TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL LABORATORY SCIENCES (DMLS 15S)

ACH 2101: FUNDAMENTALS OF CHEMISTRY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick DateSelect MonthPick Year

<u>**Instructions to Candidates**</u>
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) Explain why 2-methylbutane have higher boiling point than 2,2-dimethylpropane (4 marks)
b) Define the following terms
   i) Valency (2marks)
   ii) Isotopes (2marks)
c) Explain the relationship between the atomic size and the ionization energy (4marks)
d) Discus using examples the different between nuclear fusion and nuclear fission (4marks)
e) State why alkenes are the only hydrocarbons able to form stereoisomers (4marks)
f) The pH of 0.01 mol dm^{-3} of ethanoic acid (acetic acid), CH_3COOH is 3.40 at 25 °C.
  What is the dissociation constant of ethanoic acid at this temperature? (6marks)
g) State any two hazards associated with volatile liquids and two precautions that

  should be taken against these hazards. (4 Marks)

Question TWO

a) List any six general precautions that can be taken against chemical hazards. (6 Marks)
b) Explain three factors that influence ionisation energy (6marks)
c) State any three precautions that should be taken against explosions (3 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) A mixture of 5.00×10^{-3} mol of H_2 and 1.00×10^{-2} mol of I_2 are placed in a 5.00 L container at 448 ^0C and allowed to come to equilibrium. Analysis of the equilibrium mixture shows that the concentration of HI is 1.87×10^{-3} M. Calculate K_C at 448^0C for the reaction. The stoichiometric equation of the reaction is shown in equation   (8 marks)

b) Use equations to illustrate the complete chlorination of methane   (7 marks)

Question FIVE

a) Nitrogen gas combine with hydrogen gas to form ammonia according to the equation below explain how changes in temperature, pressure and concentration affect equilibrium constant   (9 marks)

      $N_2 (g) \ + \ 3H_2 (g) \rightleftharpoons \ 2NH_3 (g) \ \ \Delta H \ -1024KJmol^{-1}$

b) Find the concentration of H^+ of a solution of pH 4.5.   (4 marks)

c) Define the term isomerism   (2marks)