

CBSE Test Paper 01

Chapter 05 Periodic Classification of Elements

- How does the valency vary in going down a group? **(1)**
 - remains the same
 - decreases
 - increases
 - first increases, then decreases
- How many elements are placed in lanthanide and actinide series? **(1)**
 - 14, 16
 - 15, 15
 - 14, 14
 - 15, 16
- Answer the questions on the basis of the following table, name the family of H, A, C. **(1)**

1	2	13	14	15	16	17	18
H							He
A						B	
C						D	

- Alkali
 - alkaline earth metal
 - Halogen
 - Noble
- What is the number of valence electrons in the last element of 3rd period? **(1)**
 - 8.0
 - 3.0
 - 7.0
 - 5.0
 - Element **X** forms a chloride with the formula XCl_2 which is a solid with a high melting point. **X** would most likely to be in the same group of the periodic table as **(1)**

- a. Mg
- b. Al
- c. Si
- d. Na

6. Which of the following are chemically similar? **(1)**

${}_7\text{A}$, ${}_9\text{B}$, ${}_{15}\text{C}$ and ${}_{18}\text{D}$

7. Give the name and electronic configuration of second alkali metal? **(1)**

8. Helium is an unreactive gas and neon is a gas of extremely low reactivity. What, if anything, do their atoms have in common? **(1)**

9. How many periods and groups are present in the long form of periodic table? **(1)**

10. 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? **(3)**

11. Lithium, Sodium, Potassium are all metals that react with water to liberate hydrogen gas. Is there any similarity in the atoms of these elements? **(3)**

12. Name two elements you would expect to show same kind of chemical reactivity as magnesium. What is the basis for your choice? **(3)**

13. Atomic number of an element is 16. Write its electronic configuration. Find the number of valence electrons and its valency. **(3)**

14. Why is Long Form of Periodic Table regarded better than Mendeleev's Periodic table? **(5)**

15. Given below are few elements of the modern periodic table. Atomic number of the element is given in the parenthesis **(5)**

A (4) , B(9), C(14), D(19), E(20)

- i. Select the elements that has one electron in the outermost shell. Also write the electronic configuration of this element.
- ii. Which two elements amongst these, belong to the same group? Give reason for your answer.
- iii. Which two elements amongst these belong to the same period? Which one of the two has bigger atomic radius?

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Answers

1. a. remains the same

Explanation: Since the number of valence electrons in a group is the same, all the elements in a group have the same valency.

2. b. 15,15

Explanation: The elements with atomic numbers 57 to 71 are called lanthanide series and the elements with atomic numbers 89 to 103 are called actinide series.

3. a. Alkali

Explanation: The elements of group 1 are called alkali metals as they have one electron in their outermost shell and readily lose that electron to form positive ions.

4. a. 8.0

Explanation: The element in the last of the 3rd period is a noble gas i.e. its octet is complete. So, it has 8 valence electrons in its outermost shell.

5. a. Mg

Explanation: This is because Mg has a valency of +2 and would easily give its two electrons to complete its outermost electronic configuration. So, it combines with chlorine to form MgCl_2

6. Electronic configuration of A_7 : (2,5)

Electronic configuration of C_{15} : (2,8,5)

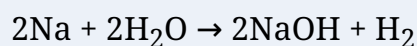
A and C have similar chemical properties because both have same electrons (5 electron) in their outer most shell.

7. Sodium (Na) (2, 8, 1).It has 1 electron in valence shell with valency is also 1.

8. Both have the valency zero and are in the same group so they have same chemical

property of not reacting with any element.

- The vertical columns in the periodic table are known as groups while the horizontal rows are known as periods. The long form of periodic table has seven periods and eighteen groups.
- Elements in a group have similar properties. Elements with atomic numbers 12 and 38 lie in the same group as calcium. Therefore, they will have properties resembling calcium.
- Lithium, sodium and potassium all react with water to form alkalis, i.e., lithium hydroxide, sodium hydroxide, potassium hydroxide, etc. with the liberation of hydrogen gas.



All these metals have one electron in their respective outermost shells.

- Magnesium (Mg) belongs to group 2 known as alkaline earth family. The two other elements belonging to the same group are calcium (Ca) and strontium (Sr). The basis of choice is the electronic distribution in the valence shell of these elements. All of them have two electrons each.

Forexample:

	K	L	M	N	O
Mg (Z=12)	2	8	2		
Ca(Z=20)	2	8	8	2	
Sr(Z=38)	2	8	18	8	2

- Since, atomic number of the given element is 16. Hence, the element is sulphur(S). It is kept in group VI A or group 16 in modern periodic table.

Electronic configuration = $\overset{K}{2}, \overset{L}{8}, \overset{M}{6}$

Number of valence electrons in sulphur are 6, present in M-shell. Its valency is 2 as it requires 2 electrons to complete its octet or achieve the nearest noble gas

configuration.

14. Long form of Periodic table is regarded better than the Mendeleev's periodic table due to the following reasons:

- i. It is based upon atomic number which is considered better than the atomic mass because the properties of the elements are related to the atomic number.
- ii. It explains why the elements placed in a group show similar properties but Mendeleev's Periodic Table gives no explanation for the same.
- iii. All groups in the Periodic table are independent groups and there are no sub-groups as in Mendeleev's Periodic Table.
- iv. Many defects in the Mendeleev's Periodic Table have been removed.
- v. There is no confusion regarding the position of isotopes because all the isotopes of an element have the same atomic number.
- vi. The periodic table is more systematic than the Mendeleev's table and is easy to remember.
- vii. In Mendeleev's periodic table transition elements included with other elements. In Modern periodic table transition elements placed in separate block.

15. i. D (19) has one electron in its outermost shell. Electronic configuration of the element is given below. The element is potassium written as K, it belongs to group I A in periodic table.

$$D(19) = \frac{K}{2}, \frac{L}{8}, \frac{M}{8}, \frac{N}{1}$$

ii. A(4) and E(20) belong to same group as they have same number of valence electrons. A is beryllium symbol Be and E is calcium symbol Ca. Both belong to group II A in the periodic table.

$$A(4) = \frac{K}{2}, \frac{L}{2},$$

$$E(20) = \frac{K}{2}, \frac{L}{8}, \frac{M}{8}, \frac{N}{2},$$

iii. A(4) and B(9) belong to same period and A(4) has bigger radius than B(9). Also the elements D(19) and E(20) belong to same period and D(19) has bigger radius than E(20).