FIRST TERM MODEL QUESTION PAPER 2024 WITH ANSWER KEY SET 1

CHEMISTRY - Standard IX

Time: 1.5 hours

Max. Marks: 40

(Prepared by www.educationobserver.com)

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1. 15 minutes is given as cool-off time.
2. This time is to be used for reading the question paper.
3. You are not supposed to write anything during the cool-off time.
4. Attempt the questions according to the instructions.

Section A: Multiple Choice Questions (MCQs) [1 mark each]

1. Who discovered the electron?
   a) J.J. Thomson
   b) Ernest Rutherford
   c) Niels Bohr
   d) James Chadwick
2. What is the mass number of an atom with 6 protons, 6 electrons, and 7 neutrons?
   a) 12
   b) 13
   c) 14
   d) 19
3. The modern periodic table is arranged in the order of:
   a) Atomic mass
   b) Atomic number
   c) Number of neutrons
   d) Chemical reactivity
4. In the Rutherford gold foil experiment, what was concluded when some alpha particles bounced back?
   a) Atoms are mostly empty space
   b) Electrons are embedded in the nucleus
   c) Atoms have a dense, positively charged nucleus
   d) Electrons revolve in fixed orbits
5. Which of the following is a noble gas?
   a) Fluorine
   b) Neon
   c) Oxygen
   d) Chlorine

Section B: Short Answer Questions (Answer any 4 out of 5) [2 marks each]

1. Explain the concept of isotopes with an example.
2. What is the significance of the atomic number in an element?
3. Write the electron configuration of chlorine (Atomic number: 17).
4. Describe the key features of the Bohr atomic model.
5. How does the periodic table help predict the properties of elements?

Section C: Descriptive Questions (Answer any 4 out of 5) [3 marks each]

1. Compare the plum pudding model and Rutherford's atomic model.
2. Explain why elements in the same group of the periodic table have similar chemical properties.
3. Describe the experiment and conclusions drawn by J.J. Thomson regarding cathode rays.
4. How does the size of atoms change across a period and down a group in the periodic table?
5. Write a short note on the discovery and properties of protons.

Section D: Application Level and Experiment Description Questions (Answer any 4 out of 5)

1. A radioactive isotope is used to treat cancer. Name the isotope and describe how its properties make it suitable for this purpose.
2. Draw and label a diagram of the Rutherford gold foil experiment and explain the key observations and conclusions.
3. An element has 3 electrons in its M shell. Predict its group, period, and possible chemical reactivity.
4. Explain the concept of valency and determine the valency of an element with the atomic number 13.
5. An atom has 2 protons, 2 neutrons, and 2 electrons. Explain why this atom is stable.

Answer Key

Section A: MCQs

1. a) J.J. Thomson
2. c) 14

3. b) Atomic number
4. c) Atoms have a dense, positively charged nucleus
5. b) Neon

Section B: Short Answer Questions

1. Isotopes are atoms of the same element with the same atomic number but different mass numbers. Example: Carbon-12 and Carbon-14.
2. The atomic number represents the number of protons in an atom and determines the element's identity.
3. Electron configuration of chlorine: 2, 8, 7.
4. Bohr's model proposes that electrons revolve in fixed orbits around the nucleus and do not radiate energy while in those orbits.
5. The periodic table arranges elements in groups and periods, allowing predictions about their reactivity and other properties based on trends.

Section C: Descriptive Questions

1. The plum pudding model suggested that electrons were scattered within a positively charged "soup," whereas Rutherford's model proposed a dense nucleus surrounded by electrons in empty space.
2. Elements in the same group have the same number of valence electrons, leading to similar chemical properties.
3. Thomson's cathode ray experiment demonstrated that electrons are negatively charged particles, which are components of all atoms.
4. Atomic size decreases across a period due to increasing nuclear charge and increases down a group due to additional electron shells.
5. Protons are positively charged particles discovered by Rutherford, residing in the nucleus and contributing to the atomic number and mass.

Section D: Application Level and Experiment Description Questions

1. Cobalt-60 is used to treat cancer due to its ability to emit high-energy gamma rays that can destroy cancer cells.
2. (Include a labeled diagram of the Rutherford experiment.) Key observations: most particles passed through, some deflected, and very few bounced back, leading to the conclusion of a dense nucleus.
3. The element belongs to Group 13 and Period 3 and is likely a metal with moderate reactivity.
4. Valency is determined by the number of electrons in the outer shell. For atomic number 13 (Aluminum), the valency is 3.

5. The atom with 2 protons, 2 neutrons, and 2 electrons is helium (He-4), which is stable due to a full outer electron shell.