

Work sheet Atomic Structure & Periodic Table

Q. (1) The element which has the highest first ionization energy in the given elements is:

1. Sodium
2. Aluminum
3. Calcium
4. Phosphorus

Q. (2) The compound which forms a colored aqueous solution is:

1. CaCl_2
2. CrCl_3
3. Sodium hydroxide
4. Potassium Bromide

Q. (3) When a metal atom combines with a nonmetal atom, the non metal atom will

1. Lose electrons and decrease in size
2. Lose electrons and its size increases
3. Gain electrons and its size decreases
4. Gain electrons and its size increases

Q. (4) Which element is metallic in nature?

1. Be
2. F
3. P
4. N

Q. (5) Which halogens are gases at ordinary temperature and pressure?

1. Chlorine and fluorine
2. Chlorine and bromine
3. Iodine and fluorine
4. Iodine and bromine

Q. (6) When combining with nonmetallic atoms, metallic atoms generally will

1. Lose electrons and form negative ions
2. Lose electrons and form positive ions
3. Gain electrons and form negative ions
4. Gain electrons and form positive ions

Q. (7) Which set of elements contains a metalloid?

1. K, Mn, As, Ar
2. Li, Mg, Ca, Kr
3. Ba, Ag, Sn, Xe
4. Fr, F, O, Rn

Q. (8) Atoms of elements in a group on the Periodic Table have similar chemical properties. This similarity is mostly due to the:

1. Number of principal energy levels
2. Number of valence electrons
3. Atomic numbers
4. Atomic masses

Q. (9) As atoms of elements in Group VII-A are considered in order from top to bottom, the electro-negativity of each successive element:

1. Decreases
2. Increases
3. Remains the same
4. Becomes double

Q. (10) Which of the following elements has the greatest ability to attract electrons?

1. Calcium
2. Neon
3. Sodium
4. Chlorine

Q. (11) Which substance is the best conductor of electricity under normal conditions?

1. Nitrogen
2. Neon
3. Sulphur
4. Silver

Q. (12) Which formula represents a molecular substance or covalent nature?

1. CaO
2. CO
3. Li₂O
4. NaCl

Q.(13) Which sequence of Group elements demonstrates a gradual decrease in the strength of the Van-der-Waals forces? All the choices are elements in the liquid state.

1. Ar, Kr, Ne, Xe
2. Kr, Xe, Ar, Ne
3. Ne, Ar, Kr, Xe
4. Xe, Kr, Ar, Ne

Q. (14) The best representation of a polar covalent bond in the given combination is:

1. Hydrogen ----Hydrogen
2. Hydrogen ---- Bromine
3. Nitrogen ----Nitrogen
4. Nitrogen ---- Bromine

Q. (15) A strontium atom differs from a strontium ion in that the atom has a greater:

1. Number of electrons
2. Number of protons
3. Atomic number
4. Mass number

.Q. (16) Which bond has the greatest ionic Character?

1. H--- Cl
2. H---F
3. H---O
4. H---N

Q. (17) Compared to the charge and mass of a proton, an electron has:

1. The same charge and a smaller mass
2. The same charge and the same mass
3. An opposite charge and a smaller mass
4. An opposite charge and the same mass

Q.(18) In Rutherford's experiment alpha particles are bombard to gold foil, most of the alpha particles pass through un-deflected. This result indicates that most of the volume of a gold atom consists of:

1. Deuterons
2. Neutrons
3. Protons
4. Un-occupied space or empty space

Q.(19) A proton has approximately the same mass as:

1. A neutron
2. An alpha particle
3. A beta particle
4. An electron

Q.(20) When electrons in an atom in an excited state fall to lower energy levels, energy is

1. Absorbed only
2. Released only
3. Neither released nor absorbed
4. Both released and absorbed

.Q.(21) A neutron has approximately the same mass as:

1. An alpha particle
2. A beta particle
3. An electron
4. A proton

Q. (22) Which symbols represent atoms that are isotopes?

1. C^{14} and N^{14}
2. O^{16} and O^{18}
3. I^{131} and I^{131}
4. ^{222}Rn and ^{222}Ra

Q.(23) Which element's ionic radius is smaller than its atomic radius?

1. Neon
2. Nitrogen
3. Sodium
4. Sulphur

Q.(24) The atom contains exactly 15 protons is:

1. P-32
2. S-32
3. O-15
4. N-15

Q.(25) An ion with 5 protons, 6 neutrons, and a charge of 3+ has an atomic number of:

1. 5
2. 6
3. 8
4. 11

Q. (26) What is the mass number of an atom which contains 28 protons, 28 electrons, and 34 neutrons?

1. 28
2. 56
3. 62
4. 90

Q: (27) To convert Li into Li^+ we need to:

- (a).Add one electron (b).Remove one proton (c).Remove one electron
(d).Add one neutron

Q: (28) Fe^{2+} and Fe^{3+} are two different:

- (a).Ions (b).Isotope (c).Elements (d).Atoms

Q: (29) $^{14}_6\text{C}$ and $^{12}_6\text{C}$ are the examples of carbon:

- (a).Ions (b).Neutrons (c).Isotopes (d).Molecules

Q: (30). The number of protons in $^{14}_6\text{C}$ is:

- (a).6 Protons (b).12 Protons (c).14 Protons (d).20 protons

Q: (31). Li^+ and Cu^{2+} are examples of:

- (a). An-ions (b).Cat-ions (c).Isotopes (d).Molecules

Q: (32). What is the symbol represents an ion which has 8 protons and 10 electrons?

- (a). N^{3-} (b). O^{2-} (c). O^{3-} (d). F^-

Q:(33) The symbol for the isotope of oxygen which has 9 neutrons is:

- (a). $^{16}_8\text{O}$ (b). $^{17}_8\text{O}$ (c). $^{18}_8\text{O}$ (d). $^{18}_9\text{O}$

Q:(34) The atomic number of Li is 3, so the number of electrons that Li^+ has:

- (a).0 (b).1 (c).2 (d).3

Q:(35). State the number of protons, neutrons, and electrons does ${}^7_4\text{Be}^{2+}$ has:

- (a). 4, 3, 2 (b). 4, 3, 4 (c). 4, 3, 6 (d). 4, 6, 3

Q:(36) Nitrogen has atomic number 7, the symbol represents that N^{3-} has:

- (a). 7 protons and 4 electrons (b). 7 protons and 10 electrons
(c). 7 protons and 11 electrons (d). 8 protons and 11 electrons

Q:(37). Which of these elements has the largest atomic radius?

- (a). Aluminum (b). Calcium (c). Fluorine (d). *Potassium*

Q: (38). Which of these elements has the smallest atomic radius?

- (a). *Potassium* (b). Bromine (c). copper (d). Iron

Q: 39. Which of these elements has the highest first ionization potential?

- (a). *Oxygen* (b). Beryllium (c). Fluorine (d) Carbon

Q: (40) Which of these elements has the lowest first ionization potential?

- (a). *Sodium* (b). Aluminum (c). Phosphorus (d). Sulphur

Q: (41) Which of these elements has the highest electro-negativity?

- (a). Lithium (b). *Nitrogen* (c). Potassium (d). Beryllium

Q: (42). Which of these elements has the lowest electro-negativity?

- (a). *Sodium* (b).Aluminum (c).Sulphur (d).Chlorine

Q: (43). Which of these elements has the highest electron affinity?

- (a).Astatine (b).Iodine (c).Bromine (d). *Chlorine*

Q: (44). Which of these elements has the lowest electron affinity?

- (a). *Polonium* (b).Tellurium (c).Selenium (d).Sulphur

Q: (45). As you move up and to the right on the periodic table:

- (a).Atomic radius increases and electro-negativity increases
(b). *Atomic radius decreases and electro-negativity increases*
(c).Atomic radius increases and electro-negativity decreases
(d).Atomic radius decreases and electro-negativity decreases

Q:(46) As you move from the top to the bottom of the periodic table:

- (a).Ionization energy increases and electro-negativity increases
(b). *Ionization energy decreases and electro-negativity increases*
(c).Ionization energy increases and electro-negativity decreases
(d).Ionization energy decreases and electro-negativity decreases

Answer key to worksheet:

Q.1 Correct Answer Number: 4

Explanation: Phosphorus (P) has first ionization energy of 1012 kJ/mol

Q.2 Correct Answer Number: 2

Explanation: Colored aqueous solutions are a characteristic of transition compounds. The only transition compound in the above choices is CrCl_3 . Cr is a transition element

Q.3 Correct Answer Number: 4

Explanation: Metals have the property to lose electrons due to which their size shrinks while nonmetals tend to gain electrons and become larger ions.

Q.4 Correct Answer Number: 1

Explanation: The only metallic member among these elements is **Be** which belongs to group II –A. All other elements are non metallic in nature

Q.5 Correct Answer Number: 1

Explanation: Iodine is a solid and bromine is a liquid. The gaseous halogens are chlorine and fluorine.

Q.6 Correct Answer Number: 2

Explanation: Metals tend to lose electrons and form positive ions. A neutral atom of Li has 3 protons (+) and 3 electrons (-). If it loses an electron, the Li atom now has +3 and -2 or a net charge of +1. Metals also have low electro-negativities and low ionization energies

Q.7 Correct Answer Number: 1

Explanation: In the Periodic Table note the location of the stepped line dividing metals and nonmetals. Elements next to the left or right of this line are metalloids. As (Arsenic) is a metalloid

Q.8 Correct Answer Number: 2

Explanation: Most of the time elements in the same group have the same number of valence electrons. Valence electrons are involved in bonding and this effects how elements react and determines their chemical properties

Q.9 Correct Answer Number: 1

Q. 10 Correct Answer Number: 4

Explanation: Electro-negativity is a measure of the ability of an atom to attract electrons. The greater the ability to attract, the higher the electro-negativity Chlorine has the highest electro-negativity of the choices given.

Q.11 Correct Answer Number: 4

Explanation: The best conductors of electricity are metals. Silver is a metal, the others are nonmetals

Q.12 Correct Answer Number: 2

Explanation: On the basis of electro-negativity difference of each of options the difference between Carbon has E.N value 2.6 and Oxygen has 3.4 so, the difference of E.N is 0.9 or in the range of covalent bonding because a covalent bond has the electro-negativity differences of less than 1.7. The other three compounds have differences in the ionic bond range or over 1.7.

Q.13 Correct Answer Number: 4

Explanation: Van der Waals forces are weak forces of attraction between molecules. These forces decrease as the molecule gets smaller and increase as the molecule increases. In the periodic table notice that how in answer 4, the elements are getting smaller. Therefore the Van – der- Waals forces would also be decreasing

Q.14 Correct Answer Number: 2

Explanation: The electro-negativity difference between Hydrogen (2.1) and Bromine (3.0) is 0.9. If the difference is less than 1.7 but not zero, usually more than 0.4, a polar covalent bond is formed. A non-polar covalent bond is formed when the difference is zero. If the difference is more than 1.7, an ionic bond is formed.

Q.15 Correct Answer Number: 1

Explanation: Strontium has 2 valence electrons in its outer shell. It is easier to lose these 2 electrons than it is to gain 6 more electrons. Losing 2 electrons will give the strontium ion a charge of +2. Ions are charged atoms. A neutral atom has no charge because it has the same number of protons and electrons. An ion can have more or less electrons than an atom of the same element does. A strontium atom would have 2 more electrons than a strontium ion

Q.16 Correct Answer Number: 2

Explanation: Hydrogen has an electro-negativity of 2.1 and Fluorine has an electro-negativity of 4.0. The difference is 1.9. Ionic bonds have differences of 1.7 or greater. Check the electro-negativity differences for the other choices. H--F has the greatest difference and is the most ionic of the choices

Q.17 Correct Answer Number: 3

Explanation: Protons are positively charged particles and a massive particle while the electrons are negatively charged and lightest particle

Q.18 Correct Answer Number: 4

Explanation: Because most of the particles do not hit anything (pass right through), one can infer the atom is mostly empty space. See hyperlink for more details

Q.19 Correct Answer Number: 1

Explanation: A proton has the same mass as a neutron. An electron has the same mass as a beta particle. An alpha particle has a mass of 4: two protons plus two neutrons.

Q.20 Correct Answer Number: 2

Explanation: The ground state is the lowest energy state. To raise the atom to an excited state, energy must be added. To fall back to the ground state (lowest energy), the energy it had absorbed must be released

Q.21 Correct Answer Number: 4

Explanation: Protons and neutrons each have a mass of 1a.m.u

Q.22 Correct Answer Number: 2

Explanation: Isotopes are atoms of the same element (same atomic number) but with a different number of neutrons (different atomic mass). Only choice 2 is correct.

Choice 1: C and N are not the same elements.

Choice 3: both are the same element but there is no difference in mass. Therefore, they are not isotopes.

Choice 4: not the same elements

Q.23 Correct Answer Number: 3

Explanation: Elements that lose electrons form positive ions that are smaller than atoms of the same element. Therefore the ionic radius of these ions is smaller than its atomic radius.

Only choice 3, sodium, is a metal that will lose electrons.

Neon is stable and will neither lose nor gain electrons.

N and S will tend to gain electrons, each having a larger ionic radius than atomic radius.

Q.24 Correct Answer Number: 1

Explanation: An atom with 15 protons also has an atomic number of 15. Refer to the Periodic Table for element 15 (phosphorus).

Q.25 Correct Answer Number: 1

Explanation: The number of protons is the same as the atomic number. There are 5 protons so the atomic number is also

Q.26 Correct Answer Number: 3

Explanation: Atomic mass is found by adding protons plus neutrons. $28 + 34 = 62$. Electrons have a mass of nearly 0 so they are not counted in the formula for atomic mass