



# 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 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) 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) Discuss 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<sup>-3</sup> of ethanoic acid (acetic acid), CH<sub>3</sub>COOH 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  $5.00 \times 10^{-3}$  mol of  $H_2$  and  $1.00 \times 10^{-2}$  mol of  $I_2$  are placed in a 5.00 L container at  $448^\circ C$  and allowed to come to equilibrium. Analysis of the equilibrium mixture shows that the concentration of HI is  $1.87 \times 10^{-3}$  M. Calculate  $K_C$  at  $448^\circ C$  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)  
$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g) \quad \Delta H -1024KJmol^{-1}$$
- b) Find the concentration of  $H^+$  of a solution of pH 4.5. (4 marks)
- c) Define the term isomerism (2marks)