# CHEMISTRY

# BOOKS - MTG IIT JEE FOUNDATION

# PERIODIC CLASSIFICATION OF ELEMENTS

## Illustrations

**1.** From the given list of element make three triads and name the family of each triad. C, Li,

Ca, Br, Na, Sr, I, K and Ba

Watch Video Solution

**2.** Li, Na and K is a Dobereiner's triad. The atomic masses of Li and K are 7 and 39 respectively. What is the expected mass of Na?

Watch Video Solution

**3.** Explain law of octaves with example

Watch Video Solution

**4.** What was the position of isotopes in Mendeleev's periodic table?

Watch Video Solution

**5.** An element A has atomic number 14. To which period does this element belong and how many elements are there in that period?

Watch Video Solution

**6.** Elements E and F have atomic number 17 and 35 respectively. Write the electronic configuration of E and F and find out the period and groups to which they belong in the periodic table.

View Text Solution

**7.** Give the name and symbol for the element that occupies each of the following positions in the periodic table

Period 2, group 16

Watch Video Solution

**8.** Give the name and symbol for the element that occupies each of the following positions in the periodic table

Period 4, group 2

Watch Video Solution

**9.** Give the name and symbol for the element that occupies each of the following positions

in the periodic table

Period 1, group 1

Watch Video Solution

**10.** Give the name and symbol for the element that occupies each of the following positions in the periodic table

Period 4, group 18

Watch Video Solution

**11.** Give the name and symbol for the element that occupies each of the following positions in the periodic table

Period 3, group 17

Watch Video Solution

**12.** The table given below shows the mass number and number of neutrons in four elements P, Q< R and S

| Element | *P* | *Q* | *R* | *S* |
|---|---|---|---|---|
| Mass number | 12 | 20 | 23 | 35 |
| Number of neutrons | 6 | 10 | 12 | 18 |

Write down the atomic numbers of P, Q,R and S

Watch Video Solution

**13.** The table given below shows the mass number and number of neutrons in four elements P, Q< R and S

| Element | P | Q | R | S |
|---|---|---|---|---|
| Mass number | 12 | 20 | 23 | 35 |
| Number of neutrons | 6 | 10 | 12 | 18 |

Write down electronic configurations of P, Q, R and S

Watch Video Solution

**14.** The table given below shows the mass number and number of neutrons in four elements P, Q< R and S

| Element | *P* | *Q* | *R* | *S* |
|---|---|---|---|---|
| Mass number | 12 | 20 | 23 | 35 |
| Number of neutrons | 6 | 10 | 12 | 18 |

To which groups do P, Q, R and S belong?

Watch Video Solution

**15.** The table given below shows the mass number and number of neutrons in four elements P, Q< R and S

| Element | *P* | *Q* | *R* | *S* |
|---|---|---|---|---|
| Mass number | 12 | 20 | 23 | 35 |
| Number of neutrons | 6 | 10 | 12 | 18 |

To which periods do P, Q, R and S belong?

Watch Video Solution

**16.** The table given below shows the mass number and number of neutrons in four elements P, Q< R and S

| Element | P | Q | R | S |
|---|---|---|---|---|
| Mass number | 12 | 20 | 23 | 35 |
| Number of neutrons | 6 | 10 | 12 | 18 |

Which amongst the above elements is a noble gas, an alkali metal and a halogen?

Watch Video Solution

**17.** Arrange the ions $Ca^{2+}, Cl^{-}$ and $S^{2-}$ in the decreasing order of their ionic radius.

Watch Video Solution

**18.** Arrange the ions $Na^+, O^{2-}$ and $F^-$ in the decreasing order of their ionic radius.

Watch Video Solution

**19.** Arrange $I^-, I$ and $I^+$ in the decreasing order of their atomic radius

Watch Video Solution

**20.** On what basis an element can be classified as a metal or a non-metal?

Watch Video Solution

**21.** Name the most electropositive and most electronegative element of the periodic table.

Watch Video Solution

**22.** Given reason: While going down in the group 1, the chemical reactivity of metals increases.

Watch Video Solution

**23.** While going down in a group of non-metals the chemical reactivity decreases. Explain with an examples

Watch Video Solution

## Solved Examples

**1.** Given below are the value of the atomic radii of three elements A, B and C of the periodic table, each having n electrons in the outermost shell of its atom.

| Elements | $A$ | $B$ | $C$ |
|---|---|---|---|
| Atomic radii(A) | 1.31 | 1.52 | 1.94 |

Answer the following

Will the valencies of these elements be the same or different?

Watch Video Solution

**2.** Given below are the value of the atomic radii of three elements A, B and C of the periodic table, each having n electrons in the outermost shell of its atom.

| Elements | $A$ | $B$ | $C$ |
|---|---|---|---|
| Atomic radii(A) | 1.31 | 1.52 | 1.94 |

Answer the following

Which element will have the highest atomic number?

Watch Video Solution

**3.** Carbon (atomic number 6) and silicon (atomic number 14) are elements in the same group of the periodic table. Give the electronic arrangements of the carbon and silicon atoms, and state the group in which these elements, occur.

Watch Video Solution

**4.** Give reason- While going down in group 1 lithium is least electropositive while caesium is

most electropositive.

Watch Video Solution

**5.** Consider an element $_{15}{}^{31}X$ and answer the following questions

What is its electronic configuration?

Watch Video Solution

**6.** Consider an element $_{15}{}^{31}X$ and answer the following questions

To which group does it belong?

Watch Video Solution

**7.** Consider an element $_{15}{}^{31}X$ and answer the following questions

To which period does it belong?

Watch Video Solution

**8.** Consider an element $_{15}{}^{31}X$ and answer the following questions

How many electrons are there in its valence shell?

Watch Video Solution

**9.** Consider an element $_{15}{}^{31}X$ and answer the following questions

What is its valency?

Watch Video Solution

**10.** Consider an element ${}_{15}{}^{31}X$ and answer the following questions

Is it a metal or a non-metal?

Watch Video Solution

**11.** From the list of the elements Na, Mg, Al, Si, predict

The most electropositive element

Watch Video Solution

**12.** From the list of the elements Na, Mg, Al, Si, predict

The most electronegative element

Watch Video Solution

**13.** From the list of the elements Na, Mg, Al, Si, predict

The element which belongs to group 2

Watch Video Solution

**14.** From the list of the elements Na, Mg, Al, Si, predict

The element which acts as a metalloid

Watch Video Solution

**15.** From the list of the elements Na, Mg, Al, Si, predict

The element which is tetravalent in its compounds

Watch Video Solution

**16.** Two elements A and B belong to group 1 and 2 respectively in the same period. Compare them with respect to

the number of valence electrons

Watch Video Solution

**17.** Two elements A and B belong to group 1 and 2 respectively in the same period. Compare them with respect to

valency

Watch Video Solution

**18.** Two elements A and B belong to group 1 and 2 respectively in the same period. Compare them with respect to

metallic character

Watch Video Solution

**19.** Two elements A and B belong to group 1 and 2 respectively in the same period.

Compare them with respect to

size of the atoms

Watch Video Solution

**20.** Four elements A, B, C and D along with their configurations are given below: Element A-2,1: Element B-2, 8, Element C-2, 8, 1, Element D-2, 8, 8

Which two elements belong to the same period?

Watch Video Solution

**21.** Four elements A, B, C and D along with their configurations are given below: Element A-2,1: Element B-2, 8, Element C-2, 8, 1, Element D-2, 8, 8

Which two elements belong to the same group?

Watch Video Solution

**22.** Four elements A, B, C and D along with their configurations are given below: Element

A-2,1: Element B-2, 8, Element C-2, 8, 1, Element D-2, 8, 8

Which element out of A and C is more reactive and why?

Watch Video Solution

**23.** Four elements A, B, C and D along with their configurations are given below: Element A-2,1: Element B-2, 8, Element C-2, 8, 1, Element D-2, 8, 8

Which element out of A and B forms more number of compounds?

Watch Video Solution

**24.** State giving reason why argon(atomic mass =39.94) has been rightly placed before potassium (atomic mass=39.01) in the Modern Periodic Table.

View Text Solution

**25.** Which metal is a liquid at room temperature?

Watch Video Solution

**26.** Name a non-metal having a very high melting point.

Watch Video Solution

**27.** There are certain exceptions to the properties of elements

Which non-metal is a liquid at room temperature?

View Text Solution

**28.** Which of the following two elements in the periodic table are expected to combine in the most violent fashion?

Watch Video Solution

**29.** Out of $Li^+$, $Be^{2+}$ and $B^{3+}$ ions, which has the smallest ionic radius and why?

Watch Video Solution

**30.** On going through the modern periodic table, it is seen that the elements Li, Be, B, C, N, O, F and Ne belong to the period 2. Write down electronic configuration of all of them.

Watch Video Solution

**31.** The second period of the long form of periodic table contains the following elements

Li Be B C N O F Ne

Do they contain the same number of valence electrons?

View Text Solution

**32.** The second period of the long form of periodic table contains the following elements

Li Be B C N O F Ne

Do they contain the same number of shells?

View Text Solution

**33.** Name the pair of elements in the Mendeleev's periodic table whose positions were not in increasing order of their atomic masses.

View Text Solution

**34.** If R is the symbol of an element in the third period and third group of Mendeleev's periodic table then what is the formula of its oxide?

View Text Solution

**35.** Carbon is a non-metal belonging to group 14. Do you find a metal in this group?

View Text Solution

**36.** The elements X, Y and Z have the atomic numbers 9, 12 and 15. Examine which of these will have metallic character?

View Text Solution

**37.** Three elements X, Y and Z belong to groups 2, 15 and 17 respectively. Predict their: Number of valence electrons and valency.

View Text Solution

## Ncert Section

**1.** Did Döbereiner's triads also exist in the columns of Newlands' Octaves? Compare and find out.

Watch Video Solution

**2.** What were the limitations of Döbereiner's classification?

Watch Video Solution

**3.** What were the limitations of Newlands' Law of Octaves?

Watch Video Solution

**4.** Use Mendeléev's Periodic Table to predict the formulae for the oxides of the following elements:

K, C, Al, Si, Ba.

Watch Video Solution

**5.** Besides gallium, which other elements have since been discovered that were left by Mendeléev in his Periodic Table? (any two)

Watch Video Solution

**6.** What were the criteria used by Mendeléev in creating his Periodic Table?

Watch Video Solution

**7.** Why do you think the noble gases are placed in a separate group?

Watch Video Solution

**8.** How could the Modern Periodic Table remove various anomalies of Mendeleev's Periodic Table?

Watch Video Solution

**9.** Name two elements you would expect to show chemical reactions similar to magnesium. What is the basis for your choice?

Watch Video Solution

**10.** Name: three elements that have a single electron in their outermost shells.

View Text Solution

**11.** Name: two elements that have two electrons in their outermost shells.

View Text Solution

**12.** Name: three elements with filled outermost shells.

View Text Solution

**13.** Lithium, sodium, potassium are all metals that react with water to liberate hydrogen gas. Is there any similarity in the atoms of these elements?

Watch Video Solution

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

View Text Solution

**15.** In the Modern Periodic Table, which are the metals among the first ten elements?

Watch Video Solution

**16.** By considering their position in the Periodic Table, which one of the following elements would you expect to have maximum metallic characteristic?

Ga Ge As Se Be

Watch Video Solution

**17.** 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 becomes less metallic in nature.

B. The number of valence electrons increases.

C. The atoms lose their electrons more easily.

D. The oxide becomes more acidic.

**Answer: C**

Watch Video Solution

**18.** Element X forms a chloride with the formula $XCl_2$, which is a solid with a high melting point. X would most likely be in the same group of the Periodic Table as

A. Na

B. Mg

C. Al

D. Si

**Answer: B**

 Watch Video Solution

**19.** which element has

two shells, both of which are completely filled

with electrons?

View Text Solution

**20.** which element has

the electronic configuration 2, 8, 2?

View Text Solution

**21.** which element has

a total of three shells, with four electrons in its valence shell?

Watch Video Solution

**22.** which element has

a total of two shells, with three electrons in its valence shell?

View Text Solution

**23.** which element has

Twice as many electrons in its second shell as in its first shell?

View Text Solution

**24.** What property do all elements in the same column of the periodic table as that of boron have in common?

View Text Solution

**25.** What property do all elements in the same column of the periodic table as that of fluorine have in common?

View Text Solution

**26.** An atom has electronic configuration 2, 8, 7. What is the atomic number of this element?

View Text Solution

**27.** An atom has electronic configuration 2, 8, 7. 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)

Watch Video Solution

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

| Group 16 | Group 17 |
|---|---|
| – | – |
| – | $A$ |
| – | – |
| $B$ | $C$ |

State whether A is metal or non-metal.

Watch Video Solution

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

| Group 16 | Group 17 |
| --- | --- |
| – | – |
| – | $A$ |
| – | – |
| $B$ | $C$ |

State whether C is more reactive or less reactive than A.

Watch Video Solution

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

| Group 16 | Group 17 |
| --- | --- |
| – | – |
| – | $A$ |
| – | – |
| $B$ | $C$ |

Will C be larger or smaller in size than B?

Watch Video Solution

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

| Group 16 | Group 17 |
| --- | --- |
| – | – |
| – | $A$ |
| – | – |
| $B$ | $C$ |

Which type of ion, cation or anion will be formed by the element A?

Watch Video Solution

**32.** 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?

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

**35.** Compare and contrast the arrangement of elements in Mendeléev's Periodic Table and the Modern Periodic Table.

Watch Video Solution

## Exercise Multiple Choice Questions Level 1

**1.** According to Mendeleev's perodic law, the properties of elements are a periodic function of their

A. atomic number

B. atomic mass

C. atomic volumes

D. atomic sizes

**Answer: B**

Watch Video Solution

**2.** According to modern periodic law, the properties of elements are a periodic function of their

A. atomic masses

B. atomic volume

C. atomic numbers

D. densities.

**Answer: C**

View Text Solution

**3.** 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

**Answer: A**

View Text Solution

**4.** Which element has the largest size in the second period?

A. N

B. F

C. Li

D. Be

**Answer: C**

View Text Solution

**5.** All the elements in a period in the periodic table have the same

A. atomic number

B. electronic configuration

C. atomic weight

D. valence shell.

**Answer: D**

View Text Solution

**6.** The chemistry of lithium is very similar to that of magnesium even though they are placed in different groups because

A. both are found together in nature

B. both have nearly the same size

C. both have similar electronic configuration

D. all of these

**Answer: B**

Watch Video Solution

**7.** Which of the following has the maximum atomic radius?

A. Al

B. Si

C. P

D. Mg

**Answer: D**

Watch Video Solution

**8.** Cl, Br, I, if this is a Dobereiner's triad and the atomic masses of Cl and I are 35.5 and 127 respectively the atomic mass of Br is

A. $162.5$

B. $91.5$

C. $81.25$

D. $45.625$

**Answer: C**

View Text Solution

**9.** The element with the smallest size in group 13 is

A. gallium

B. thallium

C. aluminium

D. boron

**Answer: D**

View Text Solution

**10.** From the given set of metals and non-metals identify the non-metals. S, Mg, Al, P, N, Na, K.

A. S, P, K

B. Mg, Al, Na

C. S, P, N

D. S, Al, K

**Answer: C**

View Text Solution

**11.** Which one of the following is the most electropositive element?

A. Sodium

B. Chlorine

C. aluminium

D. Silicon

**Answer: A**

View Text Solution

**12.** Which of the following combination of elements belong to the same group?

A. N, P, As

B. Li, Be, Al

C. Na,Mg, Al

D. O, S, Cl

**Answer: A**

View Text Solution

**13.** Which of the following elements has three valence electrons?

A. Cs

B. Ca

C. Al

D. S

**Answer: C**

View Text Solution

**14.** Which of the following elements has highest electron gain enthalpy?

A. Oxygen

B. Fluorine

C. Chlorine

D. Neon

**Answer: C**

View Text Solution

**15.** The atomic radius decreases as we move across a period because

A. atomic mass increases

B. atomic number increases

C. effective nuclear charge increases

D. electrons are added removed.

**Answer: C**

Watch Video Solution

**16.** Which statement is wrong about C and Si?

A. They have similar chemical properties

B. They have similar electronic configuration.

C. They form double and triple bonds

D. None of these

**Answer: C**

View Text Solution

**17.** In the third period of the periodic table, the element having smallest size is

A. Na

B. Ar

C. Cl

D. Si

**Answer: C**

View Text Solution

**18.** Which of the following is the most non-metallic element?

A. Br

B. Cl

C. P

D. S

**Answer: B**

View Text Solution

**19.** The noble gases are unreactive because

A. they react with sodium

B. they have a full outer shell of electrons

C. they have a half-filled outer shell of electrons

D. they have large number of neutrons.

**Answer: B**

Watch Video Solution

**20.** Which of the following elements is a metalloid?

A. Pb

B. Sb

C. Bi

D. Zn

**Answer: B**

View Text Solution

**21.** The atoms of elements belonging to the same group of periodic table have same number of

A. protons

B. electrons

C. neutrons

D. electrons in outermost shell

**Answer: D**

View Text Solution

**22.** 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.

**Answer: B**

 Watch Video Solution

**23.** which of the following statements does not apply to elements belonging to the same period of the periodic table ?

A. The number of valence electrons increases on moving from left to right.

B. The atomic size increases from left to right

C. The atomic size decreases from left to right

D. The metallic character of elements decreases from left to right.

**Answer: B**

Watch Video Solution

**24.** Silicon is a metalloid because

A. its valency is 4

B. it has three electron shells

C. it shows properties of both metals and non-metals

D. it is a liquid metal.

**Answer: C**

View Text Solution

**25.** Which of the following increases along the period?

A. Number of valence electrons

B. Atomic size

C. Electropositive character

D. all of these

**Answer: A**

View Text Solution

**26.** An elements X has an atomic number of 16. With which of the following elements will it show similar chemical properties?

A. Ne(10)

B. N(7)

C. O(8)

D. Be (4)

**Answer: C**

View Text Solution

**27.** The lightest metal is

A. Li

B. Fe

C. Cu

D. Ag

**Answer: A**

View Text Solution

**28.** In the periodic table, the element with atomic number 16 will be placed in the group

A. fourteen

B. sixteen

C. thirteen

D. fifteen

**Answer: B**

View Text Solution

**29.** In the given metals one with the smallest size is

A. Rb

B. Cs

C. K

D. Na

**Answer: D**

View Text Solution

**30.** Identify the statement/statements which are true for the long form of 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

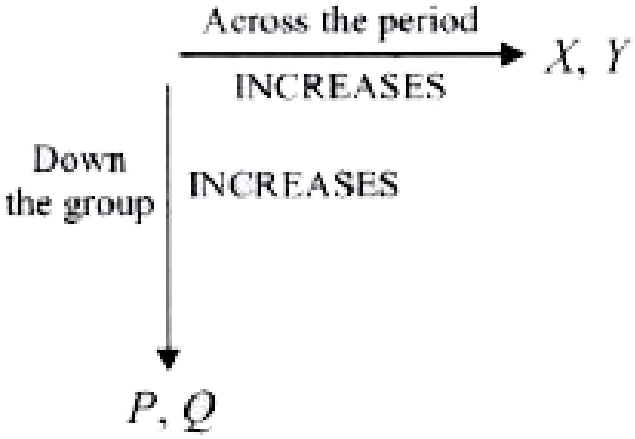
D. all of these

**Answer: D**

Watch Video Solution

## Exercise Multiple Choice Questions Level 2

**1.** Observe the following trends in the periodic properties, in the periodic table




Identify the properties X, Y, P and Q respectively

A. Effective nuclear change, Non-metallic character, Atomic size, Metallic character

B. Metallic character, Electronegativity, Effective nuclear charge, Valency

C. Atomic size, Metallic character, Valency, Non-metallic character

D. Valency, Non-metallic character, Electronegativity, Effective nuclear charge

**Answer: A**

Watch Video Solution

**2.** Identify the pair of atomic numbers representing s-block elements

A. 7,15

B. 9,17

C. 2,10

D. 11,12

**Answer: D**

View Text Solution

**3.** Listed below are the locations of certain elements in groups and periods of the periodic table. Arrange these elements in the expected order of increasing first ionisation energy.

P: Element in the fourth period and group IVA

Q: Element in the third period and group VIA

R: Element in the sixth period and group IIIA

S: Element in the second period and group

VIIIA

T: Element in the fourth period and group VIA

A. $P < Q < R < S < T$

B. $T < S < R < Q < P$

C. $R < P < T < Q < S$

D. $S < Q < T < P < R$

**Answer: C**

Watch Video Solution

**4.** The element with atomic number 14 is hard and forms acidic oxide and a covalent halide. To which of the following categories does the element belong ?

A. Metal

B. Metalloid

C. Non-metal

D. Left-hand side element

**Answer: B**

Watch Video Solution

Watch Video Solution

**5.** Arrange the following elements in order of their increasing ionization energies: O, S, Se, Te, Po

A. Se, Te, S, Po, O

B. O, S, Se, Te, Po

C. Po, Te, Se, S, O

D. Te, O, S, Po, Se

**Answer: C**

View Text Solution

**6.** Which of the given pairs of atomic numbers represents elements in the same group?

A. 11,19

B. 6,12

C. 4,16

D. 8,17

**Answer: A**

View Text Solution

**7.** Considering the elements $B$, $Al$, $Mg$ and $K$, the correct order of their metallic character is

A. $B > Al > Mg > K$

B. $Al > Mg > B > K$

C. $Mg > Al > K > B$

D. $K > Mg > Al > B$

**Answer: D**

Watch Video Solution

**8.** Which of the following will have equal number of electrons?

A. $Cl^-$ and $Br^-$

B. $Na^+$ and $Mg^{2+}$

C. Ar and Ne

D. $Mg^{2+}$ and $Ca^{2+}$

**Answer: B**

View Text Solution

**9.** Element X forms a chloride with formula $XCl_4$ which is a solid with low melting point. X would most likely be in the same group of the periodic table as

A. Na

B. Mg

C. Al

D. Si

**Answer: D**

View Text Solution

**10.** Which of the following sets of elements have elements with four electrons in their valence shell?

A. C, Si, Sn

B. O, S, Se

C. B, Al, Ga

D. Ne, Ar, Kr

**Answer: A**

View Text Solution

**11.** An element X combines with hydrogen to form a compound $XH_3$. The element X is placed on the right side of the periodic table. What is true about the element X?

I. It has 2 valence electrons.

II It is a metal and is solid.

III. It is a non-metal and is a gas.

IV. it has 5 valence electrons

V. $XH_3$ reacts with water to form a basic compound

A. I, II and III

B. II, III and IV

C. III, IV and V

D. V, I and II

**Answer: C**

 Watch Video Solution

**12.** Among O, C, F, Cl, Br, the correct order of increasing atomic radii is

A. F, O, C,Cl, Br

B. F, C, O, Cl, Br

C. F, Cl, Br, O, C

D. C,O, F, Cl, Br

**Answer: A**

View Text Solution

**13.** Which is true about electronegativit order?

A. $P > Si$

B. $C > N$

C. $Br > Cl$

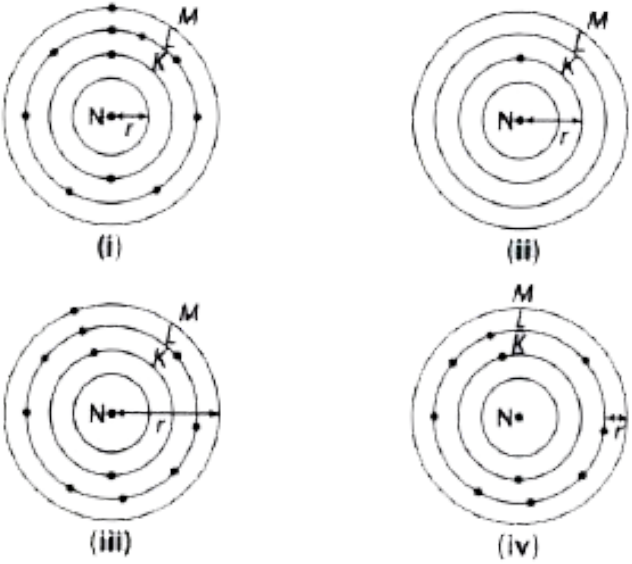
D. $Sr > Ca$

**Answer: A**

View Text Solution

**14.** Which one of the following depict the correct representation of atomic radius (r ) of

an atom?




A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iv)

**Answer: B**

View Text Solution

**15.** Which of the following pairs of atomic numbers represents elements belonging to the same group?

A. 11 and 20

B. 12 and 30

C. 13 and 31

D. 14 and 33

**Answer: C**

View Text Solution

**16.** Which of the following statements is correct about element ${}_{8}^{17}A$ and element ${}_{17}^{37}B$ ?

A. A is more electronegative than B

B. A forms a positive ion and B forms a negative ion

C. A and B have the same number of neutrons

D. A and B have the same number of electrons.

**Answer: A**

Watch Video Solution

**17.** The elements A, B, C and D have indicated electronic arrangement, which is the most metallic element?

A. A:2, 8, 4

B. B: 2, 8, 8

C. C: 2, 8, 8, 1

D. D: 2, 7

**Answer: C**

Watch Video Solution

**18.** In the periodic table, the ionisation potential in a group.....from top to bottom

A. increases

B. decreases

C. does not change

D. can not be predicted

**Answer: B**

 Watch Video Solution

**19.** Which one of these group of elements is also called the halogen family?

A. Group 16

B. Group 18

C. Group 10

D. Group 17

**Answer: D**

Watch Video Solution

**20.** The correct order of increasing acidic nature of $SO_2$, $SiO_2$, $P_2O_3$ and $Al_2O_3$ is

A. $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$

B. $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$

C. $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

D. $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$

**Answer: C**

Watch Video Solution

## Exercise Match The Following

**1.** In this section each question has two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c ) and (d) out of which one is correct.

| List-I (Element) | List-II (Group) |
|---|---|
| (P) Barium | 1. 17 |
| (Q) Nitrogen | 2. 16 |
| (R) Oxygen | 3. 15 |
| (S) Chlorine | 4. 2 |

A. P-4, Q-2, R-3, S-1

B. P-4, Q-3, R-2, S-1

C. P-1, Q-2, R-3, S-4

D. P-4, Q-2, R-1, S-3

**Answer: B**

 Watch Video Solution

**2.** In this section each question has two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c ) and (d) out of

which one is correct.

| List-I (Element) | List-II (Valency) |
|---|---|
| (P) Sodium | 1. 2 |
| (Q) Carbon | 2. 3 |
| (R) Sulphur | 3. 1 |
| (S) Aluminium | 4. 4 |

A. P-1, Q-4, R-3, S-2

B. P-3, Q-2, R-1, S-4

C. P-1, Q-4, R-2, S-3

D. P-3, Q-4, R-1, S-2

**Answer: D**

 Watch Video Solution

**3.** In this section each question has two matching lists. Choices for the correct combination of elements from List-I and List-II are given as options (a), (b), (c ) and (d) out of which one is correct.

| List-I | List-II |
|---|---|
| (P) Metallic character in a group | 1. Decreases |
| (Q) Valency in a period | 2. First increases then decreases |
| (R) Valence electrons in a group | 3. Remain same |
| (S) Atomic size in a period | 4. Increases |

A. P-4, Q-2, R-3, S-1

B. P-1, Q-2, R-3, S-4

C. P-4, Q-3, R-2, S-1

D. P-2, Q-1, R-3, S-4

**Answer: A**

Watch Video Solution

## Exercise Assertion Reason Type

**1.** Assertion: Elements in the same vetical column have similar properties.

Reason: Periodic properties of elements is a function of atomic number

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: B**

Watch Video Solution

**2.** Assertion: Down the group, atomic radius increases.

Reason: Electrons are added in new shell.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: A**

 Watch Video Solution

**3.** Assertion: Atomic size of As is less than that of P.

Reason: Atomic size increases along a period.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: D**

 Watch Video Solution

**4.** Assertion: Number of valence electrons increases down a group.

Reason: More electrons are added in valence shell as we move from right to left in a period.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: D**

 Watch Video Solution

**5.** Assertion: Following is the increasing order of non-metallic character $Si < B < C < N < F$.

Reason: Non-metallic character increases along a period and decreases down the group.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: A**

 Watch Video Solution

**6.** Assertion: According to Mendeleev periodic properties of elements are the function of their atomic numbers.

Reason: Atomic number is equal to number of neutrons.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: D**

Watch Video Solution

**7.** Assertion: Increasing order of metallic character is : $P < Si < Be < Mg < Na$

Reason: Metallic character increases along a period and decreases down a group.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: C**

 Watch Video Solution

**8.** Assertion: Electron gain enthalpy value of $Cl^-$ has positive value.

Reason: Electron gain enthalpy values of all uninegative ions are positive.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of

assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: C**

View Text Solution

**9.** Assertion: Argon (at mass 39.94) has been placed before potassium (at mass 39.10) in the modern periodic table.

Reason: In modern periodic table, elements

have been placed in order of their increasing atomic numbers.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: A**

Watch Video Solution

**10.** Assertion: Group 18 elements are almost inert

Reason: They have completely filled outer-most shell.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

**Answer: A**

 Watch Video Solution

## Exercise Comprehension Type

**1.** Atoms of metals have only a few electrons in their valence shells while atoms of non-metals generally have more electrons in their valence shells. Metallic character is closely related to atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from left to right in a period. Metallic character is inversely related to electronegativity.

Which of the following groups contains metals, non-metals and metalloids?

A. Group 1

B. Group 17

C. Group 14

D. Group 2

**Answer: C**

View Text Solution

**2.** Atoms of metals have only a few electrons in their valence shells while atoms of non-metals generally have more electrons in their valence shells. Metallic character is closely related to

atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from left to right in a period. Metallic character is inversely related to electronegativity.

Non-metals are present in the periodic table at

A. right side

B. left side

C. middle

D. both right and left

**Answer: A**

 Watch Video Solution

**3.** Atoms of metals have only a few electrons in their valence shells while atoms of non-metals generally have more electrons in their valence shells. Metallic character is closely related to atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from left to right in a period. Metallic character is inversely related

to electronegativity.

Considering the elements B, C, N, F and Si, the correct order of their non-metallic character is

A. $B > C > Si > N > F$

B. $Si > C > B > N > F$

C. $F > N > C > B > Si$

D. $F > N > C > Si > B$

**Answer: C**

View Text Solution

**4.** Metals have few electrons in their valence shell while non-metals generally have more electrons in their valence shell. Metallic character is closely related to atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from let to right in a period of periodic table. metallic character is inversely related to electronegativity of element.

Q. The electronegativity of the following elements increase in the order:

A. C,N, Si, P

B. N, Si, C, P

C. Si, P, C, N

D. P, Si, N, C

**Answer: C**

 Watch Video Solution

**5.** Atoms of metals have only a few electrons in their valence shells while atoms of non-metals generally have more electrons in their valence shells. Metallic character is closely related to

atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from left to right in a period. Metallic character is inversely related to electronegativity.

Considering the elements B, Al, Mg and K, the correct order of their ionisation potential is

A. $B > Al > Mg > K$

B. $Al > K > B > Mg$

C. $Mg > Al > K > B$

D. $K > Mg > Al > B$

**Answer: A**

 Watch Video Solution

**6.** Atoms of metals have only a few electrons in their valence shells while atoms of non-metals generally have more electrons in their valence shells. Metallic character is closely related to atomic radius and ionisation enthalpy. Metallic character increases from top to bottom in a group and decreases from left to right in a period. Metallic character is inversely related

to electronegativity.

The element with maximum electronegativity belongs to

A. period 2, group 17

B. period 1, group 18

C. period, 3, group 17

D. period, 2, group 16

**Answer: A**

 Watch Video Solution

**7.** While going down in the group of non-metals (14, 15, 16 and 17) the electronegative character of non-metals decreases. Typical example is of group 15 elements. The elements nitrogen (2nd period) and phosphorus (3rd period) are non-metals and their oxides are acidic in nature. The elements arsenic (4th period) and antimony (5th period) are metalloids and their oxides are amphoteric in nature. However, bismuth (6th period) is a metal. Thus, we can see that the electronegative character (non-metallic

character) of elements gradually decreases and ultimately the last element becomes metal. In case of group 17 of halogens, the first member of the group i.e., fluorine is most non-metallic in character and last member of group, i.e., astatine is least non-metallic in character. In other words, the electronegative nature of the elements decreases as we move down the group.

Which of the following is least metallic?

A. N

B. P

C. As

D. Sb

**Answer: A**

 Watch Video Solution

**8.** While going down in the group of non-metals (14, 15, 16 and 17) the electronegative character of non-metals decreases. Typical example is of group 15 elements. The elements nitrogen (2nd period) and phosphorus (3rd

period) are non-metals and their oxides are acidic in nature. The elements arsenic (4th period) and antimony (5th period) are metalloids and their oxides are amphoteric in nature. However, bismuth (6th period) is a metal. Thus, we can see that the electronegative character (non-metallic character) of elements gradually decreases and ultimately the last element becomes metal. In case of group 17 of halogens, the first member of the group i.e., fluorine is most non-metallic in character and last member of group, i.e., astatine is least non-metallic in

character. In other words, the electronegative nature of the elements decreases as we move down the group.

Which of the following is the most metallic element?

A. P

B. N

C. Bi

D. As

**Answer: C**

Watch Video Solution

**9.** While going down in the group of non-metals (14, 15, 16 and 17) the electronegative character of non-metals decreases. Typical example is of group 15 elements. The elements nitrogen (2nd period) and phosphorus (3rd period) are non-metals and their oxides are acidic in nature. The elements arsenic (4th period) and antimony (5th period) are metalloids and their oxides are amphoteric in nature. However, bismuth (6th period) is a

metal. Thus, we can see that the electronegative character (non-metallic character) of elements gradually decreases and ultimately the last element becomes metal. In case of group 17 of halogens, the first member of the group i.e., fluorine is most non-metallic in character and last member of group, i.e., astatine is least non-metallic in character. In other words, the electronegative nature of the elements decreases as we move down the group.

Which is the least electronegative element among the following ?

A. F

B. Cl

C. Br

D. I

**Answer: D**

 Watch Video Solution

**10.** While going down in the group of non-metals (14, 15, 16 and 17) the electronegative character of non-metals decreases. Typical

example is of group 15 elements. The elements nitrogen (2nd period) and phosphorus (3rd period) are non-metals and their oxides are acidic in nature. The elements arsenic (4th period) and antimony (5th period) are metalloids and their oxides are amphoteric in nature. However, bismuth (6th period) is a metal. Thus, we can see that the electronegative character (non-metallic character) of elements gradually decreases and ultimately the last element becomes metal. In case of group 17 of halogens, the first member of the group i.e., fluorine is most non-

metallic in character and last member of group, i.e., astatine is least non-metallic in character. In other words, the electronegative nature of the elements decreases as we move down the group.

Which of the following is the most non-metallic element?

A. F

B. Cl

C. Br

D. I

**Answer: A**

Watch Video Solution

**11.** Numerous forms of the periodic table have been devised from time to time. A modern version, which is most convenient and widely used is the long or extended form of periodic table. The horizontal rows are called periods. There are altogether seven periods. The first period consists of 2 elements. The subsequent periods consist of 8, 8, 18, 18 and 32 elements

respectively. Elements having similar outer electronic configurations in their atoms are grouped in vertical columns. These are referred to as groups or families. According to the recommendation of IUPAC, groups are numbered 1 to 18 replacing the older notation of group 0,IA, IIA, ....VIIA, VIII, IB, .....VIIB

An element belongs to group 17. It is present in third period and its atomic number is 17. What is the atomic number of the element belonging to same group and present in fifth period?

A. 25

B. 33

C. 35

D. 53

**Answer: D**

Watch Video Solution

**12.** Numerous forms of the periodic table have been devised from time to time. A modern version, which is most convenient and widely

used is the long or extended form of periodic table. The horizontal rows are called periods. There are altogether seven periods. The first period consists of 2 elements. The subsequent periods consist of 8, 8, 18, 18 and 32 elements respectively. Elements having similar outer electronic configurations in their atoms are grouped in vertical columns. These are referred to as groups or families. According to the recommendation of IUPAC, groups are numbered 1 to 18 replacing the older notation of group 0,IA, IIA, ....VIIA, VIII, IB, .....VIIB

Elements in the same vertical group of the periodic table have generally the same

A. number of electron shells

B. electronic configuration

C. atomic mass

D. valence electrons

**Answer: D**

 Watch Video Solution

**13.** Numerous forms of the periodic table have been devised from time to time. A modern version, which is most convenient and widely used is the long or extended form of periodic table. The horizontal rows are called periods. There are altogether seven periods. The first period consists of 2 elements. The subsequent periods consist of 8, 8, 18, 18 and 32 elements respectively. Elements having similar outer electronic configurations in their atoms are grouped in vertical columns. These are referred to as groups or families. According to

the recommendation of IUPAC, groups are numbered 1 to 18 replacing the older notation of group 0,IA, IIA, ....VIIA, VIII, IB, .....VIIB

Electronic configuration 2, 8, 1 is of

A. Na

B. Li

C. F

D. Be

**Answer: A**

 Watch Video Solution

**14.** Numerous forms of the periodic table have been devised from time to time. A modern version, which is most convenient and widely used is the long or extended form of periodic table. The horizontal rows are called periods. There are altogether seven periods. The first period consists of 2 elements. The subsequent periods consist of 8, 8, 18, 18 and 32 elements respectively. Elements having similar outer electronic configurations in their atoms are grouped in vertical columns. These are

referred to as groups or families. According to the recommendation of IUPAC, groups are numbered 1 to 18 replacing the older notation of group 0,IA, IIA, ....VIIA, VIII, IB, .....VIIB

In Mendeleev's periodic table, silver belongs to IB group. The group to which silver belongs in long form of periodic table is

A. first

B. eleventh

C. tenth

D. sixteenth

**Answer: B**

Watch Video Solution

## Exercise Subjective Problems Very Short Answer Type

**1.** The three elements A, B and C with similar properties have atomic masses X, Y and Z respectively. This mass of Y is approximately equal to the average mass of X and Z. What is

such an arrangement of elements called as ? Give on example of such a set of elements.

Watch Video Solution

**2.** Hydrogen occupies a unique position in modern periodic table. Justify the statement.

Watch Video Solution

**3.** Three elements A, B and C have 3,4 and 2 electrons respectively in their outermost shell.

Give the group number to which they belong in the modern periodic table. Also, give their valencies.

Watch Video Solution

**4.** Compare the radii of two species X and Y. Give reasons for your answer.

(a) X has 12 protons and 12 electrons

(b) Y has 12 protons and 10 electrons.

Watch Video Solution

**5.** Compare the radii of two species X and Y. Give reasons for your answer.

(a) X has 12 protons and 12 electrons

(b) Y has 12 protons and 10 electrons.

Watch Video Solution

**6.** Identify and name the metal out of the following elements whose electronic configurations are given below.

(a) 2,8,2

(b) 2,8,1

(c) 2,8,7

(d) 2,1.

Watch Video Solution

**7.** Properties of the elements are given below. Where would you locate the following elements in the periodic table?

A soft metal stored under kerosene

Watch Video Solution

**8.** Properties of the elements are given below. Where would you locate the following elements in the periodic table?

An element with variable (more than one) valency stored under water.

Watch Video Solution

**9.** Properties of the elements are given below. Where would you locate the following elements in the periodic table?

An element which is tetravelent and forms the basis of organic chemistry

Watch Video Solution

**10.** Properties of the elements are given below. Where would you locate the following elements in the periodic table?

An element which is an inert gas with atomic number 2.

Watch Video Solution

**11.** Properties of the elements are given below. Where would you locate the following elements in the periodic table?

An element whose thin oxide layer is used to make other elements corrosion resistant by the process of "anodising".

Watch Video Solution

**12.** A metal M forms an oxide having the formula $M_2O_3$. It belongs to 3rd period in the

modern periodic table. Write the atomic number and valency of the metal.

Watch Video Solution

**13.** What property did Mendelev use to classify the elements in his perodic table.

Watch Video Solution

**14.** State the modern periodic law.

Watch Video Solution

**15.** Name a species that will be isoelectronic with each of the following atoms or ions:

Ne

Watch Video Solution

**16.** Name a species that will be isoelectronic with each of the following atoms or ions:

Rb

Watch Video Solution

**17.** Name a species that will be isoelectronic with each of the following atoms or ions:

$Ca^{2+}$

Watch Video Solution

**18.** Name a species that will be isoelectronic with each of the following atoms or ions:

Rb

Watch Video Solution

**19.** How do atomic sizes vary in a group and in a period? Give reason for the variations.

Watch Video Solution

**20.** Arrange the following ions in the order of increasing size :

$Be^{2+}, Cl^{-}, S^{2-}, Na^{+}, Mg^{2+}, Br^{-}$

Watch Video Solution

**21.** Select from each group the species which has the smallest radius stating appropriate reason

$O, O^-, O^{2-}$

Watch Video Solution

**22.** Select from each group the species which has the smallest radius stating appropriate reason

$K^+, Sr^{2+}, Ar$

Watch Video Solution

**23.** Select from each group the species which has the smallest radius stating appropriate reason

Si, P, Cl

Watch Video Solution

**24.** Choose from the following :

$_4Be, _9F, _{19}K, _{20}Ca$

The element having one electron in its outermost shell

Watch Video Solution

**25.** Choose from the following :

$_4Be, _9F, _{19}K, _{20}Ca$

Two elements of the same group

Watch Video Solution

**26.** Consider the elements N, P, O and S and arrange them in order of increasing non-metallic character.

Watch Video Solution

## Exercise Subjective Problems Short Answer Type

**1.** Three elements 'X', 'Y' and 'Z' have atomic numbers 7, 8 and 9 respectively.

State their position (Group number and

period number both) in the Modern Periodic Table.

Watch Video Solution

**2.** Three elements 'X', 'Y' and 'Z' have atomic numbers 7, 8 and 9 respectively.

Arrange these elements in the decreasing order of their atomic radii.

Watch Video Solution

**3.** Chlorine is an element in period 3 of the Periodic Table. Bromine is found in period 4 of the Periodic Table. These two elements may be from different periods of the periodic table, but they have many similar properties.

| Element | Molecular formula | Number of valence electrons |
|---|---|---|
| Chlorine | | |
| Bromine | | |

Complete the given table

Watch Video Solution

**4.** Chlorine is an element in period 3 of the Periodic Table. Bromine is found in period 4 of the Periodic Table. These two elements may be from different periods of the periodic table, but they have many similar properties.

| Element | Molecular formula | Number of valence electrons |
|---|---|---|
| Chlorine | | |
| Bromine | | |

Explain why the properties of chlorine and bromine closely resemble one another.

Watch Video Solution

**5.** Chlorine is an element in period 3 of the Periodic Table. Bromine is found in period 4 of the Periodic Table. These two elements may be from different periods of the periodic table, but they have many similar properties.

| Element | Molecular formula | Number of valence electrons |
|---|---|---|
| Chlorine | | |
| Bromine | | |

Lithium is an element from Group I of the Periodic Table. Write the formula of the compound formed between lithium and

(i) Chlorine (ii) Bromine (iii) What type of

bonding is found in these compounds ? Give reason.

 Watch Video Solution

**6.** Why atomic size increases on going down the group? Arrange the following in decreasing order of their atomic size -Na, Li, Rb, Cs, K.

 Watch Video Solution

**7.** Potassium bromine and krypton are elements in period 4 of the Periodic Table

In which group of the periodic table can these elements be found ?

(i) Potassium (ii) bromine (iii) krypton

Watch Video Solution

**8.** Potassium bromine and krypton are elements in period 4 of the Periodic Table

Bromine exists as a molecule. Draw a dot-and-

cross' diagram to show the bonding in a molecule of bromine.

Watch Video Solution

**9.** Potassium bromine and krypton are elements in period 4 of the Periodic Table Krypton does not react with either potassium or bromine. Explain the unreactive nature of krypton.

Watch Video Solution

**10.** An element X has a total of 31 nucleons, out of which 16 are neutrons.

Write the electronic configuration of an atom of element X

Watch Video Solution

**11.** An element X has a total of 31 nucleons, out of which 16 are neutrons.

Determine the group and period number of element X.

Watch Video Solution

**12.** An element X has a total of 31 nucleons, out of which 16 are neutrons.

Give the formula of the ion formed by element X.

Watch Video Solution

**13.** What physical and chemical properties of elements were used by Mendeleev in creating

his periodic table? List two observations which posed a challenge to Mendeleev's periodic law.

Watch Video Solution

**14.** Table given below shows a part of the periodic table

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| H | | | | | | | He |
| Li | Be | B | C | N | O | F | Ne |
| Na | Mg | Al | Si | P | S | Cl | Ar |

Using this table explain why

Li and Na are considered as active metals

Watch Video Solution

**15.** Table given below shows a part of the periodic table

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| H | | | | | | | He |
| Li | Be | B | C | N | O | F | Ne |
| Na | Mg | Al | Si | P | S | Cl | Ar |

Using this table explain why

Atomic size of Mg is less than that of Na

Watch Video Solution

**16.** Table given below shows a part of the periodic table

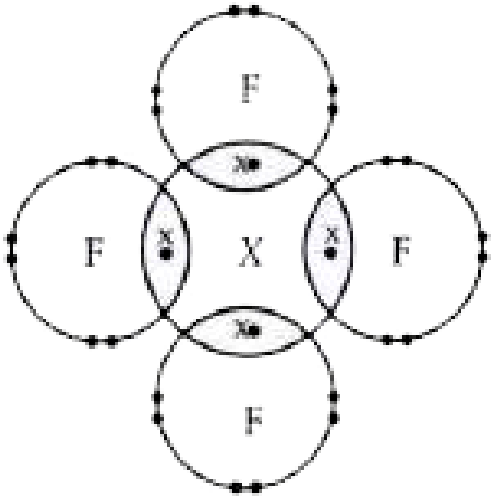
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| H | | | | | | | He |
| Li | Be | B | C | N | O | F | Ne |
| Na | Mg | Al | Si | P | S | Cl | Ar |

Using this table explain why

Fluorine is more reactive than chlorine?

Watch Video Solution

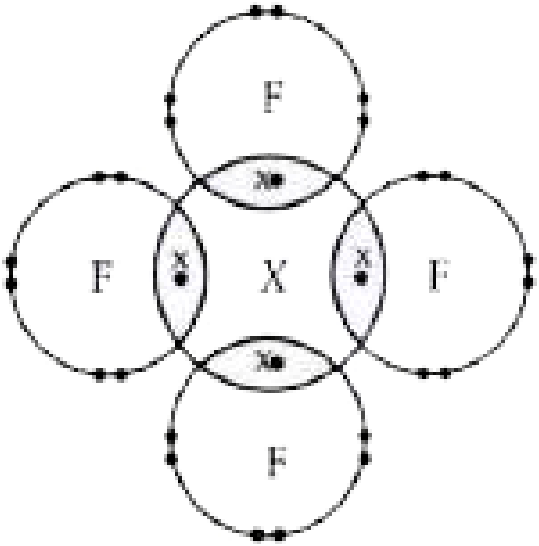
**17.** The given diagram shows the electron arrangement in a compound formed between an element X and fluorine.




What is the formula of this compound?

Watch Video Solution

**18.** The given diagram shows the electron arrangement in a compound formed between an element X and fluorine.

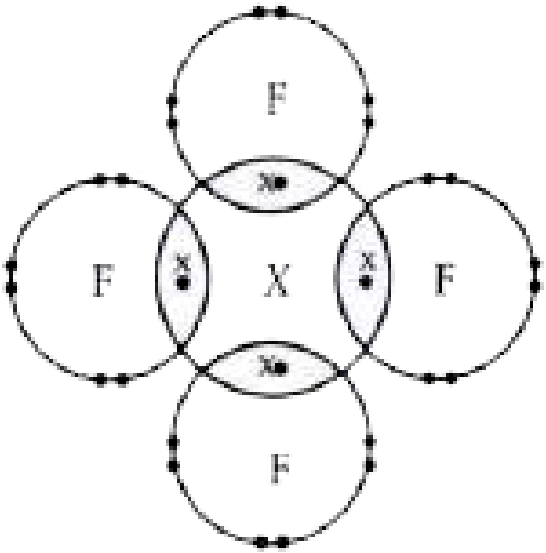



Is this an ionic or covalent compound? Give your reason.

Watch Video Solution

**19.** The given diagram shows the electron arrangement in a compound formed between

an element X and fluorine.




In which group of the periodic table can you find element X?

Watch Video Solution

**20.** Study the variation in the atomic radii of first group elements given below and answer the following

| Group I elements | Na | Li | Rb | Cs | K |
|---|---|---|---|---|---|
| Atomic radius (pm) | 61 | 52 | 244 | 262 | 231 |

Name the elements which have the smallest and the largest atoms

Watch Video Solution

**21.** Study the variation in the atomic radii of first group elements given below and answer the following

| Group I elements | Na | Li | Rb | Cs | K |
|---|---|---|---|---|---|
| Atomic radius (pm) | 61 | 52 | 244 | 262 | 231 |

How does the atomic size vary as you go down a group?

Watch Video Solution

**22.** Atomic number is considered to be a more appropriate parameter than atomic mass for classification of elements in a periodic table. Why ? How does atomic size of elements vary on moving from:

Give reasons for your answers.

left to right in a period

 Watch Video Solution

**23.** Atomic number is considered to be a more appropriate parameter than atomic mass for classification of elements in a periodic table. Why ? How does atomic size of elements vary on moving from:

Give reasons for your answers.

from top to bottom in a group.

Watch Video Solution

## Exercise Subjective Problems Long Answer Type

**1.** An atom is electrically neutral but still it has a tendency to form an ion. While forming an ion it is observed that the size of cation is smaller while the size of an anion is bigger than the atom. Explain

Watch Video Solution

**2.** Why do we classify elements?

Watch Video Solution

**3.** What were the two criteria used by Mendeleev in creating his periodic table?

Watch Video Solution

**4.** Why did Mendeleev leave some vacant places in his periodic table ?

Watch Video Solution

**5.** In Mendeleev's periodic table, why were noble gases like helium, neon and argon not mentioned?

Watch Video Solution

**6.** Would you place the two isotopes of chlorine, Cl-35 and Cl-37 in different slots because of their different atomic masses or in the same slot because their chemical properties are the same ? Justify your answer.

Watch Video Solution

**7.** Why is argon bigger than chlorine inspite of the fact that atomic radius decreases from left to right across a period?


Watch Video Solution

**8.** Taking an example of element of 3rd period discuss the trend of reactivity from left to right.


Watch Video Solution

**9.** Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table

| Group → / Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | A | | | | | B | | | C |
| 3 | | | | D | E | | | | F |

On the basis of the above table, answer the following questions

Name the element which forms only covalent compounds

Watch Video Solution

**10.** Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table

| Group → / Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | *A* | | | | | *B* | | | *C* |
| 3 | | | | *D* | *E* | | | | *F* |

On the basis of the above table, answer the following questions

Name the element which is a metal with valency three

Watch Video Solution

**11.** Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table

| Group → / Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | *A* | | | | | *B* | | | *C* |
| 3 | | | | *D* | *E* | | | | *F* |

On the basis of the above table, answer the following questions

Name the element which is a non-metal iwth valency three

Watch Video Solution

**12.** Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table

| Group → / Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | *A* | | | | | *B* | | | *C* |
| 3 | | | | *D* | *E* | | | | *F* |

On the basis of the above table, answer the following questions

Out of D and E, which is bigger in size and why?

Watch Video Solution

**13.** Study the following table in which positions of six elements A, B, C, D, E and F are shown as they are in the modern periodic table

| Group → / Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | *A* | | | | | *B* | | | *C* |
| 3 | | | | *D* | *E* | | | | *F* |

On the basis of the above table, answer the following questions

Write the common name for the family to which the elements C and F belong.

Watch Video Solution

## Exercise Integer Numerical Value Type

**1.** The period to which elements with atomic number 36 belongs is

Watch Video Solution

**2.** Number of valence electrons in $Cl^-$ ion are:

Watch Video Solution

**3.** The element with atomic number 20 will be found in group

Watch Video Solution

**4.** Two elements X and Y have atomic numbers 6 and 17 respectively. The sum of their period

numbers is

Watch Video Solution

**5.** For (Ar), the electronic configuration is 2, 8, x. The value of x is

Watch Video Solution

## Olympiad Hots Corner

**1.** The positions of four elements K, L, M and N in the periodic table are shown below:

| Group 13 | Group 14 | Group 15 |
|---|---|---|
| *K* | – | – |
| – | *L* | – |
| Ga | *M* | *N* |

Which of the following statements are correct?

I. K, L, M and N are metalloids

II. K is a metal while L, M and N are non-metals

III. Among these four elements, K is the smallest in size.

IV. K is a metal while L and M are metalloids and N is a non-metal.

A. II and III

B. I and III

C. III and IV

D. None of these

**Answer: B**

 Watch Video Solution

**2.** Which of the following orders of atomic radii is correctly represented?

A. $B < Al < Ga$

B. $B < Ga < Al$

C. $Al < B < Ga$

D. $B > Ga > Al$

**Answer: B**

Watch Video Solution

**3.** Which of the given elements A,B,C,D and E with atomic number 2,3,7,10 and 30 respectively belong to the same period ?

A. A,B,C

B. B,C,D

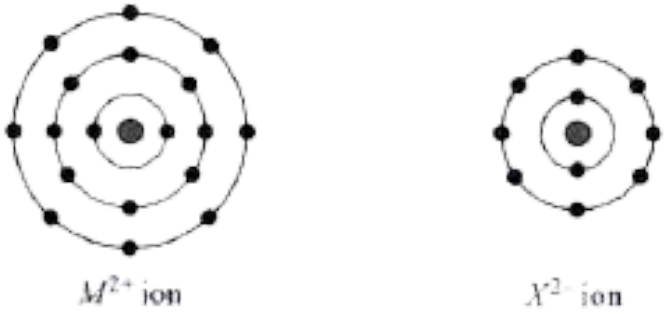
C. A,D,E

D. B,D,E

**Answer: B**

Watch Video Solution

**4.** Elements M forms an ion, $M^{2+}$ and element X forms an ion, $X^{2-}$. The electronic arrangements of these ions are shown as




Which of the following statements about the elements M and X is/are incorrect?

I. M is in group 2 and period 4 of the periodic table.

II. M is a non-metal and X is a metal.

III. X is in group 15 and period 2 of the periodic

table.

IV. M and X form MX type compound.

V. On moving from M towards X in the periodic table, electronegativity decreases.

A. Only II, III and V

B. Only I and IV

C. Only II

D. Only II and III

**Answer: A**

Watch Video Solution

**5.** Periodicity in the properties of elements in modern periodic table is due to

A. a regular increase in atomic weight of elements

B. periodicity in the electronic configuration of atoms of elements

C. successive increases in the atomic number of elements

D. existence of families of elements.

**Answer: B**

Watch Video Solution

**6.** X, Y and Z are the three elements, each one belongs to any one of the group IA, IIIA and VA. The oxide of X is amphoteric, the oxide of Y is highly acidic, and the oxide of Z is highly basic. Identify the groups to which these elements X, Y, Z belong to?

A. $\begin{matrix} X & Y & Z \\ VA & IA & IIIA \end{matrix}$

B. $\begin{matrix} X & Y & Z \\ IA & VA & IIIA \end{matrix}$

C. $\begin{matrix} X & Y & Z \\ IIIA & IA & VA \end{matrix}$

D. $\begin{matrix} X & Y & Z \\ IIIA & VA & IA \end{matrix}$

**Answer: D**

Watch Video Solution

**7.** 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 number of valence electrons increases.

B. The atoms lose their electrons more easily

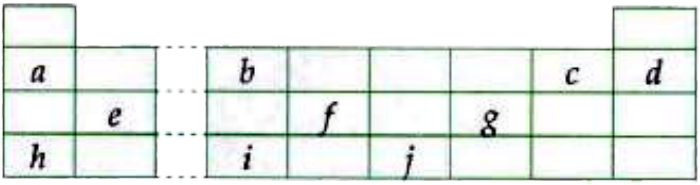
C. The oxides become more acidic

D. The elements become less metallic in nature.

**Answer: B**

Watch Video Solution

**8.** The given part of the modern periodic table shows positions of elements a to j




Fill in the blanks by choosing an appropriate option.

Elemetn __i__ resembles sodium in properties and element __ii__ belongs to the same group as nitrogen. The formula of the hydride of g is __iii__. The formula of compound formed between b and c is __iv___while the formula of compound formed between e and g is __v__.

A. $\begin{matrix} i & ii & iii & iv & v \\ h & g & Hg & bc_2 & e_2g \end{matrix}$

B. $\begin{matrix} i & ii & iii & iv & v \\ a & j & H_2g & bc_3 & eg \end{matrix}$

C. $\begin{matrix} i & ii & iii & iv & v \\ b & j & Hg & b_2c & eg_2 \end{matrix}$

D. $\begin{matrix} i & ii & iii & iv & v \\ \mathrm{h} & i & \mathrm{H\,g_2} & bc & eg \end{matrix}$

**Answer: B**

Watch Video Solution

**9.** The elements A, B, C and D have atomic numbers 4,12, 17 and 19 respectively. Which pair of elements belong to the same period?

A. B and C

B. A and B

C. A and D

D. C and D

**Answer: A**

 Watch Video Solution

**10.** Which of the following metals is not placed in eighth group of Mendeleev periodic table?

A. Fe

B. Na

C. Pt

D. Ni

**Answer: B**

Watch Video Solution

**11.** The atoms having the bigger size among each of the following pairs are

(i) Mg (At. No .12) or Cl (At. No. 17)

(ii) Na (At. No. 11) or K (At. No. 19)

A. Mg and K

B. Mg and Na

C. Cl and Na

D. Cl and K

**Answer: A**

 Watch Video Solution

**12.** Which of the following elements would lose an electron easily ?

A. Na

B. Mg

C. K

D. Ca

**Answer: C**

Watch Video Solution

**13.** Example of Dobereiner's triad is

A. Li, Al, Ca

B. Li, Na, K

C. Li, K, Na

D. K, Al, Ca

**Answer: B**

 Watch Video Solution

**14.** The given table shows a part of the periodic table

| Groups → Periods ↓ | 1 | 2 | 3 to 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | *Q* | | *R* |
| 3 | | *P* | | | | *T* | | | *U* |

P, Q, R, T and U are respectively

A. Mg, S, Ar, Al and Ne

B. O,Mg, Ar, P and Ne

C. Mg, O, Ne, P and Ar

D. O, Mg, Ne, P and Ar

**Answer: C**

Watch Video Solution

**15.** An element X belongs to group 2 and period 3 of the periodic table. The chemical formulae of its nitrate, sulphate and phosphate respectively will be

A. $X(NO_3)_2, XSO_4, X_3(PO_4)_2$

B. $XNO_3, XSO_4, XPO_4$

C. $X_3(NO_3)_2, X_2(SO_4)_2, X_2(PO_4)_3$

D. $X(NO_3)_3, X_2(SO_4)_3, X_2(PO_4)_3$

**Answer: A**

Watch Video Solution