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| *ATOMIC STRUCTURE* | |
| **1.** The maximal oxidation state of element as a rule is equal:  ***A*** to the number of group in the periodic table  ***B*** to the number of subgroup in the periodic table  ***C*** to the number of period  ***D*** to the number of row  ***E*** to the difference of positive oxidation state and date 8 | **2.** What is the difference between the large periods and small periods of elements?  ***A*** presence of d and f- elements.  ***B*** presence of s- elements  ***C*** presence of inert gases.  ***D*** presence of metals.  ***E*** presence of nonmetals |
| **3.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *p* – electronic family?  ***A*** Cl, S, N  ***B*** Ag, Mg, O  ***C*** Al, Pt, N  ***D*** Na, Ca, Fe  ***E*** Fe, Cu, Cr | **4.** Atomic and ionic radii in the row  О – S – Se – Te are:  ***A*** increased  ***B*** decreased  ***C*** decreased and after increased  ***D*** increased and after decreased  ***E*** not changed |
| **5.** Which alkali metal has the largest ionization energy:  ***A*** Li  ***B*** K  ***C*** Na  ***D*** Rb  ***E*** Cs | **7.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *s* – electronic family?  ***A*** K, Ca, Ba  ***B*** S, P, Cl  ***C*** Be, Mg, S  ***D*** Mn, Br, Mo  ***E*** P, S, Cr |
| **8.** Specify the correct electron configuration for carbon in the excited state:  ***A*** 1s22s12p3  ***B*** 1s22s22p2  ***C*** 1s22s22p0  ***D*** 1s22s22p4  ***E*** 1s22s22p6 | **9.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *p*– electronic family?  ***A*** Р  ***B*** Сu  ***C*** Fe  ***D*** Mg  ***E*** K |
| **10.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *s* – electronic family?  ***A*** K, Ca, Sr  ***B*** S, P, Cl  ***C*** Be, Mg, Al  ***D*** Mn, Br, Mo  ***E*** P, S, Cr | **11.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *p*– electronic family?  ***A*** Br, O, P  ***B*** Cl, Ca, O  ***C*** N, Al, Cd  ***D*** K, Ca, Ni  ***E*** Fe, Cu, F |
| **12.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *p* – electronic family?  ***A*** S, P, Cl  ***B*** K, Ca, Sc  ***C*** Be, Mg, Al  ***D*** Mn, Br, Mo  ***E*** P, S, Cr | **13.**  Specify the oxidation state of sulfur that has the octet of electrons on the outermost level  ***A*** -2  ***B*** +2  ***C*** +4  ***D*** +6  ***E*** 0 |
| **14.** All elements of periodic system can be classified on *s-, p-, d-,* and *f-*electronic families. Which of the specified elements belong only to *p* – electronic family?  ***A*** P, О, S  ***B*** Na, P, Cl  ***C*** Ca, Mg, Fe  ***D*** K, Br, Ba  ***E*** Be, Ca, S | **15.** The atomic number of chemical element is:  ***A*** the number of protons in the nuclear of atom.  ***B*** the number of neutrons in the nuclear of atom.  ***C*** the number of nucleons in the nuclear of atom  ***D*** the number of protons and neutrons in the nuclear of atom  ***E*** the mass of atomic nuclear. |
| **16.** What is the correct electron configuration for ion Fe3+, if the electron configuration for iron atom is [Ar]3d6 4s2  ***A*** [Ar] 3d5 4s0  ***B*** [Ar] 3d5 4s1 4p1  ***C*** [Ar] 3d3 4s2  ***D*** [Ar] 3d3 4s1 4p1  ***E*** [Ar] 3d4 4s1 | **17.** Specify the element with the electronic configuration [Ar]4s23d8  ***A*** Ni  ***B*** Cu  ***C*** Zn  ***D*** Pt  ***E*** Mn |
| **18.** What is the correct electron configuration for atom 29Сu  ***A*** [Ar] 3d10 4s1  ***B*** [Ar] 3d9 4s2  ***C*** [Ar] 3d6 4s2  ***D*** [Ar] 3d8 4s2  ***E*** [Ar] 3d7 4s2 | **19.** What is the correct electron configuration for sulfur atom in the oxidation state -2?  ***A*** 3s23p6  ***B*** 3s23p2  ***C*** 3s2  ***D*** 3s23p4  ***E*** 3s23p3 |
| **20.** What is the electronic configuration of valence electrons corresponds to an element of 4-th period of the VI group of main sub-group:  ***A*** 4s2 4p4  ***B*** 4s1 3d5  ***C*** 6s2 6p2  ***D*** 6s2 5d2  ***E*** 3s2 3p4 | **21.** Specify the electronic configuration of chlorine atom in the valence VII (17Cl):  ***A*** 1s2 2s2 2p6 3s1 3p3 3d3  ***B*** 1s2 2s2 2p6 3s2 3p5  ***C*** 1s2 2s2 2p6 3s2 3p4 3d1  ***D*** 1s2 2s2 2p6 3s2 3p3 3d2  ***E*** 1s2 2s2 2p6 3s2 3p6 |
| **22.** On the base of electronic structure of the atom 1735Cl specify the number of neutrons in it.  ***A*** 18  ***B*** 52  ***C*** 10 |  |
| *CHEMICAL BOND AND STRUCTURE OF MOLECULES* | |
| **1.** Specify the type of chemical bond in the molecule of hydrogen  ***A*** covalent nonpolar  ***B*** covalent polar  ***C*** hydrogen  ***D*** metallic  ***E***ionic | **2.** What is the type of chemical bond between the water molecules:  *A* hydrogen  *B* covalent  *C* covalent and ionic  *D* ionic  *E* metallic |
| **3.** What property of covalent bond predetermines the spatial structure of molecules?  *A* direction  *B* saturation  *C* polarity  *D* polarization  *E* energy | **4.** Specify the angle between the orbitals in sр2- hybridization:  *A* 1200  *B* 1800  *C* 1090  *D* 900  *E* 104,50 |
| **5.** Which of the choices has covalent polar bond? *A* HCl (g)  *B* NaBr  *C* CaCl2  *D* I2  *E* O2 | **6.** Identical valence in hydrogen compound and in a higher oxide is exposed by an element:  *A* carbon  *B* phosphorus  *C* selenium  *D* bromine  *E* argon |
| **7.** Which of the choices has covalent nonpolar bond?  *A* N2  *B* CO2  *C* AlCl3  *D* H2S  *E* NaCl | **8.** Which of the choices has only ionic bond?  *A* Na2S  *B* NH4Cl  *C* HCl  *D* CH3COOH  *E* PH3 |
| **9.** Which of the choices has ionic and covalent bond?  *A* NH4NO3  *B* H2S  *C* N2O5  *D* N2  *E* NH3 | **10.** Which of the choices has only covalent polar bond?  *A* HCl  *B* KClO  *C* Na2S  *D* CH3COOK  *E* NH4Cl |
| **11.** Which of the choices has ionic and covalent bond?  *A* Na2SO4  *B* NaCl  *C* CaCl2  *D* CH3COOH  *E* NH3 | **12.** Which of the choices has covalent nonpolar bond?  *A* Н2  *B* KCl  *C* NH4Cl  *D* KI  *E* H2S |
| **13.** Which of the choices has covalent polar bond?  *A* HСl  *B* NaCl  *C* NH4Сl  *D*O2  *E* CH3COOK | **14.** Specify the type of chemical bond in the molecule of sodium chloride  *A* ionic  *B* covalent nonpolar  *C* hydrogen  *D* covalent polar  *E* metallic |
| **15.** Electronegativity in the row F, O, N, Cl increases. Specify the molecule that has the most polar chemical bond?  *A* СlF  *B*OF2  *C* Cl2O  *D* NCl3  *E* NF3 | **16.** What is the type of hybridization of orbital in the methane molecule?  *A* sp3  *B* sp2  *C* sp  *D* dsp2  *E* sp3d2 |
| **17.** For which molecules is not possess hydrogen  bond?  *A* CH4  *B* NH3  *C* HF  *D* H2O  *E* C2H5OH | **18.** What is the maximal valence of fluorine?  *A* 1  *B* 7  *C*2  *D* 5  *E*3 |
| **19.** What is the structure of water molecule?  *A* angle  *B* line  *C* square  *D* cube  *E* octahedral | **20.** What is the maximal valence of Nitrogen taking into account the donor-acceptor mechanism of formation of covalent bond?  *A* 4  *B* 1  *C* 2  *D* 3  *E*5 |
| **21.** The molecule of carbon (II) oxide has a very high energy of chemical bond (E = 1071kJ/mol). It is caused by:  *A* the triple bond between carbon and oxygen  *B* covalent bond  *C* ionic bond  *D*the high polarity of the bond  *E* hydrogen bond | **22.** Taking into account ability of iodine to dissolve in non-polar solvents, specify the type of chemical bond in the iodine molecule I2  ***A*** covalent nonpolar  ***B***ionic  ***C*** covalent polar  ***D*** metallic  ***E*** intermolecular bonding |
| **23.** The molecule ВF3 has an triangular structure. Specify the type of hybridization of atomic orbital of boron:  *A* sp2  *B* sp3  *C* sp  *D* dsp2  *E* sp2d | **24.** Specify the type of chemical bond in the chlorine molecule  *A* covalent nonpolar  *B* ionic  *C* hydrogen  *D* covalent polar  *E* coordination |
| **25.** Specify the most polar and stable compounds of hydrogen with the elements of V-A group:  *A* NH3  *B* PH3  *C* AsH3  *D* SbH3  *E* BiH3 | **26.** Hydrogen compounds of which from the elements can form the hydrogen bonds?  *A* F  *B* С  *C* Si  *D* P  *E* I |
| **27.** Specify a valence of carbon atom in the molecule carbon(II) oxide  *A* 3  *B* 4  *C* 2  *D* 1  *E* – 4 | **28.** Specify the molecule in which the oxidation degree is equal to zero and the valence is equal to one?  *A* H2  *B* HCl  *C* NH3  *D* N2  *E* SO3 |
| **29.** The ionic bond in the NaCl define:  *A* the ability of the solution current electricity  *B* Plasticity.  *C*Heat Conductivity.  D Opacity.  E Conductivity | **30.** Intermolecular hydrogen bond does not influence on such physical property of matter, as:  *A* molecular mass  *B* boiling temperature  *C* solubility in the water  *D* density of solution  *E* Transformation of gas on a liquid |
| **31.** Specify the compounds of nitrogen with the valence IV:  *A* NH4Cl  *B* NH3  *C* NO  *D* HNO2  *E* N2 | **32.** What is the name for chemical bond which appears due to electrostatic attraction of the oppositely charged ions?  *A* Ionic  *B* polar covalent  *C* nonpolar covalent  *D* donor-acceptor  *E* hydrogen |