

1. Introduction

This document contains vital information, structural details, and topical guidance for candidates preparing for the New Uzbekistan University (NewUU) Admissions Test in Chemistry for Medical School.

The examination is rigorously designed to evaluate candidates' foundational knowledge, quantitative problem-solving skills, and analytical reasoning in chemistry—traits essential for success in a demanding medical curriculum.

2. Core Examination Topics

The chemistry examination covers the following comprehensive subject areas:

Foundational Chemical Principles

- **Atoms, Molecules, and Ions:** Atomic theory, atomic structure (subatomic particles, isotopes), and writing/interpreting chemical formulas.
- **Composition of Substances and Solutions:** Mass and the mole concept, molar mass calculations, molarity, and various units of solution concentration.
- **Stoichiometry of Chemical Reactions:** Balancing chemical equations, limiting reactant analysis, theoretical and percentage yields, and reaction stoichiometry.

Structure and Bonding

- **Electronic Structure and Periodic Properties of Elements:** Electron configurations, quantum numbers, and periodic trends.
- **Chemical Bonding and Molecular Geometry:** Ionic vs. covalent bonding, Lewis structures, and molecular polarity.

Physical Chemistry and Energetics

- **Thermochemistry:** Endothermic and exothermic processes, enthalpy, and calorimetry.
- **Thermodynamics:** Entropy, Free Energy, and predicting reaction spontaneity.
- **Chemical Kinetics:** Factors affecting reaction rates, rate laws, order of reactions, activation energy, and catalyst mechanics.

Equilibrium and Solution Chemistry

- **Fundamental Equilibrium Concepts:** The dynamic nature of equilibrium and the equilibrium constant.
- **Acids and Bases**
- **Electrochemistry**

Inorganic, Organic, and Biological Chemistry

- **Transition Metals and Coordination Chemistry:** Properties of transition metals, coordination compounds, ligands, and coordination numbers.
- **Organic Chemistry:** Nomenclature, functional groups (alcohols, aldehydes, ketones, carboxylic acids, amines, etc.), isomerism, and basic organic reaction mechanisms.
- **Biomacromolecules and Polymers:** Structure and function of carbohydrates, lipids, amino acids, proteins (peptide bonds), nucleic acids, and fundamental polymerization reactions.

3. Structure of the Examination

Candidates should familiarize themselves with the design, timing, and formatting of the examination to optimize their performance:

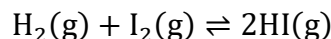
- **Format:** The examination consists of a total of **20 multiple-choice questions (MCQs)**. Each question features four options with a single correct answer.
- **Duration:** Candidates are allocated exactly **60 minutes** to complete the exam. Efficient time management is critical.
- **Scoring Policy:** There is **no penalty for incorrect answers** (no negative marking). Candidates are highly advised to attempt all questions on the paper.

Permitted Materials

- **Periodic Table:** A standard periodic table of elements containing atomic numbers and relative atomic masses will be printed directly in the examination booklet.
- **Calculators:** The use of standard, **general scientific calculators** is fully permitted. However, programmable calculators or devices with communication features are strictly prohibited.

Sample Questions

1. Hydrogen gas reacts with iodine gas to form hydrogen iodide according to the following equilibrium:



At equilibrium, the concentrations are:

$$[\text{H}_2] = 0.20 \text{ mol L}^{-1}$$

$$[\text{I}_2] = 0.10 \text{ mol L}^{-1}$$

$$[\text{HI}] = 0.80 \text{ mol L}^{-1}$$

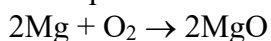
What is the value of the equilibrium constant, K_c ?

- A) 8
- B) 16
- C) 32
- D) 64

2. Magnesium is in Group II and Period 3 of the Periodic Table.
Which row shows the charge on a magnesium ion and the electronic configuration of a magnesium ion?

	charge	electronic configuration
A	+2	2,8
B	+2	2,8,2
C	-2	2,8
D	-2	2,8,2

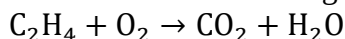
3. The equation for the combustion of magnesium is shown.



Which mass of magnesium oxide will be formed from the complete reaction of 9.6 g of magnesium?

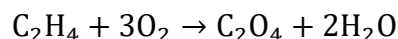
- A) 8.0 g
- B) 16.0 g
- C) 24.0 g
- D) 40.0 g

4. A group of students was asked to balance the following chemical equation.

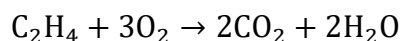


Two students proposed the following balanced equations:

Student 1:



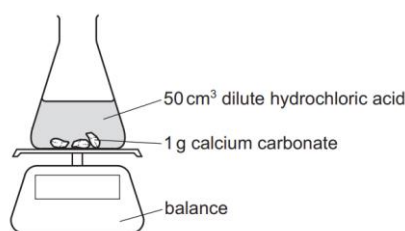
Student 2:



Which statement is correct?

- A) Only Student 1 correctly balanced the equation.
- B) Only Student 2 correctly balanced the equation.
- C) Both students correctly balanced the equation.
- D) Neither student correctly balanced the equation.

5. An unknown gas has a mass of 44.0 g.
At a pressure of 220 kPa and a temperature of 167°C, it occupies a volume of 16.62 L.
Using the ideal gas equation, determine the relative density (vapor density) of the unknown gas with respect to methane (CH₄).
(Take $R = 8.314 \text{ kPa} \cdot \text{L mol}^{-1} \text{ K}^{-1}$ and the molar mass of methane = 16.0 g mol^{-1} .)
A) 1.375
B) 1.650
C) 2.750
D) 3.125
6. An experiment is set up as shown. The mass of the conical flask and its contents is measured at 30-second intervals.



Which statement about the reaction and changes to the reaction conditions is correct?

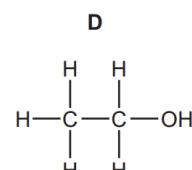
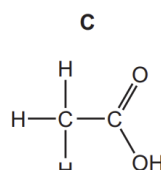
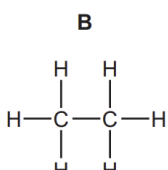
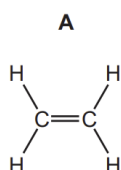
- A) Adding 10 cm³ of water to the 50 cm³ of acid increases the rate of the reaction.
B) Increasing the size of the pieces of calcium carbonate increases the rate of the reaction.
C) Increasing the temperature increases the rate of the reaction.
D) The mass of the conical flask and its contents increases as carbon dioxide is formed.
7. The results of the reaction of metals W, X, Y and Z with cold water and dilute acid are shown.

metal	reaction with cold water	reaction with dilute acid
W	fizzes, gas evolved	rapid fizzing, gas evolved
X	no observable reaction	no observable reaction
Y	no observable reaction	slow fizzing, gas evolved
Z	a few bubbles of gas	fizzes, gas evolved

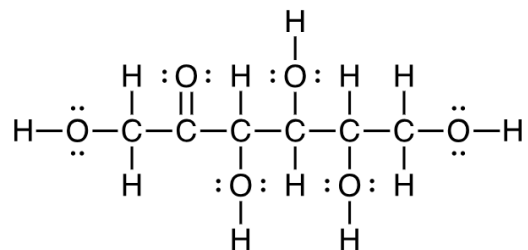
What is the order of reactivity of the metals?

	least reactive → most reactive			
A	W	Z	Y	X
B	W	Y	Z	X
C	X	Y	Z	W
D	X	Z	Y	W

8. What is the structure of ethanol?



9. Fructose is a sugar found naturally in honey, fruits, and vegetables.
A Lewis structure of fructose is shown below.



- A) 30.03 g/mol
B) 90.08 g/mol
C) 120.96 g/mol
D) 180.156 g/mol
10. Calculate how many grams of water will be consumed during the complete hydrolysis of 46.6 g of the tripeptide Gly-Ala-Ser.
Glycine (Gly): $\text{C}_2\text{H}_5\text{NO}_2$
Alanine (Ala): $\text{C}_3\text{H}_7\text{NO}_2$
Serine (Ser): $\text{C}_3\text{H}_7\text{NO}_3$
- A) 4.5
B) 7.2
C) 10.8
D) 1.8