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:APRIL2016

TIME:2HOURS

DATE:Pick DateSelect MonthPick Year

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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 H_2SO_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

$$FeO_{(s)} + CO_{(g)} \longrightarrow Fen_{(s)} + CO_{2\ (g)}$$

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) Discus using examples the different 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 $\underline{Cl}O_3^-$, $\underline{S}O_3^{2-}$ and $\underline{Mn}_2O_7$ (3marks)