

## UNIT

## 4

## Periodic classification of elements



## TEXT BOOK EXERCISES

## I. Choose the correct answer

1. If Dobereiner is related with 'law of triads', then Newlands is related with
- Modern periodic law
  - Hund's rule
  - law of octaves
  - Pauli's Exclusion principle

Ans: c) law of octaves

2. Modern periodic law states that the physical and chemical properties of elements are the periodic functions of their \_\_\_\_\_
- atomic numbers
  - atomic masses
  - similarities
  - anomalies

Ans: a) atomic numbers

3. Elements in the modern periodic table are arranged in \_\_\_\_\_ groups and \_\_\_\_\_ periods.
- 7, 18
  - 18, 7
  - 17, 8
  - 8, 17

Ans: b) 18, 7

4. The increasing order of the energy of subshells is
- $s > p > d > f$
  - $s < p < d < f$
  - $s < p < f < d$
  - $p < s < d < f$

Ans: b)  $s < p < d < f$

5. If the electronic configuration of an element is  $1s^2 2s^2 2p^6 3s^2 3p^1$ , then it will occupy \_\_\_\_\_ block of the periodic table

a) s      b) p      c) d      d) f

Ans: b) p

## II. Fill in the blanks

1. In Dobereiner's triads, the atomic weight of the middle element is the \_\_\_\_\_ of the atomic masses of 1st and 3rd elements.

Ans: Average

2. Noble gases belong to \_\_\_\_\_ group of the periodic table.

Ans: 18<sup>th</sup>

3. The basis of the classifications proposed by Dobereiner, Newlands and Mendeleev was \_\_\_\_\_.

Ans: Atomic mass

4. B, Si, Ge and As are the examples of \_\_\_\_\_.

Ans: metalloids

5. Example for liquid metal is \_\_\_\_\_.

Ans: mercury

## III. Match the following

1.	Triads	Newlands
2.	Alkali metal	Calcium
3.	Law of octaves	Henry Moseley
4.	Alkaline earth metal	Sodium
5.	Modern Periodic Law	Dobereiner

Ans:

1.	Triads	Dobereiner
2.	Alkali metal	Sodium
3.	Law of octaves	Newlands
4.	Alkaline earth metal	Calcium
5.	Modern Periodic Law	Henry Moseley

#### IV. State whether True or False

- 1) Newlands' periodic table is based on atomic masses of elements and modern periodic table is based on atomic number of elements

**Ans: True**

- 2) Metals can gain electrons

**Ans: False, Metals can lose electrons**

- 3) Alloys bear the characteristics of both metals and nonmetals

**Ans: True**

- 4) Lanthanides and actinides are kept at the bottom of the periodic table because they resemble each other but they do not resemble with any other group elements

**Ans: True**

- 5) Group 17 elements are named as Halogens

**Ans: True**

#### V. Assertion and Reason

Statement: Elements in a group generally possess similar properties but elements along a period have different properties.

Reason: The difference in electronic configuration makes the element differ in their chemical properties along a period.

- a) Statement is true and reason explains the statement.
- b) Statement is false but the reason is correct.

**Ans:** a) Statement is true and reason explains the statement.

#### VI. Answer the following

1. State modern periodic law.

Chemical and Physical properties of elements are periodic functions of their atomic numbers is called modern periodic law.

2. What are groups and periods in the modern periodic table?

- ❖ Vertical columns called 'groups'
- ❖ Horizontal rows called 'period'.

3. What are the limitations of Mendeleev's periodic table?

- ❖ No proper position could be given to the element hydrogen. Non-metallic hydrogen was placed along with metals like lithium (Li), sodium (Na) and potassium (K).
- ❖ The increasing order of atomic mass was not strictly followed throughout. Eg. Co & Ni, Te & I
- ❖ No place for isotopes in the periodic table

4. State any five features of modern periodic table.

- All the elements are arranged in the increasing order of their atomic number
- The horizontal rows are called periods. There are seven periods in the periodic table.
- The elements are placed in periods based on the number of shells in their atoms
- Vertical columns in the periodic table starting from top to bottom are called groups. There are 18 groups in the periodic table
- Based on the physical and chemical properties of elements, they are grouped into various families.

#### VII. Complete the following table

Element	Number of electrons	Sub shell electronic configuration
N	7	$1s^2 2s^2 2p^3$
F	9	$1s 2s p$
Na		
Cl		
Ar		

Ans:

Element	Number of electrons	Sub shell electronic configuration
N	7	$1s^2 2s^2 2p^3$
F	9	$1s^2 2s^2 2p^5$
Na	11	$1s^2 2s^2 2p^6 3s^1$
Cl	17	$1s^2 2s^2 2p^6 3s^2 3p^5$
Ar	18	$1s^2 2s^2 2p^6 3s^2 3p^6$

VIII. Arrange the jumbled letters to answer the following

1. We are a family of five and lies in 17th group of periodic table (7 letters)
2. I am being stored in kerosene and be cut by knife (6 letters)
3. I am the most corrosion resistant silvery white metal and lies in group 9 (7 letters)
4. I am being used as refrigerant in liquid form with atomic number 7 (8 letters)
5. I am in your blood as hemoglobin and without me no buildings are possible (4 letters)
6. I am the highly radioactive and newly designated element in the modern periodic table with atomic number 113 (8 letters)

7. I am used as a disinfectant for drinking water. (8 letters)
8. I am mixed with salt and used for thyroid health (6 letters)
9. I am the key part of biological molecules and have the valency of four. (5 letters)
10. I am the first in the noble gas group and used to fill balloons (6 letters)

S.No	Jumbled letters	Answer
1	L A O H S E N G	HALOGEN
2	S D I M U O	SODIUM
3	R I D M U I I	IRIDIUM
4	T I R N G O N E	NITROGEN
5	N R O I	IRON
6	I H N M U I N O	NIHONIUM
7	H C L E I R N O	CHLORINE
8	E N I D O I	IODINE
9	B A R C O N	CARBON
10	E L I H U M	HELIUM

IX) Complete the following table referring the modern periodic table:

Period No	Total no of elements	Elements		Total no of elements in			
		From	To	s-block	p-block	d-block	f-block
1	2	Hydrogen	Helium	2			
2	8	Lithium	Neon	2	6		
3	8	Sodium	Argon	2	6		
4	18	potassium	Krypton	2	6	10	
5	18	Rubidium	Xenon	2	6	10	
6	32	Caesium	Radon	2	6	10	14
7	32	Francium	Ognesson	2	6	10	14

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