

Directions: Using the Reference Tables for Chemistry, locate the following information.

1. Name C_5H_{12} . Pentane (P) (Q)

2. Write the equation for the decay of Kr-85. $^{85}_{36}\text{Kr} \rightarrow ^0_{-1}\text{e} + ^{85}_{37}\text{Rb}$ (N) (O)

3. Explain how you know that Na_3PO_4 is soluble in water but NiCrO_4 is not. (F)
 PO_4^{3-} insol - except w/ Na CrO_4^{2-} Not Sol

4. Define STP and give its values including units.

(A) $T \rightarrow 273\text{K}, 0^\circ\text{C}$ $P \rightarrow 101.3\text{kPa}, 1\text{atm}$

X Name and give the formulas of the strongest and weakest bases.

$\text{NaOH} \rightarrow$ Strong - Gr 1 with OH, NH_4^+ with OH

6. Name $\text{C}_2\text{H}_3\text{O}_2^-$ or CH_3COO^- .

acetate (E)

7. What is the solubility of sulfur dioxide at 40°C , in grams? (G)

10g SO_2 in $100\text{g H}_2\text{O}$

8. What is the freezing point of fluorine?

(S) $\text{MP} = \text{FP} = 53\text{K}$ or 326°C

9. What are the units for the heat of fusion and what do they mean?

(B) $\text{J/g} \rightarrow$ for every 1g ice need 334J to melt it

10. What is the symbol for the mole?

(D) mol

11. What is the vapor pressure of water at 75°C ?

(H) 38kPa

12. How much heat does it take to convert 20g of water to steam at 100°C ? Show work.

(B) (T) $q = mH_v \rightarrow q = 20\text{g} \times 2260\text{J/g} = 45200\text{J}$

13. What is the prefix for $1/1000$ of a meter?

(C) $10^{-3} = 1/1000 \rightarrow$ milli

14. What is the molecular formula of ammonia?

NH_3 (L)

15. What is the formula for the permanganate ion?

(E) MnO_4^-

16. Name CH_3COOH .

(K) ethanoic acid (acetic acid)

17. Write the symbol for a positron.

(O) β^+

18. What is the half-life of Pu-239?

(N) 2.410×10^4 years

19. Is the formation of water from its elements endothermic or exothermic?

(I) EXO $-\Delta H$

20. What is the atomic mass of silver?

Per Table 107.868

21. How much heat is released when LiBr dissolves in water?

(I) $\Delta H = -48.83\text{kJ}$

X Give the names and formulas of the strongest and weakest acids.

23. What is the general formula for alkynes? What does it mean?

(Q) $\text{C}_n\text{H}_{2n-2}$ Triple $\text{C}\equiv\text{C}$ ~~one~~ bonds

24. What is the electronegativity of chlorine and what does it mean?

(S) 3.2 This is chlorines attraction for e^-

25. What is the decay mode of Au-198?

(N) ^{198}Au β^- - Beta decay

26. What is the ionization energy of Rb and what does it mean?

(S) 403 kJ/mol $\rightarrow$ energy required to remove e^-

27. Which atom is more likely to lose electrons, Al or Zn?

(J) Al $\rightarrow$ Higher on Table (J) - more easily oxidized

28. What is the atomic number of Fe?

Per Table 52

29. What is the atomic radius of bromine?

(S) 117 pm

30. What are the oxidation states of sulfur?

Per Table -2, +4, +6

31. Which indicator would be the best to use to identify a strong base?

(M) Thymol Blue or Phenolphthalein

32. Write the electron configuration of potassium.

Per Table K 2-8-8-1

33. At what temperature will water boil, when the atmospheric pressure is 55 kPa?

(H) 85°C

34. What is the trend of atomic radii across period 3?

(S) Na-160. Mg-140 Al-124 $\rightarrow$ Rad DEC - due to greater nuclear charge.

35. Will Mn produce colored ions in solution? Why or why not?

Yes, it is a transition metal

36. Will Sn gain or lose electrons when it reacts with Cu?

(J) Sn - lose e^- (oxid) because it is above Cu on (J)

37. What is the heat of vaporization of water?

(B) 2260 J/g

38. Will Al react with HCl to produce hydrogen gas?

(J) Yes, metals above H_2 on (J) react with acid to produce $\text{H}_2(\text{g})$

39. What is the density of tin?

(S) 7.287 g/cm³

40. In the molecule CCl_4 , what is the electronegativity difference of the C-Cl bond? Is the bond polar or nonpolar? Why? Is the molecule polar or nonpolar? Why?

ED = 0.6, Polar Cov Bond (2 DIFF NM's), Non Polar Molecule (SYM)

Using table T, solve the following problems. Show all work.

41. Give the parts per million of solute for a solution containing 25.0 g of sodium chloride in 200. g of water.

$$\text{ppm} = \frac{\text{g solute} \times 1,000,000}{\text{g sol'n}} \rightarrow \frac{25.0 \text{ g} \times 1,000,000}{200 \text{ g}} = 125000 \text{ ppm}$$

42. If the accepted value for the mass of an object is 10.3 g and a student found that the mass was 10.1 g, what is the student's percent error?

$$\% \text{ E} = \frac{|\text{mea val} - \text{acc val}|}{\text{acc val}} \times 100 \rightarrow \frac{10.1 - 10.3}{10.3} \times 100 = 1.94\%$$

43. If a peanut is burned in a calorimeter containing 50.0 g of water, and the water temperature changes from 45.0°C to 57.0°C, how many joules of energy were released by the peanut?

$$q = mc\Delta T \\ = 50.0 \text{ g} \times 4.18 \text{ J/g}^\circ\text{C} \times 12^\circ\text{C}$$

$$= 2500 \text{ J}$$