



Estd. 1861

# BOYS' HIGH SCHOOL AND COLLEGE

SECOND TERM EXAMINATION (2023-24)

CLASS – IX

CHEMISTRY (SCIENCE PAPER – 2)

TIME- 2 HOURS

MM- 80

Attempt *all* questions from *Section A* and any *four* questions from *Section B*.  
The intended marks for questions or part of questions are given in brackets [ ].

## Section A (40 marks)

Attempt *all* questions from this section.

### Question 1.

Choose the correct answer from the given alternatives-

[15]

- i. The atomic number is represented by the letter \_\_\_\_\_.  
a. A                                      b. Z                                      c. P                                      d. N
- ii. Least number of electrons is present in which of the following shell?  
a. M shell                                      b. N shell                                      c. K shell                                      d. L shell
- iii. The nucleus is positively charged due to the presence of \_\_\_\_\_ in it.  
a. Neutrons                                      b. Electrons                                      c. Nucleons                                      d. Protons
- iv. The elements with atomic numbers 3, 11, 19 belongs to:  
a. Alkaline earth metals                                      b. Halogens                                      c. Alkali metals                                      d. Transition metals
- v. For an element with atomic number 20, which of the following will be true?  
a. Valency 1, non metal                                      b. Valency 1, metal                                      c. Valency 2, non metal                                      d. Valency 2, metal
- vi. Which of the following is an example of an electrovalent compound?  
a. MgCl<sub>2</sub>                                      b. CaO                                      c. NaCl                                      d. All.
- vii. Chemical bond that is formed by the mutual sharing of one or more pairs of electrons between two combining atoms is called a \_\_\_\_\_.  
a. Coordinate bond                                      b. Ionic bond                                      c. Covalent bond                                      d. Hydrogen bond
- viii. A covalent bond could also be formed between two atoms of the same \_\_\_\_\_.  
a. Metals                                      b. Non metals                                      c. Elements                                      d. None
- ix. The elements which have a tendency to lose electrons are usually:  
a. Metals, reducing agent                                      b. Non metals, oxidising agent                                      c. Metals, oxidising agent                                      d. Non metals, reducing agent
- x. Atoms like oxygen and chlorine \_\_\_\_\_ the electrons to form stable molecules such as O<sub>2</sub> and Cl<sub>2</sub>.  
a. Donates                                      b. Accepts                                      c. Shares                                      d. Exchanges
- xi. \_\_\_\_\_ elements were known when Mendeleev presented the periodic table.  
a. 63                                      b. 80                                      c. 118                                      d. 102
- xii. Each period in the modern periodic table ends with \_\_\_\_\_.  
a. An alkali metal                                      b. An alkaline metal                                      c. Transition element                                      d. An inert gas.
- xiii. Eka-aluminium is \_\_\_\_\_.  
a. Germanium                                      b. Gallium                                      c. Aluminium                                      d. Boron
- xiv. \_\_\_\_\_ found that atomic number is a better fundamental property of elements compared to atomic mass.  
a. Newland                                      b. Henry Moseley                                      c. Mendeleev                                      d. Kossel and Lewis
- xv. The elements with atomic numbers 4, 12 and 20 belongs to:  
a. Alkaline earth metals                                      b. Alkali metals                                      c. Noble gases                                      d. Halogens

### Question 2.

- i. Define the following- [5]  
a. Periodicity                                      b. Periodic table                                      c. Mass number                                      d. Penultimate shell                                      e. Isotopes
- ii. Study the table and answer the questions- [5]

Elements	P	R
Atomic number	11	17

- a. Write the electronic configurations of P and R.
- b. To which groups do P and R belong?
- c. To which periods do P and R belong?
- d. Which amongst P and R is (a) an alkali metal, and (b) a halogen

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e. Write the valency of P and R?

iii. Fill in the blanks-

[5]

- The electrons revolve around the nucleus in an imaginary path called the \_\_\_\_\_.
- The number of protons is equal to the number of electrons in \_\_\_\_\_.
- The total number of protons and neutrons in an atom is collectively called as \_\_\_\_\_.
- The electrons are outside the nucleus and have \_\_\_\_\_ mass.
- Mass number is denoted by \_\_\_\_\_.

iv. Answer the following-

[2+1+2=5]

- If an element X has 10 electrons and 10 neutrons, what will be its-
  - Mass number
  - Atomic number
- An element Y has 9 protons. State whether the element will be a metal, a non metal or a metalloid.
- Draw the diagram of the orbit structure of sodium ion (atomic number=11) and aluminium atom (atomic number=13).

v. Match the items in column I with those in column II-

[5]

Column I	Column II
MgCl <sub>2</sub>	Covalent compound
Water	Electrovalent compound .
Carbon	Electrically charged atom
Sulphur	Valency= 4
Ion	Valency= 2

### Section B (40 marks)

Attempt any four questions from this section.

Question 3.

i. Draw the orbit structural diagram to show the formation of covalent bond between H-atom and Cl-atom (atomic number of H=1, Cl=17) [2]

ii. Complete the given table- [2]

Element	Atomic number	Valence electrons
Be	4	i.
K	19	ii.

iii. Draw the atomic orbit structure of the isotopes of Hydrogen (with their names). [3]

iv. Describe the rules for the distribution of electrons in various shells or energy levels. [3]

Question 4.

i. Cause of periodicity is the recurrence of similar electronic configuration. Comment on the statement. [2]

ii. Differentiate between- [2]

a. Duplet and octet

b. Halogens and alkali metals (on the basis of their position in the modern periodic table).

iii. Define Ionic bond. Draw the atomic orbit structural diagram to show the formation of compound NaCl. (atomic number of Na=11, Cl=17) [3]

iv. Write the valency of the following elements. Which of the following elements have attained stability? Justify your answer. [3]

a. Neon (atomic number=10)

b. Oxygen (atomic number=8)

c. Magnesium (atomic number=12)

Question 5.

i. State: - a. Mendeleev's periodic law b. Modern periodic law. [2]

ii. Explain Newlands' Law of octaves? [2]

iii. E(2,6) F(2,8) G(2,7) H(2,8,1) are the coded names of elements and their electronic configuration is shown within brackets. Answer the following questions:- [3]

a. Which element in the above list does not belong to the same period and why?

b. Which element is a noble gas?

c. If E combines with H, what would be the formula of the resulting compound?

iv. Discuss the defects in Mendeleev's periodic table. [3]

Question 6.

i. Elements X, Y and Z have atomic numbers 12, 15 and 18 respectively. Which one: [2]

a. Forms an anion

b. Forms a cation

- ii. An atom of an element 'T' has four electrons in the M shell. **What** is the: [2]
  - a. Atomic number
  - b. Number of protons, in this element?
- iii. **Why** the lanthanides and actinides are shown at the bottom of the modern periodic table? If a uninegative ion of an atom of an element D has 10 electrons and 10 neutrons, **what** will be its mass number? [3]
- iv. **Discuss** Dobereiner's law of triads briefly. Why was it discarded? [3]

**Question 7.**

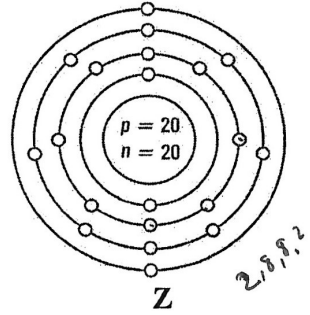
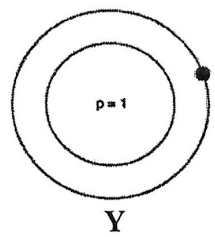
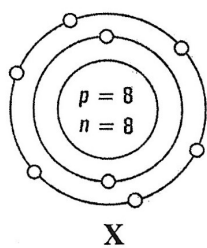
- i. **How** many groups are there in the modern periodic table? **Why** Noble gases are chemically inactive? [2]
- ii. **What** is the number of elements in the: [2]
  - a. 3<sup>rd</sup> period
  - b. 6<sup>th</sup> period, of the modern periodic table.
- iii. **Illustrate** the chemical bonding present in the following molecules/compounds by drawing atomic orbit structures-
  - a. Water (H<sub>2</sub>O)
  - b. Nitrogen (N<sub>2</sub>)
  - c. Methane (CH<sub>4</sub>)
- iv. **Study** the electronic configuration of the certain elements (symbols are not real) given below and **answer** the questions that follow- [3]

Elements	Electronic configuration
A	2,8,2
B	2,8,7
C	2,8,6
D	2,8,8
E	2,8,1

- a. Which one of these is the most stable element?
- b. Which of these elements are metals?
- c. Which among these accepts electrons during reactions?

**Question 8.**

- i. **What** are following groups of the modern periodic table known as? [2] 12
  - a. Group 2
  - b. Group 17
- ii. An electron X has electronic configuration 2,8,7. It combines with Y having 1 electron in its valence shell. [2] 12
  - a. **What** type of bond will be formed between X and Y?
  - b. **Which** amongst X and Y is- (a) A metal, and (b) A non metal
- iii. The distribution of electrons in the atoms of three elements is given below-



For answering the following questions, you are not required to identify the atom. Use the letters X, Y and Z as symbols for the elements. In each case given below, state whether the bonding is ionic or covalent and give the formula of the molecule or the compound so formed.

- a. Between the two atoms of X
  - b. Between the atom of X and the atom of Z.
  - c. Between the atom of X and the atom of Y.
- iv. Carbon is an element of atomic number 6. It has 3 isotopes of mass numbers 12, 13 and 14 respectively. **Complete** the following table using the given information- [3]

Element	Number of neutrons	Number of protons
<sup>12</sup> <sub>6</sub> C	i. _____	iv. _____
<sup>13</sup> <sub>6</sub> C	ii. _____	v. _____
<sup>14</sup> <sub>6</sub> C	iii. _____	vi. _____

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