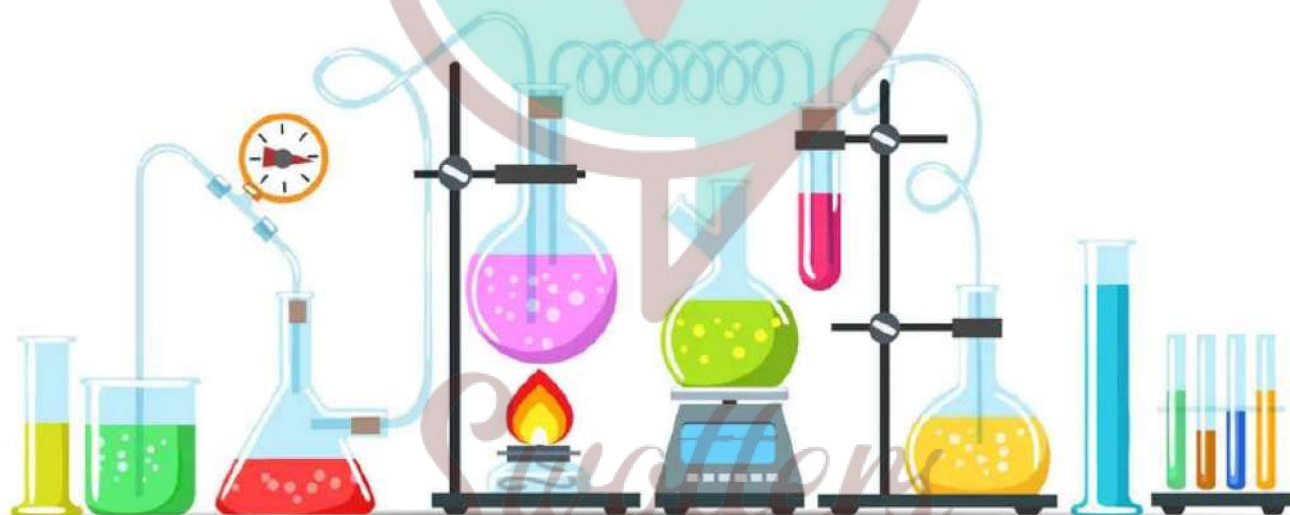


SCIENCE

(Chemistry)



Important Questions

➤ Multiple Choice Questions:

1. Newlands relation is called.

- (a) Musical Law
- (b) Law of Octaves
- (c) Periodic Law
- (d) Atomic Mass Law

2. Upto which element, the Law of Octaves was found applicable?

- (a) Oxygen
- (b) Calcium
- (c) Cobalt
- (d) Potassium

3. In Mendeleev's Periodic Table, gaps were left for the elements to be discovered later. Which of the following elements found a place in the Periodic Table later?

- (a) Chlorine
- (b) Silicon
- (c) Oxygen
- (d) Germanium

4. At the time of Mendeleev, the number of elements known was

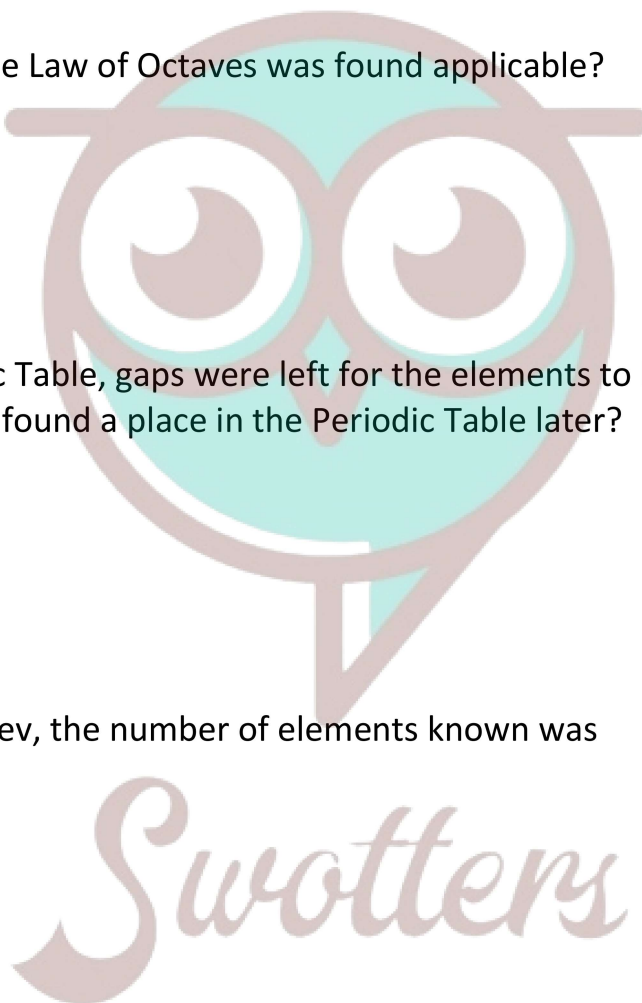
- (a) 63
- (b) 65
- (c) 62
- (d) 64

5. The properties of eka-aluminium predicted by Mendeleev are the same as the properties of later discovered element:

- (a) Scandium
- (b) Germanium
- (c) Gallium
- (d) Aluminium

6. An atom of an element has the electronic configuration 2,8,2. To which group does it belong?

- (a) 4th group



- (b) 6th group
- (c) 3rd group
- (d) 2nd group

7. The arrangement of elements in the Modern Periodic Table is based on their

- (a) increasing atomic mass in the period
- (b) increasing atomic number in the horizontal rows
- (c) increasing atomic number in the vertical columns
- (d) increasing atomic mass in the group

8. Where would you locate the element with electronic configuration 2, 8 in the Modern Periodic Table?

- (a) Group 8
- (b) Group 2
- (c) Group 18
- (d) Group 10

9. Element 'X' forms a chloride with the formula XCl_2 , which is a solid with high melting point. X would most likely be in the same group of the periodic table as:

- (a) Si
- (b) Mg
- (c) Al
- (d) Na

10. Which of these belong to the same period?

Element	A	B	C
Atomic number	2	10	5

- (a) A, B
- (b) B, C
- (c) C, A
- (d) A, B and C

➤ **Very Short Question:**

1. Indicate the elements which belong to the same group from their atomic numbers as 9, 17, 24, 30, 35, 45.

2. Arrange the following in decreasing atomic size:

(i) Na, Mg, K

(ii) N, F, O

(iii) N, S, P

3. Give the name and electronic configuration of second alkali metal.

4. What is the similarity in the electronic configuration of Mg, Ca and Sr?

5. Name the members of alkaline earth family. Which out of them is radioactive in nature?

Answer: The members of alkaline earth family (group 2) are: Be, Mg, Ca, Sr, Ba, Ra. The last element radium (Ra) is radioactive in nature.

6. The two isotopes of chlorine have atomic mass 35 u and 37 u. Should they be placed in separate slots in the periodic table?

7. An element "X" has mass number 35 and number of neutrons is 18.

Identify group number and period of the element "X".

8. How does metallic character of the elements vary

(i) in a group

(ii) in a period?

9. Name three elements which behave as metalloids.

10. Which property do all the elements possess which are present in the same period as the element boron?

➤ Short Questions:

1. Identify the non-metals from the elements given below.

(a) 2, 8, 1

(b) 2, 8, 7

(c) 2, 8, 3

(d) 2, 8, 5.

2. Identify the elements X and Y from the following information.

(a) X has 17 protons and 18 neutrons

(b) Y has 17 protons and 20 neutrons.

3. Identify the elements from the following characteristics and arrange them in increasing order of metallic character.

(a) An element which imparts golden yellow colour to the flame.

(b) An element whose oxide is used as a white wash.

(c) An element which is constituent of chlorophyll i.e. green coloring matter in plants.

4. (a) Atomic numbers of Mg and Al are 12 and 13 respectively. "Write their electronic configuration.

(b) Mention the period of the Modern Periodic Table to which the above two elements belong. Give reason for your answer.

5. From the part of a periodic table, answer the following questions

1 Hydrogen	2	13	14 Carbon	15	16 Oxygen	17 Fluorine
X			P			Q
Y						R
Z						T

(a) Atomic number of oxygen is 8. What would be the atomic number of, Fluorine?

(b) Out of 'X' and 'Q' which element has larger atomic size? Give reason for your answer.

(c) Out of 'Y' and 'Z' which element has smaller atomic size? Give reason for your answer.

6. Calcium is an element with atomic number 20.

(i) Is it a metal or non-metal?

(ii) Will its size be more or smaller than that of potassium?

(iii) Write the formula of its chloride.

7. An element 'X' has mass number 35 and number of neutrons 18. Write atomic number and electronic configuration of 'X'. Also write group number, period number and valency of 'X'.

8. Given below are some of the elements of first group Li, Na, K

(Their atomic numbers are 3, 11, 19 respectively and they belong to 2nd, 3rd and 4th period respectively). Arrange these in the decreasing order of metallic character exhibited by them.

➤ Long Questions:

1. Three elements A, B and C have atomic numbers 7, 8 and 9 respectively.

(a) What would be their positions in the modern periodic table? (Mention group and period both)

- (b) Arrange A, B and C in decreasing order of their size.
- (c) Which one of the three elements is most reactive and why?
2. The elements with atomic number 3 to 10 belong to the second period. Taking into account the trends in the general periodic properties, predict.
- (a) The most electronegative element
- (b) The most electropositive element
- (c) The element belonging to noble gas family
- (d) The element which constitutes large number of organic compounds.
3. "Elements in Periodic Table show periodicity of properties". List any four properties.

➤ Assertion Reason Questions:

1. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
- Both A and R are true, and R is correct explanation of the assertion.
 - Both A and R are true, but R is not the correct explanation of the assertion.
 - A is true, but R is false.
 - A is false, but R is true.

Assertion: Atomic size of As is more than that of P.

Reason: Atomic size decreases along a period.

2. For two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:
- Both A and R are true, and R is correct explanation of the assertion.
 - Both A and R are true, but R is not the correct explanation of the assertion.
 - A is true, but R is false.
 - A is false, but R is true.

Assertion: Chlorine is the most electronegative element of the halogen family.

Reason: Size of chlorine is more than that of fluorine.

1. Read the following and answer any four questions from (i) to (v).

"Properties of elements are the periodic function of their atomic numbers." This is known as modern periodic law. It means that the properties of elements depend on their atomic numbers, and the elements are given positions in the periodic table on the basis of their increasing atomic number. Atomic number determines the distribution of electrons in the orbit,

and electrons of the outermost orbit determine the properties of an element. There are 18 groups (vertical columns) and 7 periods (horizontal lines) in modern form of the periodic table. The number of the period is equal to the number of shells in the atoms of the elements belonging to that period.

- i. What is the atomic number of elements of period 3 and group 17?
 - a. 10
 - b. 14
 - c. 17
 - d. 12
 - ii. Atomic number of an element is 2, 8, 6. Its period number and valency are respectively.
 - a. 3, 2
 - b. 6, 6
 - c. 6, 2
 - d. 2, 2
 - iii. An element has mass number 40 and contains 20 neutrons in its atom. To which period and group of the periodic table does it belong?
 - a. Period-3, Group-3
 - b. Period-4, Group-3
 - c. Period-4, Group-2
 - d. Period-4, Group-4
 - iv. An element 'X' has an atomic number of 16. With which of the following elements will it show similar.
 - a. Ne (10)
 - b. N (7)
 - c. O (8)
 - d. Be (8)
 - v. Identify the statement(s) which is(are) true for the modern periodic table.
 - a. It reflects trends in physical and chemical properties of the elements.
 - b. It helps to reflect the relative atomicity of bonds between any two elements.
 - c. It helps to predict the stable valency state of the elements.
 - d. All of these.
2. Read the following and answer any four questions from (i) to (v).

The recurrence of properties of the elements after a certain regular interval, when they are arranged in the increasing order of their atomic numbers, is called periodicity. There are a number of physical properties such as atomic size, metallic and non-metallic character, etc. which show periodic variation. In periodic table, various properties vary differently from moving left to right in a period and going down in a group. In a period, properties vary because from moving left to right in a period, number of shells remain same, but valence electron increases by one number hence nuclear charge increases. In a group, ongoing down, number of valence shells increases while number of valence electrons remains same.

- i. From top to bottom in a group of the periodic table, the electropositive character of the element.
 - a. Increases.
 - b. Decreases.
 - c. Remains unchanged.
 - d. Changes irregularly.
- ii. Which element has the largest size in the second period?
 - a. N
 - b. F
 - c. Li
 - d. Be
- iii. Which of the following elements has three valence electrons?
 - a. Cs
 - b. Ca
 - c. Al
 - d. S
- iv. In the periodic table, the metallic character of elements.
 - a. Decreases from left to right and decreases down the group.
 - b. Decreases from left to right and increases down the group.
 - c. Increases from left to right and increases down the group.
 - d. Increases from left to right and decreases down the group.
- v. Which of the following increases along the period?
 - a. Number of valence electrons.
 - b. Atomic size.
 - c. Electropositive character.

d. All of these.

Answer Key-

➤ Multiple Choice Answers:

1. (b) Law of Octaves
2. (b) Calcium
3. (d) Germanium
4. (a) 63
5. (c) Gallium
6. (d) 2nd group
7. (b) increasing atomic number in the horizontal rows
8. (c) Group 18
9. (b) Mg
10. (b) B, C

➤ Very Short Answers:

1. Answer: Elements with atomic numbers 9, 17 and 35 belong to the same group i.e., halogen family.
2. Answer:
 - (i) K, Na, Mg
 - (ii) N, O, F
 - (iii) P, S, N.
3. Answer: The second alkali metal is sodium (Na). Its electronic configuration is 2, 8, 1.
4. Answer: All the elements belong to group 2 and have two electrons in their valence shell.
5. Answer: The members of alkaline earth family (group 2) are: Be, Mg, Ca, Sr, Ba, Ra. The last element radium (Ra) is radioactive in nature.
6. Answer: No, they should be placed in the same slot (or position) because the periodic table is based on the atomic numbers of the elements. Both the isotopes of the element chlorine have the same atomic number ($Z = 17$).
7. Answer:

Atomic number of X = Mass No. – No. of neutrons = $35 - 17 = 18$.

Electronic configuration = 2, 8, 7;

Group No. = 17, Period No. = 3.

8. Answer:

- (i) The metallic character of the elements increases downwards in a group.
- (ii) The metallic character of the elements decreases from left to the right along a period.

9. Answer: The elements are: arsenic (As), antimony (Sb) and germanium (Ge).

10. Answer: In all the elements, the last electron is present in the same shell i.e., L-shell or second shell.

➤ Short Answer:

1. Answer: The element chlorine (Cl) corresponding to configuration (b) and the element phosphorus (P) corresponding to configuration (d) are both non-metals.

2. Answer: Both the elements X and Y are the isotopes of the same element chlorine because they have the same number of protons (17).

Remember: Two different elements cannot have the same number of protons. Therefore, X and Y are the isotopes of the same element.

3. Answer:

- (a) Sodium
- (b) Calcium
- (c) Magnesium.

Sodium (Na) belongs to group 1. Both calcium (Ca) and magnesium (Mg) are present in group 2. The element Ca is placed below Mg in the group. Since the metallic character of the elements decreases along a period and increases down the group, in the light of these observations, the increasing order of metallic character is: $Mg < Na < Ca$.

4. Answer:

(a) The electronic configuration of the elements are

Mg ($Z = 12$) 2, 8, 2 ;

Al ($Z = 13$) 2, 8, 3.

(b) Both these elements belong to third period since their atoms have three shells.

5. Answer:

(a) Atomic number of Fluorine is $(8 + 1) = 9$.

(b) Since the atomic size of the elements decreases along a period the element 'Q' has a smaller size than element 'X'.

(c) Since the atomic size of the elements increases down the group, the element 'Y' has a smaller size than element 'Z'.

6. Answer:

The electronic configuration of calcium ($Z = 20$) is 2, 8, 8, 2.

(i) Since it has only two valence electrons, it is present in group 2. It is a metal.

(ii) Both potassium (K) and calcium (Ca) are present in fourth period. Since atomic size decreases along a period, calcium is smaller in size.

(iii) The valency of calcium is 2. The formula of its chloride is CaCl_2 .

7. Answer:

Atomic number of the element 'X' = $35 - 18 = 17$

Electronic configuration of the element 'X' = 2, 8, 7

Group number = 17;

Period number = 3.

Valency of the element 'X' = $8 - 7 = 1$.

8. Answer: All the three elements belong to the group (1) of alkali metals. Since the metallic character of the elements increases down a group, the decreasing order of metallic character is $\text{K} > \text{Na} > \text{Li}$.

➤ Long Answer:

1. Answer:

The electronic configuration of these elements are :

(a) A ($Z = 7$) 2, 5;

B ($Z = 8$) 2, 6;

C ($Z = 9$) 2, 7

Position of element A = 15th group and 2nd period

Position of element B = 16th group and 2nd period

Position of element C = 17th group and 2nd period.

(b) In general, atomic size decreases along a period. Therefore, decreasing order of size is $\text{A} > \text{B} > \text{C}$

(c) The element C ($Z = 9$) is fluorine. It is the most reactive element since it needs only one electron to acquire a noble gas configuration.

2. Answer:

(a) The most electronegative element has atomic number (Z) = 9. It is fluorine (F).

(b) The most electropositive element has atomic number (Z) = 3. It is lithium (Li)

(c) The element belonging to noble gas family has atomic number (Z) = 10. It is neon (Ne)

(d) The element which constitutes large number of organic compounds has atomic number

(Z) = 6. It is carbon (C).

3. Answer:

Periodicity i.e., repetition of similar properties is shown by the elements present in a group and separated by definite gaps of atomic number. For example,

Elements in a group have same number of valence electrons and same valency.

Elements present in a group show similar chemical properties.

The atomic sizes of the elements in a group increase regularly.

The m.p. and b.p. of the elements in a group increase regularly.

➤ Assertion Reason Answer:

1. (b) Both A and R are true, but R is not the correct explanation of the assertion.

Explanation:

Atomic size increases down a group.

2. (d) A is false, but R is true.

Explanation:

Fluorine is most electronegative element of the halogen family.

➤ Case Study Questions:

1. i (c) 17

Explanation:

The element is chlorine (Z = 17).

ii. (a) 3, 2

Explanation:

The element (sulphur) belongs to third period and its valency is 2.

iii. (c) Period-4, Group-2

Explanation:

Atomic number of the element = $40 - 20 = 20$ Electronic configuration of the element is 2, 8, 8, 2; i.e., the element is calcium which belongs to 4th period and 2nd group of the periodic table.

iv. (c) O (8)

Explanation:

The element is sulphur. Sulphur and oxygen belong to group 16.

v. (d) All of these.

2. i (a) Increases.

Explanation:

As the size of the atom increases down the group, electropositive character increases.

- ii. (c) Li

Explanation:

Li is the first element of the second period. As the size decreases in the period from left to right, therefore, Li is the largest atom in the period.

- iii. (c) Al

Explanation:

Al ($Z = 13$): 2, 8, 3

- iv. (b)

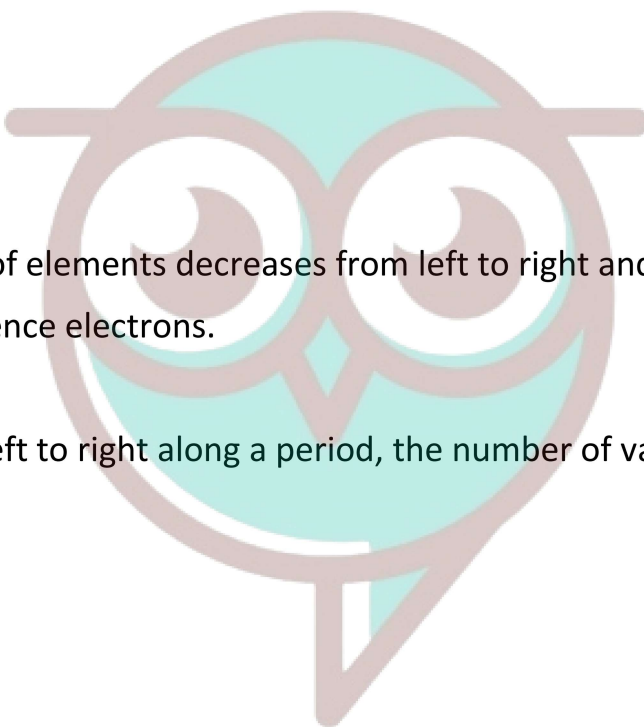
Explanation:

Metallic character of elements decreases from left to right and increases down the group.

- v. (a) Number of valence electrons.

Explanation:

As we move from left to right along a period, the number of valence electrons increases from 1 to 8.



Swotters