Name: _____ Test 3

120 points Chemistry 121A

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SHOW ALL CALCULATIONS & USE PROPER SIGNIFICANT FIGURES AND UNITS

Multiple Choice Questions: Circle the single best answer. No penalty for guessing.

1. Convert 210 ˚C into the Kelvin scale. (5 points)

A) 483 K **B)** 320 K **C)** 100 K **D)** 32 K **E)** –63 K

2. What is the molecular geometry of a molecule with 6 pairs of valence electrons about the central atom, of which 2 are lone pairs of electrons (*i.e.* XeF_4)? (5 points)

A) tetrahedral **B)** square planar **C)** bent **D)** trigonal **E)** linear

3. Which of the following atoms has the largest first ionization energy? (5 points)

A) Na **B)** Cl **C)** Ne **D)** Os **E)** At

4. How many electrons are required to fill all of the 5f orbitals for a single atom? (5 points)

A) 2 **B)** 6 **C)** 8 **D)** 14 **E)** 18

5. What is the ground state electron configuration for cadmium, Cd? (5 points)

A) $[He]5s^25d^{10}$ **B)** $[Xe]3p^64p^6$ **C)** $[Xe]5s^24p^{10}$ **D)** $[Kr]5s^24d^{10}$ **E)** $[Kr]5s^25d^{10}$

6. Which of the following bonds is most stable? (5 points)

A) C – H **B)** C – O **C)** C = O **D)** C = C **E)** C ≡ N

7. How many moles of hydrogen atoms are in 2 mol of $(NH_4)_2HPO_4$? (5 points)

A) 7 **B)** 9 **C)** 16 **D)** 18 **E)** 24

8. Draw the Lewis dot structures and give oxidation numbers of all atoms for OF_2 and PCl_5. (12 points)

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9. Write the formula or name of the following ionic compounds and indicate the solubility. (16 points)

$(NH_4)_3PO_4$	_____	_____
$PbSO_3$	_____	_____
_____	sodium permanganate	_____
_____	perbromic acid	_____

10. Explain why CaS has a higher lattice energy than CsI. (10 points)

11. Draw the Lewis dot structure for HNO. Describe the molecular and electron pair geometry as well as formal charge on each atom of this molecule. (10 points)

12. Calculate the bond order for the molecule ON. Is this a stable molecule? Why? (5 points)

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13. Explain why Cs (cesium) atoms are larger than both Na (sodium) and Zr (Zirconium) atoms using electron configuration and charge arguments. (10 points)

14. Calculate the enthaply of combustion (reaction with O_2 to make CO_2 and H_2O) for C_3H_8, given the following bond dissociation energies: O=O 495; C–C 348; C–H 413; C=O 799; O–H 463 kJ/mol. (10 points)

15. Balance the following equation and write out a final net ionic equation. Calculate the mass of solid precipitate formed when 0.5 moles of $Ca(NO_3)_2$ in solution reacts with 0.3 moles of Na_2CO_3 in solution. (12 points)

____ $Ca(NO_3)_2$ *(aq)* + ____ Na_2CO_3 *(aq)* —> _____ + _____