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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  |