JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF HEALTH SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN PUBLIC HEALTH

1ST YEAR 1ST SEMESTER 2023/2024 ACADEMIC YEAR

MAIN CAMPUS

COURSE CODE: HCB 1107

COURSE TITLE: APPLIED CHEMISTRY

DATE: **STREAM: (BSc. Env. Health)**

EXAM SESSION:

TIME: 2 HOURS

Instructions:

1. **Answer ALL questions in Section A and ANY other TWO questions in Section B**
2. **Candidates are advised not to write on Question Paper.**

Candidates must hand in the Answer Booklet to the Invigilator while in the Examination Room

SECTION A [30 MARKS]

Answer ALL questions from this Section.

Question one.

a) Define the following terms as used in chemistry. (10 mrks)

- Isotope
- Mass number
- Mole
- Avogadro's law.

b) .A sample of nitrogen gas consists of 4.22 ×1023 molecules of nitrogen. How many moles of nitrogen gas are there? (3mrks)

c) 1) Define an electronic configuration. (2 mrks)

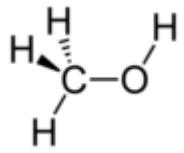
2) Write The electron configurations and orbital box diagrams of these two elements . (6 mrks)

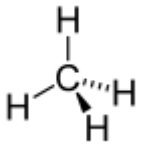
- Nitrogen (N)
- Potassium (K)

d) Differentiate between non-polar and polar covalent bonds. (3mrks)

e) Differentiate between the terms radioactivity and radionuclide. (4 marks)

f)Give names of the following organic compound structures (2mrks)

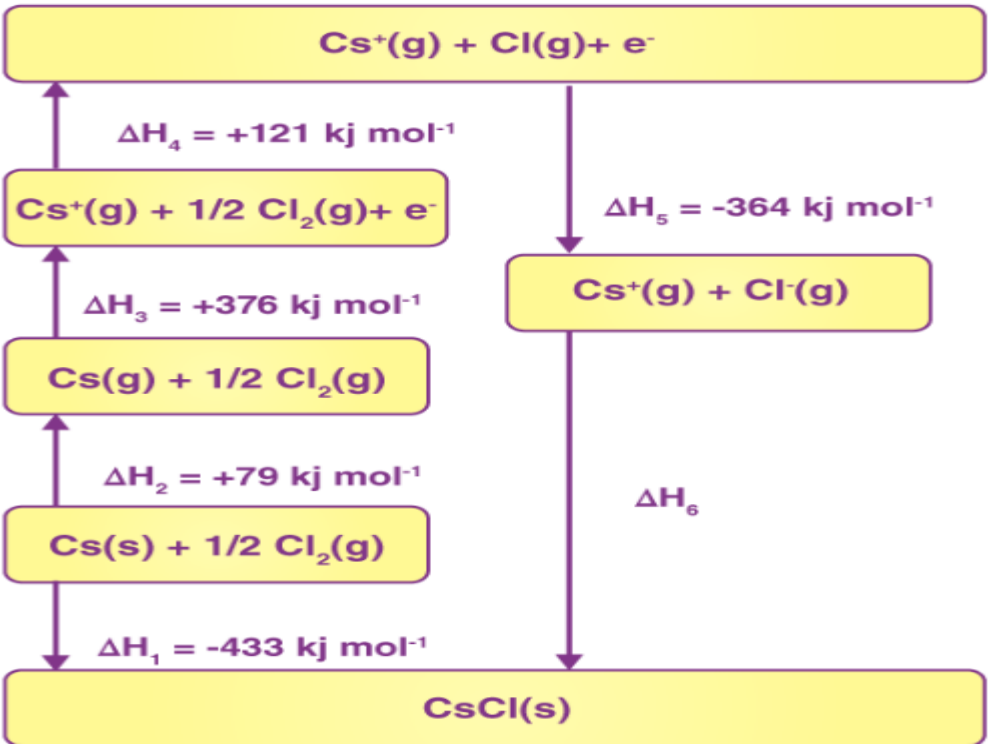
a) 

b) 

Question 2

a) What distinguishes Hess law from the Born Haber cycle? (4 marks)

b) The energy level diagram (Born-Haber cycle) for caesium chloride is shown below. Give the names of the enthalpy changes represented by ΔH1, ΔH2, and ΔH5. (6 marks)



c) The energy level diagram (Born-Haber cycle) for caesium chloride is shown above. Calculate the value of the lattice energy ΔH6. (4 marks)

d) Differentiate between transmutation and fission in radioactivity giving examples. (6 marks)

Question 3

a) Define an intermolecular force and describe four categories of the intermolecular forces (10 mrks)

b) Discuss characteristics of any two types of radioactive decays(natural radiation emitted by unstable nuclei) (10 mrks)

Question 4

a)What are the principal differences between nuclear reactions and ordinary chemical changes? (10 mrks)

b) Discuss ways through which organic compounds can be represented (formulas) (10 marks)

Question 5

a) Describe in terms of bonding structure the following organic functional groups.
Alkanes, Alkenes, Alkynes (10 marks)

b) What is hybridization of alkenes? (4 mrks)

c) Give structural formula of an alkane and alkanols (6 marks)