

Chemistry Study Materials for Class 10 (Based on: Periodic Classification of Elements)

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NCERT SOLUTIONS FOR CHAPTER 5 TEXTBOOK (END QUESTIONS)

Q1. Which of the following statements is not a correct statement about the trends when going from left to right across the periods of Periodic Table.

- (a) The elements become less metallic in nature.
- (b) The number of valence electrons increases.
- (c) The atoms lose their electrons more easily.
- (d) The oxides become more acidic.

A1. (c) The atoms lose their electrons more easily.

Q 2. Element X forms a chloride with the formula XCl_2 , which is solid with a high melting point. X would most likely to be in the same group of the periodic table as (a) Na (b) Mg (c) Al (d) Si

A2. (b) Mg

Q3. Which element has

- (a) two shells, both of which are completely filled with electrons ?
- (b) the electronic configuration 2, 8, 2 ?
- (c) a total of three shells, with four electrons in its valence shell ?
- (d) a total of two shells with three electrons in its valence shell. v
- (e) twice as many electrons in its second shell as in its first shell ?

A3. (a) Neon (2, 8) (b) Magnesium (c) Silicon (2, 8, 4)
(d) Boron (2, 3) (e) Carbon (2, 4)

Q4. (a) What property do all elements in the same column of the Periodic Table as boron have in common?

(b) What property do all elements in the same column of the Periodic Table as fluorine have in common?

- A4. (a) Elements in the same column or group as boron have valency of three and have three valence electrons.
- (b) Elements in the same column or group as fluorine form acidic oxides and have seven electrons in their outermost shells and have valency of one.

Q 5. An atom has electronic configuration 2, 8, 7.

(a) What is the atomic number of this element?

(b) To which of the following elements would it be chemically similar?

(Atomic numbers are given in parentheses.) N (7), F (9), P (15), Ar (18)

- A5. (a) The atomic number of the given element is $2 + 8 + 7 (= 17)$.
- (b) It would be chemically similar to fluorine [F(9)] because its electronic configuration is 2, 7.

Q 6. The positions of three elements A, B and C in the periodic table are shown below :

Group 16	Group 17
-	-
-	A
-	-
B	C

- (a) State whether A is a metal or non-metal.**
- (b) State whether C is more reactive or less reactive than A.**
- (c) Will C be larger or smaller in size than B ?**
- (d) Which type of ion, cation or anion, will be formed by element A ?**
- A6. (a) Since the valency of group 17 elements is 1 and all these elements accept electrons, thus A is a non-metal.
- (b) C is less reactive than A because as we move down in a group, the reactivity of non-metals increases.
- (c) C is smaller in size than B because B and C both are related to the same period and the size decreases as one moves from left to right in a period.
- (d) A will form anion because it is a non-metal.

Q7. Nitrogen (atomic number 7) and phosphorus (atomic number 15) belong to group 15 of the periodic table. Write the electronic configuration of these two elements. Which of these will be more electronegative ? Why ?

A7. Electronic configuration of nitrogen -2,5

Electronic configuration of phosphorus = 2, 8, 5

Nitrogen will be more electronegative because outermost shell is nearer to nucleus and therefore nucleus will attract electrons more strongly. In a group of the periodic table, electron attracting tendency decreases as we move from top to bottom.

Q 8. How does the electronic configuration of an atom relate to its position in the Modern Periodic Table?

A8. Modern periodic table is based on the atomic number and atomic number is directly related to the electronic configuration. One can find the group number and period number of an element on the basis of electronic configuration. For example, if an element has 1 or 2 electrons in its outermost shell, then it would belong to group 1 or group 2. And if it has 3 or more electrons in its outermost shell, then it would belong to group 10 4- the number of electrons in the outermost shell.

All the alkali metals have one electron in their outermost shell, so they are placed in group 1. Thus, all the group 2 elements have 2 electrons in their outermost shell. In group 15 elements, there are 5 electrons in their outermost shell. Similarly, the number of shells in an element indicates its period number. For example, the atomic number of magnesium is 12 and its electronic configuration is 2, 8, 2. Thus it is an element of 3rd period.

Q9. In the Modern Periodic Table, calcium (atomic number 20) is surrounded by elements with atomic number 12, 19, 21 and 38. Which of these have physical and chemical properties resembling calcium?

A9. The electronic configuration of elements with :

Atomic number 12 = 2, 8, 2

Atomic number 19 = 2, 8, 8, 1

Atomic number 20 = 2, 8, 8, 2

Atomic number 21 = 2, 8, 9, 2

Atomic number 38 = 2, 8, 18, 8, 2

Elements with atomic number 12 i.e., magnesium (Mg) and 38 i.e., strontium (Sr) will have similar physical and chemical properties as element with atomic numbers 20 i.e., calcium (Ca).

Q10. Compare and contrast the arrangement of elements in Mendeleev's Periodic Table and the Modern Periodic Table.

A10.

Mendeleev's Periodic Table	Modern Periodic Table
(i) Elements are arranged in the order of increasing atomic mass.	(i) Elements are arranged in the order of increasing atomic number.
(ii) There are nine vertical columns called groups.	(ii) There are eighteen vertical columns called groups.
(iii) There is no place for noble gases.	(iii) Noble gases are placed on the right hand side of the table.
(iv) There is no place for isotopes.	(iv) Isotope are kept at the same place because their atomic number is same.
(v) Transition elements are placed together in group VIII.	(v) Transition elements are placed in the middle of the long period (Group 3 to 12).
