



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⁻³ of ethanoic acid (acetic acid), CH₃COOH 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°C 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°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)
$$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) \quad \Delta H -1024\text{KJmol}^{-1}$$
- b) Find the concentration of H^+ of a solution of pH 4.5. (4 marks)
- c) Define the term isomerism (2marks)