

1 H	2 He	3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	19 K	20 Ca

9TH CLASS CHEMISTRY

CHAPTER 08

Periodic Table and Periodicity

88 High-Yield MCQs

with Highlighted Answers & Clear Explanations

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Section 1: Introduction, History & Structure of the Periodic Table

1

The modern periodic table is based on the arrangement of elements according to increasing:

(A) Atomic mass

(B) **Atomic number**



(C) Density

(D) Valency



Correct Answer: (B) Atomic number

Explanation: While Mendeleev originally arranged elements by atomic mass, the modern periodic table corrects the anomalies of that system by arranging elements strictly in ascending order of their atomic numbers (the number of protons in the nucleus).

2

Who arranged the elements in ascending order of their atomic numbers?

(A) Mendeleev

(B) **Moseley**



(C) Rutherford

(D) Bohr



Correct Answer: (B) Moseley

Explanation: Henry Moseley discovered that the atomic number is the fundamental property of an element. He modified Mendeleev's table to arrange elements by increasing atomic number rather than atomic mass.

3

According to the modern periodic law, the properties of elements are a periodic function of their:

(A) Atomic masses

(B) **Atomic numbers**



(C) Densities

(D) Melting points



Correct Answer: (B) Atomic numbers

Explanation: The modern periodic law states that when elements are arranged by increasing atomic number, their physical and chemical properties repeat after regular intervals.

4

The horizontal rows in the modern periodic table are called:

- (A) Groups
- (B) Families

(C) **Periods**



(D) Blocks



Correct Answer: (C) Periods

Explanation: The periodic table is organized into horizontal rows known as periods and vertical columns known as groups.

5

The vertical columns in the modern periodic table are called:

(A) Periods

(B) **Groups**



(C) Series

(D) Shells



Correct Answer: (B) Groups

Explanation: Vertical columns are called groups. Elements within the same group share similar chemical properties because they have the same number of electrons in their outermost shells.

6

How many total groups and periods are present in the modern periodic table?

(A) 7 groups and 18 periods

(B) 18 groups and 7 periods



(C) 8 groups and 7 periods

(D) 16 groups and 7 periods



Correct Answer: (B) 18 groups and 7 periods

Explanation: The modern periodic table consists of 18 vertical columns (groups) and 7 horizontal rows (periods).

7

Elements present in the same group of the periodic table have similar chemical properties because they have the same number of:

(A) Neutrons

(B) Shells

(C) Electrons in their outermost shell



(D) Protons



Correct Answer: (C) Electrons in their outermost shell

Explanation: Chemical reactivity is primarily determined by valence electrons. Since group members share the same valence electron configuration, they exhibit similar chemical behavior.

8

The periodic repetition of properties in the periodic table is due to the recurrence of similar:

(A) Atomic masses

(B) **Electronic configurations in the outermost shells**



(C) Number of neutrons

(D) Physical states



Correct Answer: (B) Electronic configurations in the outermost shells

Explanation: As you move across a period, the outer shell configuration changes, but when you start a new period, a similar outer shell configuration (like ns^1 , ns^2) reappears, causing a recurrence of chemical properties.

9

In the modern periodic table, elements are divided into how many blocks?

(A) 2

(B) 3

(C) **4**



(D) 5



Correct Answer: (C) 4

Explanation: Based on the type of subshell being filled, elements are classified into four blocks: s-block, p-block, d-block, and f-block.

10

The s-block elements are those in which the outermost shell's:

(A) p-subshell is being filled

(B) s-subshell is being filled



(C) d-subshell is being filled

(D) f-subshell is being filled



Correct Answer: (B) s-subshell is being filled

Explanation: Groups 1 and 2 are called s-block elements because their outermost s-subshell is in the process of being filled.

Section 2: Periods, Lanthanides and Actinides

11

Which period is the shortest period in the periodic table?

(A) 1st period



(B) 2nd period

(C) 3rd period

(D) 4th period



Correct Answer: (A) 1st period

Explanation: The first period contains only 2 elements (Hydrogen and Helium) and is known as the short period, filling only the 1st shell.

12

The 2nd and 3rd periods of the periodic table are called:

(A) Short periods

(B) Normal periods



(C) Long periods

(D) Very long periods



Correct Answer: (B) Normal periods

Explanation: Both the 2nd and 3rd periods contain 8 elements each and are categorized as normal periods, filling the 2nd and 3rd shells respectively.

13

How many elements are present in the 4th and 5th periods?

(A) 8

(B) 18



(C) 32

(D) 2



Correct Answer: (B) 18

Explanation: The 4th and 5th periods are known as long periods because they contain 18 elements each, accommodating electrons in the d-subshell as well.

14

The 6th and 7th periods are called very long periods because they contain:

(A) 18 elements

(B) 32 elements



(C) 8 elements

(D) 2 elements



Correct Answer: (B) 32 elements

Explanation: These periods accommodate 32 elements each because they fill the s, p, d, and f subshells.

15

The series of elements starting from Lanthanum (La = 57) is called:

- (A) Actinides
- (B) Lanthanides
- (C) Halogens
- (D) Alkali metals



Correct Answer: (B) Lanthanides

Explanation: The first of the two series placed at the bottom of the table starts at Lanthanum, hence they are known as Lanthanides.

16

The series of elements starting from Actinium (Ac = 89) is called:

- (A) Lanthanides
- (B) Actinides
- (C) Transition metals
- (D) Noble gases



Correct Answer: (B) Actinides

Explanation: The second series of inner transition metals starts at Actinium, giving them the name Actinides.

17

Lanthanides and Actinides are collectively known as:

- (A) Normal elements
- (B) Transition elements
- (C) Rare earth elements or f-block elements
- (D) Alkaline earth metals



Correct Answer: (C) Rare earth elements or f-block elements

Explanation: Because they are placed at the bottom and involve the filling of f-orbitals, they are called f-block elements or rare earth elements.

18

Which of the following is true about the elements of a period?

- (A) They have the same number of valence electrons
- (B) They have identical chemical properties
- (C) They have consecutive atomic numbers
- (D) They belong to the same group



Correct Answer: (C) They have consecutive atomic numbers

Explanation: Elements in a period are arranged sequentially with increasing atomic numbers, one after the other.

19

Each period in the periodic table, except the first, starts with an alkali metal and ends at a:

- (A) Halogen
- (B) Noble gas
- (C) Transition metal
- (D) Alkaline earth metal



Correct Answer: (B) Noble gas

Explanation: A period begins with an element having 1 valence electron (alkali metal) and concludes with a completely filled valence shell (noble gas).

20

The elements of which period have their outermost shell completely filled?

- (A) 1st period
- (B) 2nd period
- (C) 3rd period
- (D) All periods end with a completely filled shell (Noble gases)



Correct Answer: (D) All periods end with a completely filled shell (Noble gases)

Explanation: Every period concludes with a noble gas, which has a completely filled outermost shell ($ns^2 np^6$ configuration, except Helium which is $1s^2$).

Section 3: Groups, Families and Blocks

21 The elements of Group 1 are known as:

(A) Alkaline earth metals

(B) **Alkali metals**



(C) Halogens

(D) Noble gases



Correct Answer: (B) Alkali metals

Explanation: Group 1 elements (Li, Na, K, etc.) are highly reactive metals that form strongly alkaline hydroxides when reacting with water.

22 The elements of Group 2 are called:

(A) Alkali metals

(B) **Alkaline earth metals**



(C) Transition metals

(D) Chalcogens



Correct Answer: (B) Alkaline earth metals

Explanation: Group 2 elements (Be, Mg, Ca, etc.) form basic oxides and hydroxides, hence they are called alkaline earth metals.

23 The elements present in Group 17 are known as:

(A) Noble gases

(B) **Halogens**



(C) Chalcogens

(D) Transition metals



Correct Answer: (B) Halogens

Explanation: Group 17 elements (F, Cl, Br, I) are highly reactive non-metals and are called halogens, meaning "salt formers".

24 Which family name is given to Group 18 elements?

(A) Alkali metals

(B) Halogens

(C) **Noble gases**



(D) Boron family



Correct Answer: (C) Noble gases

Explanation: Group 18 elements are chemically inert due to their completely filled valence shells, hence they are called noble or inert gases.

25 The family name for Group 13 elements is:

(A) Carbon family

(B) **Boron family**



(C) Nitrogen family

(D) Oxygen family



Correct Answer: (B) Boron family

Explanation: Group 13 starts with the element Boron, so it is commonly referred to as the boron family.

26 Group 14 elements are known as the:

(A) Boron family

(B) **Carbon family**



(C) Nitrogen family

(D) Oxygen family



Correct Answer: (B) Carbon family

Explanation: Since Carbon is the first element in Group 14, it is called the carbon family.

27 The elements of Group 3 to 12 are called:

- (A) Normal elements
- (B) Representative elements
- (C) **Transition metals**
- (D) Inner transition metals



 **Correct Answer: (C) Transition metals**

Explanation: Groups 3 to 12 contain the d-block elements, which are known as transition metals because their inner d-subshells are in the process of being filled.

28 Which of the following blocks contains the normal elements?

- (A) **s and p blocks**
- (B) d and f blocks
- (C) Only s-block
- (D) Only p-block



 **Correct Answer: (A) s and p blocks**

Explanation: Elements in the s and p blocks (Groups 1, 2, and 13-18) have completely filled inner shells and incomplete outer shells, making them "normal" or representative elements.

29 The d-block elements are located between:

(A) s and p blocks



(B) p and f blocks

(C) s and f blocks

(D) f and g blocks



Correct Answer: (A) s and p blocks

Explanation: The transition metals (d-block) are sandwiched between the s-block (left side) and p-block (right side) of the periodic table.

30 Where are f-block elements placed in the periodic table?

(A) Top right corner

(B) Top left corner

(C) In the middle

(D) At the bottom in the form of two rows



Correct Answer: (D) At the bottom in the form of two rows

Explanation: To keep the periodic table manageable and fit on standard pages, the 14 Lanthanides and 14 Actinides are placed separately as two rows at the bottom.

31

The general electronic configuration of Group 1 elements is:

(A) ns^2

(B) ns^1



(C) $ns^2 np^1$

(D) $ns^2 np^6$



Correct Answer: (B) ns^1

Explanation: Alkali metals have exactly one electron in their outermost s-subshell.

32

The general outer shell electronic configuration of Group 17 elements is:

(A) $ns^2 np^5$



(B) $ns^2 np^6$

(C) $ns^2 np^4$

(D) ns^1



Correct Answer: (A) $ns^2 np^5$

Explanation: Halogens have 7 valence electrons (2 in s and 5 in p), which makes them highly reactive non-metals.

33

Which group contains elements with the electronic configuration $ns^2 np^6$?

- (A) Group 1
- (B) Group 2
- (C) Group 17

(D) **Group 18**



Correct Answer: (D) Group 18

Explanation: Noble gases have completely filled valence shells, corresponding to the $ns^2 np^6$ configuration (except Helium).

34

Which of the following is an f-block element?

- (A) Sodium
- (B) Iron

(C) **Uranium**



(D) Chlorine



Correct Answer: (C) Uranium

Explanation: Uranium belongs to the Actinide series (f-block). Sodium is s-block, Iron is d-block, and Chlorine is p-block.

35

Which group of elements is highly unreactive due to a completely filled outermost shell?

(A) Alkali metals

(B) Halogens

(C) Noble gases



(D) Transition metals



Correct Answer: (C) Noble gases

Explanation: Because their outermost shells have the maximum number of electrons (octet), noble gases have no tendency to gain, lose, or share electrons, making them unreactive.

Section 4: Ion Formation and Group Relationships

36 Elements of Group 1 form ions with a charge of:

(A) +2

(B) -1

(C) +1



(D) -2



Correct Answer: (C) +1

Explanation: Group 1 metals have 1 valence electron. To achieve a stable noble gas configuration, they lose this electron, forming a positive ion with a +1 charge.

37 When moving from left to right in the periodic table, main-group elements tend to form cations with a charge equal to:

(A) The group number



(B) 8 minus the group number

(C) The period number

(D) The number of shells



Correct Answer: (A) The group number

Explanation: For metals on the left side of the table (Groups 1, 2, 3), the positive charge on the ion they form is exactly equal to their group number (e.g., Group 2 forms +2 ions).

38 Group 17 elements form anions with a charge of:

(A) +1

(B) -1



(C) -2

(D) +2



Correct Answer: (B) -1

Explanation: Halogens have 7 valence electrons. They have a strong tendency to gain one electron to complete their octet, forming anions with a -1 charge.

39 The charge on the anion formed by Group 16 elements is:

(A) -1

(B) -2



(C) +2

(D) +1



Correct Answer: (B) -2

Explanation: Group 16 elements have 6 valence electrons. To complete their octet, they need to gain 2 electrons, resulting in a -2 charge (e.g., O^{2-} , S^{2-}).

40 The oxides of Group 1 elements are strongly:

- (A) Acidic
- (B) Neutral
- (C) **Basic**
- (D) Amphoteric



 **Correct Answer: (C) Basic**

Explanation: Alkali metals form metal oxides that dissolve in water to form alkalis (hydroxides). Therefore, their oxides are strongly basic in nature.

41 When alkali metals react with water, they produce:

- (A) Acid and Oxygen
- (B) **Alkali and Hydrogen gas**
- (C) Salt and Water
- (D) Only Hydrogen gas



 **Correct Answer: (B) Alkali and Hydrogen gas**

Explanation: The reaction of Group 1 metals with water is vigorous, producing an alkaline hydroxide solution and releasing hydrogen gas (e.g., $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$).

42 The reactivity of alkali metals down the group:

- (A) Decreases
- (B) **Increases**
- (C) Remains the same
- (D) First increases then decreases



 **Correct Answer: (B) Increases**

Explanation: As you move down Group 1, the atomic size increases, making it easier for the atom to lose its single valence electron. Thus, reactivity gradually increases.

43 The reactivity of halogens down the group:

- (A) Increases
- (B) **Decreases**
- (C) Remains constant
- (D) Depends on the period



 **Correct Answer: (B) Decreases**

Explanation: Down Group 17, atomic size increases. The nuclear pull on an incoming electron becomes weaker, making it harder for the atom to gain an electron. Hence, reactivity decreases.

44 Alkali metals react with halogens to form:

(A) Halides



(B) Oxides

(C) Hydroxides

(D) Hydrides



Correct Answer: (A) Halides

Explanation: Group 1 metals readily donate their valence electron to Group 17 halogens, forming ionic salts known as halides (e.g., $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$).

45 Which of the following elements is the most electropositive?

(A) Fluorine

(B) Chlorine

(C) Sodium

(D) Cesium



Correct Answer: (D) Cesium

Explanation: Electropositivity is the tendency to lose electrons. It increases down a group and decreases across a period. Cesium is at the bottom left of the table, making it highly electropositive.

Section 5: Atomic Radius

46 Atomic radius is defined as the:

- (A) Distance between two nuclei of an isolated atom
- (B) **Half the distance between the nuclei of two identical bonded atoms** 
- (C) Total diameter of the electron cloud
- (D) Distance from the nucleus to the outermost shell in a gas



Correct Answer: (B) Half the distance between the nuclei of two identical bonded atoms

Explanation: Since the electron cloud has no definite boundary, atomic size is measured by bonding two identical atoms together and measuring the distance between their nuclei, then dividing by two.

47 The unit used to express atomic radius is:

(A) Nanometer (nm)

(B) **Picometer (pm)**



(C) Angstrom

(D) Micrometer



Correct Answer: (B) Picometer (pm)

Explanation: Atomic radii are extremely small and are typically measured in picometers (pm), where $1 \text{ pm} = 10^{-12}$ meters.

48 When moving from left to right across a period, the atomic radius:

(A) Increases

(B) **Decreases**



(C) Remains unchanged

(D) First increases then decreases



Correct Answer: (B) Decreases

Explanation: Across a period, the nuclear charge (number of protons) increases. This stronger positive charge pulls the electron cloud closer to the nucleus, causing the atomic size to decrease.

49

When moving from top to bottom in a group, the atomic radius:

(A) Increases



(B) Decreases

(C) Remains the same

(D) Fluctuates randomly



Correct Answer: (A) Increases

Explanation: Moving down a group, new electron shells are added. Despite the increase in nuclear charge, the inner electrons shield the outer electrons, causing the overall size of the atom to increase.

50

Which of the following elements has the largest atomic radius in the second period?

(A) Lithium (Li)



(B) Beryllium (Be)

(C) Fluorine (F)

(D) Neon (Ne)



Correct Answer: (A) Lithium (Li)

Explanation: Atomic radius decreases from left to right in a period. Since Lithium is the leftmost element in period 2, it has the largest atomic radius.

51

Which element has the smallest atomic radius in the second period?

- (A) Lithium
- (B) Boron
- (C) Fluorine
- (D) Neon



 **Correct Answer: (D) Neon**

Explanation: Based on the chapter data (Li = 152, Be = 113, B = 88, C = 77, N = 75, O = 73, F = 71, Ne = 69 pm), Neon (69 pm) has the smallest atomic radius in the second period, slightly smaller than Fluorine (71 pm).

52

Among the Group 1 elements, which one has the largest atomic radius?

- (A) Li
- (B) Na
- (C) K
- (D) Cs



 **Correct Answer: (D) Cs**

Explanation: Atomic radius increases as you move down Group 1. Cesium (Cs) is at the bottom of the group, giving it the largest atomic radius among the given options.

53

The increase in atomic size down a group is primarily due to:

- (A) Increase in nuclear charge
- (B) **Addition of new shells and shielding effect**
- (C) Decrease in the number of electrons
- (D) Increase in ionization energy



Correct Answer: (B) Addition of new shells and shielding effect

Explanation: Each subsequent element down a group adds a new electron shell. The inner shells shield the outer electrons from the full attractive pull of the nucleus, causing the atom to expand.

Section 6: Ionization Energy

54

Ionization energy is the amount of energy required to:

(A) Add an electron to a gaseous atom

(B) Remove the most loosely bound electron from an isolated gaseous atom



(C) Break a chemical bond

(D) Convert a solid metal into a gas



Correct Answer: (B) Remove the most loosely bound electron from an isolated gaseous atom

Explanation: Ionization energy is the energy input required to overcome the attractive force of the nucleus and remove an electron from a neutral gaseous atom.

55

The unit of ionization energy is:

(A) kJ/mol



(B) pm

(C) g/cm³

(D) J/g



Correct Answer: (A) kJ/mol

Explanation: Ionization energy is expressed in kilojoules per mole (kJ/mol), indicating the energy required to remove one mole of electrons from one mole of gaseous atoms.

56

When moving from left to right across a period, the ionization energy:

- (A) **Increases** ✓
- (B) Decreases
- (C) Remains constant
- (D) First decreases then increases

✓ **Correct Answer: (A) Increases**

Explanation: Across a period, atomic radius decreases and nuclear charge increases. The outer electrons are held more tightly, so more energy is required to remove them, increasing ionization energy.

57

When moving from top to bottom in a group, the ionization energy:

- (A) Increases
- (B) **Decreases** ✓
- (C) Remains the same
- (D) Depends on the element

✓ **Correct Answer: (B) Decreases**

Explanation: Down a group, the atomic radius increases and shielding increases. The outermost electron is farther from the nucleus and easier to remove, so ionization energy decreases.

58

Which element has the highest ionization energy in the second period?

(A) Li

(B) C

(C) F

(D) Ne



Correct Answer: (D) Ne

Explanation: Ionization energy increases across a period. Noble gases have completely filled stable shells, requiring a massive amount of energy to remove an electron. Therefore, Neon has the highest ionization energy in period 2.

59

Why is the second ionization energy of Magnesium (Mg) higher than its first?

- (A) The second electron is closer to the nucleus
- (B) The second electron is added to a new shell
- (C) It is easier to remove an electron from a positive ion

(D) Removing an electron from a positively charged ion requires more energy due to stronger electrostatic attraction



Correct Answer: (D) Removing an electron from a positively charged ion requires more energy due to stronger electrostatic attraction

Explanation: Once the first electron is removed, the resulting Mg^+ ion has a net positive charge. The remaining electrons are held more tightly by the nucleus, requiring significantly more energy to remove the second electron.

60

Which of the following is the correct order of ionization energy for Na, Mg and Al (Na = 496, Mg = 737, Al = 577 kJ/mol)?

(A) Na < Al < Mg



(B) Na < Mg < Al

(C) Al > Mg > Na

(D) Mg > Na > Al



Correct Answer: (A) Na < Al < Mg

Explanation: Generally, ionization energy increases across a period. However, Magnesium has a stable completely filled 3s subshell ($3s^2$), which makes it harder to remove an electron than from Aluminum (which has a $3p^1$ electron that is easier to remove). Hence Na < Al < Mg.

61 Down Group 1, the ionization energy:

- (A) Increases
- (B) **Decreases**
- (C) Remains the same
- (D) Increases then decreases



 **Correct Answer: (B) Decreases**

Explanation: As you go down Group 1, the atomic size increases, and the valence electron is farther from the nucleus. The attractive pull is weaker, so less energy is needed to remove it (Li = 520, Cs = 377 kJ/mol).

Section 7: Electron Affinity & Electronegativity

62

Electron affinity is the energy change when:

(A) An electron is removed from an atom

(B) **An electron is added to an isolated gaseous atom**



(C) A proton is added to the nucleus

(D) An atom is bonded to another atom



Correct Answer: (B) An electron is added to an isolated gaseous atom

Explanation: Electron affinity measures the energy change (usually released) when a neutral gaseous atom accepts an electron to form a negative ion.

63

What happens to the electron affinity values as we move from top to bottom in a group?

(A) They increase

(B) **They decrease**



(C) They remain constant

(D) They become zero



Correct Answer: (B) They decrease

Explanation: Atomic size increases down a group, so the nuclear pull on an incoming electron is weaker. This lower attraction results in a lower (less negative) electron affinity.

64

Which of the following statements is true regarding electron affinity?

- (A) First electron affinities are always positive
- (B) **Second electron affinities are always positive**
- (C) First electron affinities are always negative
- (D) Second electron affinities are always negative



Correct Answer: (B) Second electron affinities are always positive

Explanation: Adding an electron to a neutral atom (first EA) usually releases energy (negative). However, adding a second electron to an already negative anion (second EA) requires overcoming electrostatic repulsion, so energy must be supplied (positive).

65

Electronegativity is defined as the ability of an atom to:

- (A) Lose electrons
- (B) **Attract the shared pair of electrons towards itself in a bond** ✓
- (C) Gain an electron in the gaseous state
- (D) Attract a proton



Correct Answer: (B) Attract the shared pair of electrons towards itself in a bond

Explanation: Unlike electron affinity, which deals with isolated atoms, electronegativity describes an atom's pulling power on electrons within a chemical bond.

66

Moving from left to right in a period, electronegativity:

- (A) **Increases** ✓
- (B) Decreases
- (C) Remains the same
- (D) Becomes zero



Correct Answer: (A) Increases

Explanation: As atomic size decreases and nuclear charge increases across a period, the atom's ability to attract bonding electrons (electronegativity) increases.

67

Moving from top to bottom in a group, electronegativity:

- (A) Increases
- (B) **Decreases**
- (C) Remains unchanged
- (D) Increases then decreases



Correct Answer: (B) Decreases

Explanation: Down a group, atomic size increases, reducing the effective nuclear pull on shared electrons. Therefore, electronegativity decreases.

68

Which is the most electronegative element in the periodic table?

- (A) Oxygen
- (B) Chlorine
- (C) **Fluorine**
- (D) Nitrogen



Correct Answer: (C) Fluorine

Explanation: Fluorine is the most electronegative element, with a value of 4.0 on the Pauling scale. It has the highest tendency to attract shared electrons.

69

Which of the following elements has the lowest electronegativity?

- (A) Fluorine
- (B) Lithium
- (C) Sodium

(D) **Cesium**



Correct Answer: (D) Cesium

Explanation: Electronegativity decreases down a group and across a period to the left. Cesium is at the bottom left of the table, making it one of the least electronegative elements.

70

The most electronegative atoms are found at the:

- (A) Bottom left corner of the periodic table
- (B) **Top right-hand corner of the periodic table**
- (C) Center of the periodic table
- (D) Top left corner of the periodic table



Correct Answer: (B) Top right-hand corner of the periodic table

Explanation: Electronegativity increases towards the top right. Thus, the most electronegative elements (F, O, N, Cl) are located in the upper right region.

71 Electron affinity values are highest for:

- (A) Alkali metals
- (B) Noble gases
- (C) **Halogens**
- (D) Alkaline earth metals



 **Correct Answer: (C) Halogens**

Explanation: Halogens (Group 17) are just one electron short of a stable noble gas configuration. They have the strongest tendency to accept an electron, resulting in the highest electron affinities.

Section 8: Metallic Character, Density and General Trends

72

The metallic character of elements decreases as we move:

(A) From top to bottom in a group

(B) From left to right in a period



(C) From right to left in a period

(D) Down the s-block



Correct Answer: (B) From left to right in a period

Explanation: Metals are electropositive (lose electrons). Across a period, nuclear charge increases, making it harder to lose electrons. Thus, metallic character decreases from left to right.

73

The metallic character of elements increases as we move:

(A) From left to right in a period

(B) From top to bottom in a group



(C) From right to left in a group

(D) Across the p-block



Correct Answer: (B) From top to bottom in a group

Explanation: Down a group, atomic size increases, and ionization energy decreases. It becomes easier for atoms to lose electrons, so metallic character increases.

74 The density of elements generally increases:

(A) From top to bottom in a group



(B) From left to right in a period

(C) From bottom to top in a group

(D) From right to left in a period



Correct Answer: (A) From top to bottom in a group

Explanation: As you move down a group, atomic mass increases significantly while atomic size increases moderately, causing the mass per unit volume (density) to generally increase.

75 The unit of density is:

(A) g/cm^3



(B) pm

(C) kJ/mol

(D) g/mol



Correct Answer: (A) g/cm^3

Explanation: Density is defined as mass per unit volume. For solids and liquids, it is commonly expressed in grams per cubic centimeter (g/cm^3).

76

Which of the following elements is expected to be the most reactive metal?

(A) Sodium (Na)



(B) Magnesium (Mg)

(C) Aluminum (Al)

(D) Silicon (Si)



Correct Answer: (A) Sodium (Na)

Explanation: Reactivity of metals decreases from left to right in a period. Sodium (Group 1) is far to the left and has a single valence electron, making it much more reactive than Mg, Al, or Si.

77

Which of the following elements is a metalloid?

(A) Sodium

(B) Silicon



(C) Chlorine

(D) Iron



Correct Answer: (B) Silicon

Explanation: Metalloids possess properties intermediate between metals and non-metals. Silicon (and Germanium, Arsenic) are classic examples of metalloids.

78

An element has an electronic configuration of 2, 8, 1. To which group and period does it belong?

(A) Group 1, Period 3



(B) Group 2, Period 3

(C) Group 1, Period 2

(D) Group 17, Period 3



Correct Answer: (A) Group 1, Period 3

Explanation: The valence shell is the 3rd shell, so the period is 3. It has 1 electron in the valence shell (s-block), so it belongs to Group 1 (Alkali metals).

79

An element has the electronic configuration 2, 8, 7. In which group and period is it placed?

(A) Group 17, Period 3



(B) Group 7, Period 3

(C) Group 1, Period 3

(D) Group 16, Period 3



Correct Answer: (A) Group 17, Period 3

Explanation: The outermost shell (3rd shell) has 7 electrons (2 in s and 5 in p). This corresponds to Group 17 (Halogens) and Period 3.

80

Which of the following is NOT a characteristic of transition metals (d-block elements)?

(A) They are all gases at room temperature



(B) They have variable oxidation states

(C) They are good conductors of heat and electricity

(D) Their inner d-subshells are in the process of being filled



Correct Answer: (A) They are all gases at room temperature

Explanation: Transition metals are typically hard, dense, shiny metals (solids) at room temperature (except Mercury, which is liquid). They are definitely not gases.

81 The shielding effect refers to:

(A) The repulsion between electrons in the same shell

(B) **The inner electrons reducing the nuclear pull on outer electrons**



(C) The attraction between the nucleus and valence electrons

(D) The effect of a magnetic field on electrons



Correct Answer: (B) The inner electrons reducing the nuclear pull on outer electrons

Explanation: The core (inner) electrons repel the outer electrons and act as a "shield", reducing the effective nuclear charge felt by the outermost electrons. This explains why atomic size increases down a group.

82

Which of the following has the highest electron affinity (F = -328, Cl = -349, Br = -325, I = -295 kJ/mol)?

(A) F

(B) Cl



(C) Br

(D) I



Correct Answer: (B) Cl

Explanation: Based on the chapter data, Chlorine has a more negative electron affinity (-349 kJ/mol) than Fluorine (-328 kJ/mol). This is due to the compact size of the Fluorine atom causing electron-electron repulsion.

83

Which of the following elements is expected to have the lowest ionization energy?

- (A) Li
- (B) Na
- (C) K
- (D) Cs



Correct Answer: (D) Cs

Explanation: Ionization energy decreases down Group 1. Cesium (Cs) has the lowest ionization energy (377 kJ/mol) among the options.

84

Which of the following is an alkali metal?

- (A) Calcium (Ca)
- (B) Potassium (K)
- (C) Aluminum (Al)
- (D) Iron (Fe)



Correct Answer: (B) Potassium (K)

Explanation: Group 1 elements are alkali metals. Potassium (K) is in Group 1, while Calcium is Group 2, Aluminum is Group 13, and Iron is a transition metal.

85

Which of the following is a non-metal that forms an acidic oxide?

- (A) Sodium
- (B) Magnesium
- (C) Sulfur
- (D) Calcium



 **Correct Answer: (C) Sulfur**

Explanation: Non-metals generally form acidic oxides. Sulfur is a non-metal (Group 16), and its oxide (SO_2/SO_3) is acidic. Sodium, Magnesium, and Calcium are metals and form basic oxides.

86

The elements of Group 2 form ions with a charge of:

- (A) +1
- (B) +2
- (C) -1
- (D) -2



 **Correct Answer: (B) +2**

Explanation: Group 2 elements have 2 valence electrons. They lose these two electrons to achieve a stable noble gas configuration, resulting in a +2 cation.

87

Which of the following statements about the modern periodic table is FALSE?

(A) It has 18 groups

(B) It has 7 periods

(C) It arranges elements by increasing atomic mass



(D) It classifies elements into s, p, d, and f blocks



Correct Answer: (C) It arranges elements by increasing atomic mass

Explanation: The modern periodic table arranges elements by increasing **atomic number**, not atomic mass. Mendeleev's table was based on atomic mass.

88

Which of the following elements is a noble gas?

(A) Hydrogen

(B) Helium



(C) Nitrogen

(D) Oxygen



Correct Answer: (B) Helium

Explanation: Helium belongs to Group 18, the noble gases. It is chemically inert due to its completely filled 1s orbital.

Quick Answer Key

1: B	2: B	3: B	4: C	5: B
6: B	7: C	8: B	9: C	10: B
11: A	12: B	13: B	14: B	15: B
16: B	17: C	18: C	19: B	20: D
21: B	22: B	23: B	24: C	25: B
26: B	27: C	28: A	29: A	30: D
31: B	32: A	33: D	34: C	35: C
36: C	37: A	38: B	39: B	40: C
41: B	42: B	43: B	44: A	45: D
46: B	47: B	48: B	49: A	50: A
51: D	52: D	53: B	54: B	55: A
56: A	57: B	58: D	59: D	60: A
61: B	62: B	63: B	64: B	65: B
66: A	67: B	68: C	69: D	70: B
71: C	72: B	73: B	74: A	75: A
76: A	77: B	78: A	79: A	80: A
81: B	82: B	83: D	84: B	85: C
86: B	87: C	88: B		

Well Done!

You have completed all 88 MCQs of
Periodic Table and Periodicity

Revise the explanations once more before your exam.
Focus on the trends: radius, ionization energy,
electron affinity and electronegativity.
Practice makes perfect. Keep going!

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1 H	2 He	3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	19 K	20 Ca