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: [1 mark each]

1. Which scientist proposed the planetary model of the atom?
   a) J.J. Thomson
   b) Ernest Rutherford
   c) Niels Bohr
   d) John Dalton
2. What is the charge of a proton?
   a) Neutral
   b) Positive
   c) Negative
   d) None
3. Which of the following is an isotope of carbon?
   a) Carbon-12
   b) Carbon-14
   c) Both a and b
   d) None of the above
4. In which group of the periodic table are the alkali metals found?
   a) Group 1
   b) Group 2
   c) Group 13
   d) Group 18
5. The mass number of an atom is determined by the number of:
   a) Protons only
   b) Neutrons only
   c) Protons and neutrons
   d) Protons and electrons

Section B: [2 marks each]

1. State the difference between atomic number and mass number with examples.
2. What are isotones? Give an example.
3. Explain the concept of valency with an example.
4. Write the electronic configuration of magnesium (Atomic number: 12).
5. What do you understand by the term "noble gases"? Mention two properties of noble gases.

Section C: [3 marks each]

1. Discuss the main postulates of Rutherford's model of the atom.
2. Compare the properties of alpha, beta, and gamma rays.
3. Explain the significance of Mendeleev's periodic law and the modern periodic law.
4. Write a note on the discovery of neutrons and their importance in the atomic structure.
5. How does the periodic table help in predicting the reactivity of elements?

Section D:

1. Draw and explain the electron configuration of sodium and predict its chemical reactivity.
2. A certain element X has an atomic number of 16. Predict its position in the periodic table, its valency, and its likely chemical properties.
3. Describe the experiment carried out by Millikan to determine the charge of an electron.
4. Explain the trends in atomic size across a period and down a group in the periodic table.
5. A radioactive isotope is used in diagnosing thyroid disorders. Name the isotope and explain how it is useful for this purpose.

Answer Key

Section A: MCQs

1. b) Ernest Rutherford
2. b) Positive
3. c) Both a and b

4. a) Group 1
5. c) Protons and neutrons

Section B: Short Answer Questions

1. The atomic number is the number of protons in an atom (e.g., Hydrogen: 1), while the mass number is the sum of protons and neutrons (e.g., Helium: 4).
2. Isotones are atoms with the same number of neutrons but different atomic numbers. Example: Carbon-14 and Nitrogen-15 both have 7 neutrons.
3. Valency is the combining power of an element. For example, oxygen has a valency of 2 as it needs 2 electrons to complete its outer shell.
4. Electronic configuration of magnesium: 2, 8, 2.
5. Noble gases are inert gases in Group 18 of the periodic table. They are chemically non-reactive and have stable electronic configurations.

Section C:

Rutherford's model suggested that the atom has a dense, positively charged nucleus with electrons orbiting around it, and most of the atom's space is empty.

1. Alpha rays have a positive charge and high mass, beta rays have a negative charge and low mass, and gamma rays have no charge or mass but high energy.
2. Mendeleev's periodic law arranged elements by atomic mass, while the modern periodic law arranges them by atomic number, resolving many inconsistencies.
3. Neutrons, discovered by James Chadwick, have no charge and contribute to the mass and stability of the nucleus, explaining isotopic variations.
4. The periodic table helps in predicting reactivity by organizing elements into groups with similar valency and periodic trends.

Section D:

1. (Include a diagram of sodium's electron configuration: 2, 8, 1). Sodium is highly reactive because it has one valence electron that is easily lost.
2. The element with atomic number 16 is sulfur. It belongs to Group 16, Period 3, has a valency of 2, and is a non-metal with high reactivity.
3. Millikan's oil drop experiment measured the charge of an electron by balancing gravitational and electric forces on tiny charged oil droplets.
4. Atomic size decreases across a period due to increasing nuclear charge and increases down a group due to added electron shells.
5. Iodine-131 is used for diagnosing thyroid disorders as it is selectively absorbed by the thyroid gland, allowing for targeted imaging or treatment.