how borate glasses are formed? (5 marks)

QUESTION THREE

- (3a) Why is group 1 and 2 elements highly electropositive metals and give reasons why they have the tendency to lose their outermost electron

(5 marks)

(3b). Discuss the term smelting? (5 marks)

(3c). State at least five uses of group (V) element (5 marks)

QUESTION FOUR

(4a) State five uses of hydrogen? (5 marks)

(4b). State at least 5 limitation of crystal field theory? (5 marks)

(4c). According Arrhenius theory, an acid must contain hydrogen atom, explain why ortho boric acid is written as $B(OH)_3$ and not H_3BO_3 ? (5 marks)

QUESTION FIVE

(5a). Explain how sodium thiosulphate is produced and its uses? (7 marks)

(5b). State at least three types of metallurgical operations used in reduction of metals?(3 marks)

(5c). Write the general formula for organo-silicon compounds ? (5 marks)

QUESTION SIX

(6a) State the uses of sodium nitrate? (5 marks)

(6b). Differentiate between valence bond theory and molecular orbital theory? (5 marks)

(6c). Why do group IVA elements accept more than four bonds? (5 marks)