

1										18									
1 H 1.008																		2 He 4.003	
3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18		
11 Na 22.99	12 Mg 24.31	3	4	5	6	7	8	9	10	11	12	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95		
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80		
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29		
55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.20	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)		
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (267)	105 Db (268)	106 Sg (269)	107 Bh (270)	108 Hs (270)	109 Mt (278)	110 Ds (281)	111 Rg (282)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (290)	116 Lv (293)	117 Ts (294)	118 Og (294)		

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (266)

constants

$$R = 0.08206 \text{ L atm/mol K}$$

$$R = 8.314 \text{ J/mol K}$$

$$N_A = 6.022 \times 10^{23} / \text{mol}$$

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$

$$c = 3.00 \times 10^8 \text{ m/s}$$

$$g = 9.81 \text{ m/s}^2$$

conversions

$$1 \text{ atm} = 760 \text{ torr}$$

$$1 \text{ atm} = 101325 \text{ Pa}$$

$$1 \text{ atm} = 1.01325 \text{ bar}$$

$$1 \text{ bar} = 10^5 \text{ Pa}$$

$$^\circ\text{F} = ^\circ\text{C}(1.8) + 32$$

$$\text{K} = ^\circ\text{C} + 273.15$$

conversions

$$1 \text{ in} = 2.54 \text{ cm}$$

$$1 \text{ ft} = 12 \text{ in}$$

$$1 \text{ yd} = 3 \text{ ft}$$

$$1 \text{ mi} = 5280 \text{ ft}$$

$$1 \text{ lb} = 453.6 \text{ g}$$

$$1 \text{ ton} = 2000 \text{ lbs}$$

$$1 \text{ tonne} = 1000 \text{ kg}$$

$$1 \text{ gal} = 3.785 \text{ L}$$

$$1 \text{ gal} = 231 \text{ in}^3$$

$$1 \text{ gal} = 128 \text{ fl oz}$$

$$1 \text{ fl oz} = 29.57 \text{ mL}$$

water data

$$C_{s,\text{ice}} = 2.09 \text{ J/g } ^\circ\text{C}$$

$$C_{s,\text{water}} = 4.184 \text{ J/g } ^\circ\text{C}$$

$$C_{s,\text{steam}} = 2.03 \text{ J/g } ^\circ\text{C}$$

$$\rho_{\text{water}} = 1.00 \text{ g/mL}$$

$$\rho_{\text{ice}} = 0.9167 \text{ g/mL}$$

$$\rho_{\text{seawater}} = 1.024 \text{ g/mL}$$

$$\Delta H_{\text{fus}} = 334 \text{ J/g}$$

$$\Delta H_{\text{vap}} = 2260 \text{ J/g}$$

$$K_w = 1.0 \times 10^{-14}$$

This extra practice set can be used to test your knowledge for the upcoming exam.

1. The following species are isoelectronic. Select the atom or ion that will have the largest radius.

- a. K^+
 - b. S^{2-}
 - c. Ar
 - d. Cl^-
 - e. Ca^{2+}
-

2. When an electron is excited to a higher energy level in a gas, the gas emits light when the electrons fall back down to the lower energy states. Upon closer inspection, you determine that the emitted light is a combination of violet, red, blue, and green light. For which color is the electron going down in energy the most?

- a. violet
 - b. green
 - c. red
 - d. blue
-

3. It takes light with a frequency of approximately 2.687×10^{15} Hz to break the triple bond between carbon and oxygen in carbon monoxide. Calculate the energy (in kJ/mol) necessary to break one mole of carbon-oxygen triple bonds.

- a. 4.455×10^{-17} kJ/mol
 - b. 1072 kJ/mol
 - c. 687.2 kJ/mol
 - d. 1.780×10^{-18} kJ/mol
 - e. 945.2 kJ/mol
-

4. How many unique quantum number sets are possible for the 3d electrons in zinc?

- a. 14
 - b. 8
 - c. 12
 - d. 6
 - e. 10
-

5. What is the electron configuration for the oxide anion?

- a. $1s^2 2s^2 2p^4$
 - b. $1s^2 2s^2 3p^4$
 - c. $1s^2 2s^2 3p^2$
 - d. $1s^2 2s^2 2p^2$
 - e. $1s^2 2s^2 2p^6$
-

6. Identify the set that contains ONLY ionic compounds.

- a. $CaCl_2$, HI, H_2O
 - b. NaBr, Fe_2O_3 , $CaCl_2$
 - c. $CuCl_2$, NaCl, $HClO_3$
 - d. HCl, AgCl, Al_2O_3
 - e. CH_3CH_2OH , Al_2O_3 , CH_4
-

7. Compared to yellow light, ultraviolet light will have a...

- I. shorter wavelength
 - II. lower frequency
 - III. higher energy
 - IV. greater velocity
- a. I, III, and IV
 - b. I and III
 - c. I and IV
 - d. I, II, III, and IV
-

8. Which of the following is a true statement comparing the ionic radii to a set of isoelectronic species?

- a. The smallest radius will be the ion with the greatest negative charge.
 - b. The smallest radius will be the ion with the greatest positive charge.
 - c. There is no difference in the ionic radii for isoelectronic species.
 - d. The smallest radius will be the neutral species.
-

9. Which of the following types of radiation is capable of ionizing organic molecules like DNA?

- a. UV-C radiation
 - b. blue light
 - c. infrared radiation
 - d. orange light
 - e. radio waves
-

10. What is the wavelength of a 2.45×10^9 Hz wave?

- a. 1.62×10^{-24} m
 - b. 0.122 m
 - c. 8.17×10^{-18} m
 - d. 0.753 m
 - e. 7.53 m
-

11. Which effect on matter correlates with the highest frequency light?

- a. vibration
 - b. replication
 - c. rotation
 - d. excitation
 - e. ionization
-

12. Carbon and oxygen form a polar covalent bond. Which of the following statements accurately uses the periodic table trends to explain why this type of bond forms?

- a. Carbon has a greater electronegativity than oxygen, which pushes the shared electrons closer to oxygen.
 - b. Oxygen has a greater electronegativity than carbon, which pulls the shared electrons closer to oxygen.
 - c. Carbon has a smaller radius than oxygen, which causes the electrons to be shared between the two atoms.
 - d. Oxygen and carbon have similar electronegativities, causing the electrons to be shared equally between the two atoms.
 - e. Oxygen has a greater ionization energy than carbon, which transfers electrons from carbon to oxygen.
-

13. Select the ionic compound with the highest lattice energy.

- a. MgO
 - b. NaF
 - c. MgCl_2
 - d. Na_2O
 - e. MgS
-

14. What is the ionic compound formed between Na and O?

- a. Na_2O
 - b. NaO_2
 - c. Na_3O_2
 - d. NaO
 - e. Na_2O_3
-

15. Name the salt with the strongest ionic bond strength:

MgBr_2 CaCl_2 MgCl_2 CaBr_2

- a. magnesium chloride
 - b. magnesium dichloride
 - c. calcium dichloride
 - d. magnesium dibromide
 - e. calcium bromide
 - f. calcium dibromide
-

16. Which subshell contains an electron with the following quantum number set?

$$n = 4, \quad \ell = 0, \quad m_\ell = 0, \quad m_s = \frac{1}{2}$$

- a. 3s
 - b. 3p
 - c. 3d
 - d. 4f
 - e. 4s
 - f. 4d
 - g. 4p
-

17. Which of the following incorrectly matches the polyatomic ion with its name?

- a. permanganate: MnO_4^-
 - b. phosphate: PO_3^{3-}
 - c. ammonium: NH_4^+
 - d. carbonate: CO_3^{2-}
 - e. sulfate: SO_4^{2-}
-

18. What is the energy of a single 680 nm red light photon?

- a. 2.66×10^{38} J
 - b. 4.51×10^{-40} J
 - c. 2.92×10^{-17} J
 - d. 2.92×10^{-19} J
 - e. 3.88×10^{-21} J
-

19. Chromium(III) and sulfide (S^{2-}) form an ionic bond. What is the formula for the ionic compound?

- a. Cr_2S
 - b. Cr_2S_3
 - c. Cr_3S_2
 - d. CrS
 - e. CrS_3
-

20. Your chemist friend suggests that you tune the radio to 3.0333 m, but you know that radio stations are listed as frequencies in MHz. What radio station is this?

- a. 101.5 KROX
 - b. 98.9 KUT
 - c. 93.7 KLBJ
 - d. 93.3 KGSR
 - e. 103.5 BOB
-

21. Complete the sentence regarding the energy levels of an electron in the hydrogen atom. As the principal quantum number increases,

- a. the spacing between successive energy levels decreases
 - b. the spacing between successive energy levels increases
 - c. the spacing between successive energy levels remains constant
 - d. the energy levels remain degenerate
-

22. Name the following compounds: AlPO_4 and SO_2 ?

- a. aluminum phosphate and sulfur oxide
 - b. aluminum phosphoxide and sulfur dioxide
 - c. aluminum phosphite and sulfur oxide
 - d. aluminum phosphite and sulfur dioxide
 - e. aluminum phosphoxide and sulfur oxide
 - f. aluminum phosphate and sulfur dioxide
-

23. What is the electron configuration for selenium, Se?

- a. $[\text{Ar}]4s^24d^{10}4p^6$
 - b. $[\text{Kr}]4s^24d^{10}4p^4$
 - c. $[\text{Ar}]4s^23d^{10}4p^6$
 - d. $[\text{Ar}]4s^24p^4$
 - e. $[\text{Ar}]4s^23d^{10}4p^4$
-

24. Which of the following quantum number sets is not possible?

- a. $n = 5, \ell = 2, m_\ell = -2, m_s = \frac{1}{2}$
 - b. $n = 1, \ell = 0, m_\ell = 0, m_s = -\frac{1}{2}$
 - c. $n = 4, \ell = 2, m_\ell = 3, m_s = \frac{1}{2}$
 - d. $n = 3, \ell = 1, m_\ell = -1, m_s = \frac{1}{2}$
 - e. $n = 4, \ell = 3, m_\ell = 0, m_s = \frac{1}{2}$
-

25. How many unpaired electrons will you find in the electronic configuration of nitrogen?

- a. 5
- b. 1
- c. 0
- d. 2
- e. 3

Remember to bubble in ALL your answers BEFORE time is called. Double check your name, utetid, and version number before you turn in your bubblesheet. You must keep your exam for future reference. Please do not lose it. We will not replace it.