



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ANALYTICAL CHEMISTRY (DAC 15S)

ACH 2106: FUNDAMENTALS OF INORGANIC CHEMISTRY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- a) Define binding energy and explain the relationship between binding energy and mass deficiency of a nucleus atom (5marks)
- b) Explain any three factors influencing ionization energy (6marks)
- c) 250cm³ of a solution contains 5.85g of sodium chloride calculate the molar concentration of sodium chloride in moldm³ given Na = 23, Cl = 35.5 (6marks)
- d) Explain the existence of the following bonds giving an example in each case.
- i) Ionic bond (2.5 marks)
 - ii) Covalent bond (2.5 marks)
- e) 960cm³ of a gas Q measured at room temperature had a mass of 2.32g calculate the molar mass of Q (4marks)
- f) Define the following terms
- i) Valency (2marks)
 - ii) Isotopes (2marks)

Question TWO

- a i) Calculate the concentration of a stock solution of sulphuric acid with the following label specifications: density 1.18g, percentage purity 98% and RMM of $\text{H}_2\text{SO}_4 = 98$ (3marks)
- ii) calculate the volume of a stock solution that should be taken to dilute it to 2dm^3 of the concentration 0.5mol per dm^3 (3marks)
- b) using the following chemical equation identify
- $$\text{FeO}_{(s)} + \text{CO}_{(g)} \rightarrow \text{Fe}_{(s)} + \text{CO}_{2(g)}$$
- i) Oxidized and reduced species (2marks)
- ii) Reducing and oxidizing agents (2marks)
- c) Explain why the first elements in each group exhibit considerable differences from the rest of the elements of the same group (5 marks)

Question THREE

Describe the periodic trend of the following giving reason in each case

- i) Ionization energy (3 marks)
- ii) Electronegativity (3 marks)
- iii) melting point (3 marks)
- iv) Atomic radius (3 marks)
- v) Reactivity (3marks)

Question FOUR

- a) Discuss using examples the difference between nuclear fusion and nuclear fission (4marks)
- b) Using the orbital notation write the electronic configuration of the following elements; Be, Al, Ne and S. (8 marks)
- c) Explain the difference between p-block elements and s-block elements? (3 marks)

Question FIVE

- a) Describe very briefly two experiments that show the dual nature of electromagnetic radiation and at the same time confirm the reliability of Plank's quantum theory (6marks)
- b) State and explain any three factors that influence ionization energy (6marks)
- a) Assign the oxidation number of the underlined elements $\underline{\text{C}}\text{I}\text{O}_3^-$, $\underline{\text{S}}\text{O}_3^{2-}$ and $\underline{\text{Mn}}_2\text{O}_7$ (3marks)