SCH 4UI Exam Preparation Quicks...
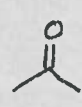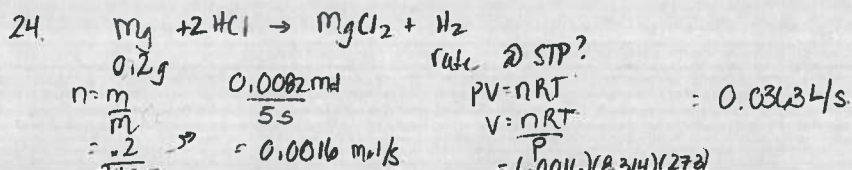
1. How many carbon atoms are in the molecule 2,3-diethylhexanol? __10__ (2x2)+6

2. Which molecule will have a higher boiling point (ethanol) or methyl methanoate? Circle Correct Answer   ~~2~~ ~~6~~   alcohol   vs   ester

3. Butanal will be oxidized to __butanoic acid__

4. What type of intermolecular forces exist for 2-propanone? __dipole-dipole__

5. 1,2-dichlorobenzene can also be named __ortho-dichlorobenzene__

6. When electrons fall from an excited state back to energy level 2 the energy produced is __visible light__

7. If l=2 what orbital is the electron in? __d-orbital__   0=s l=1,p l=2-d, l=3-f

8. What is the m_l value for the valence electron in Tungsten? __+1__   n,l, m_l, m_s

9. When do the orbitals of the same energy level have the same amount of energy? __1 electron system__

10. What is the m_s value for the valence electron in Calcium? __$-\frac{1}{2}$__

11. What is the molecular shape for BrF_5? __square pyramidal__   6x7=42

12. Is BrF_5 (polar) or non polar? Circle   assuming bonds are polar

13. How many lone pairs are in the molecule $TeCl_4$? __1__   Te = 6 + (4x7) = 34

14. What is the VSEPR notation for a molecule that is trigonal pyramidal? __AX_3E__

15. What are the bond angles for XeF_4? __90°__ (square planar) 8+4x7= 36

16. What type of intermolecular forces exist between water and NaCl? __- ion-dipole__   polar   ion

17. $\Delta E_{universe}$ = __∅__

18. What is ΔH_f for chlorine gas? __∅__

19. Write the formation reaction for propane. __$3\ C_{(s)} + 4\ H_{2(g)} \rightarrow C_3H_{8(g)}$__ (make 1 mol)

20. If the formation of HI has a ΔH_f = +25.9kJ, is this reaction (endo)thermic or exothermic? Circle

21. Determine the ΔH if 5 mol of HI is formed. __+ 129.5 KJ__

22. How much heat is absorbed by 5kg of glass if the temp increases 50°C? __+ 210 KJ__   Q=mcΔT =(5000)(0.84)(50) =

23. Determine the enthalpy change if 5g of MgO is dissolved in 85ml of water and the temp increases by 40° C. __ΔH_{rxn} = - 114.6 KJ/mol MgO__   Q= mcΔT =(85)(4.184)(40) =+ 142.25kJ Q_{rxn}= -Q_{soln} = - 14.22 KJ n_{MgO} = 5g/(40.304) = 0.124 mol Q_{rxn} = -14/.124

24. If 0.2g of magnesium dissolves in HCl in 5 seconds, what is the rate of formation of $H_{2(g)}$ at STP? __0.036 L/s__

25. If the rate law for a reaction is determined to be; rate = $k[A]^2[B]^2$ the overall order is __4th__

26. What are the units for the rate constant for the previous question? __$L^3/mol^3 \cdot s$__

27. How will a catalyst affect activation energy? __lowers Ea w̄ a different mechanism__

28. The individual reactions in a mechanism are called? __elementary steps__

29. If ΔH for a reaction is -160kJ, and the activation energy is 25kJ, what is the activation energy for the reverse reaction? __+ 185 KJ__

30. Does the activation energy of a reaction change when a reaction is heated? __NO!__

24. Mg + 2HCl → MgCl₂ + H₂
    0.2g
    n=m/m
    = .2/24
    0.0082 mol / 5s
    = 0.0016 mol/s
    rate @ STP?
    PV=nRT
    V= nRT/P
    = (.0016)(8.314)(273)
    : 0.0363 L/s

SCH 4UI Exam Prep Quicks Take 2

1. A sealed bottle of pop contains carbonic acid, which dissociates forming carbon dioxide gas. Is this reaction at equilibrium? (Yes) or **No**

2. An iceberg in the ocean shrinks due to sublimation. Is this reaction at equilibrium? **Yes** or (No)

3. Write the synthesis reaction for the formation of nitrogen monoxide, Write the K_{eq} expression. _____ $\dfrac{[NO]^2}{[N_2][O_2]}$

   $N_2 + O_2 \rightarrow 2NO$

4. The concentration of hydrogen sulphide at equilibrium is 0.6M, if the products are hydrogen gas and sulphur gas, S_2, both with a concentration of 0.15M at equilibrium determine K_{eq} for reaction. _0.0375_

   $H_2S \leftrightarrows H_2 + S$
   .6   .15 .15

5. For the synthesis reaction of hydrogen iodide, determine the concentration of hydrogen gas at equilibrium, if the initial concentration of hydrogen gas is 2.0M and the concentration of hydrogen iodide at equilibrium is 3.4M.
   ___128.4___

   $H_2 + I_2 \leftrightarrows 2HI$
   2.0

6. If Keq value is large which side of a reaction is favoured? __prod.__

7. If K_{eq} for a reaction is 3.4×10^{-4} and Qeq is calculated to be 5.0×10^{-6}, which direction will the reaction shift to obtain equilibrium? ____right____ $K_{eq} > Q_{eq}$

   Given $N_2O_{4(g)} \xrightarrow{+heat} 2\,NO_{2(g)}$ $\Delta H = +59$ kJ/mol, which direction with the reaction shift if

8. Pressure increases? ____Left____

9. The temperature decreases? ____Left____
   low ⁄ high

10. How will the Keq value change for question 9? ___decrease___

11. Acids taste sour? (True) or **False**

12. Bases turn pink in the presence of phenolphthalein. (True) or **False**

13. What is the conjugate base for HSO_4^-? ___ SO_4^{2-} ___
    Acid.

14. Determine the concentration of hydroxide ions if the pH = 6.4. ___2.5×10^{-8} M___
    OH^-

15. What is the concentration of hydronium ions in water at 25° C? ___1.0×10^{-7} M___

16. Determine Kb for the conjugate base if Ka is 8.5×10^{-4}. ___1.18×10^{-11}___

17. Write the chemical reaction for the second dissociation of H_3PO_4. ___$H_2PO_4^- + H_2O \leftrightarrows HPO_4^{2-} + H_3O^+$___

18. Write the Ksp expression for silver sulphide. $K_{sp} = [Ag^+]^2[S^{2-}]$ $Ag_2S \leftrightarrows 2Ag^+ + S^{2-}$

19. What is the molar solubility for magnesium sulphate, Ksp = 5.9×10^{-3}? ___0.0768 M___
    $MgSO_4 \leftrightarrows Mg^{2+} + SO_4^{2-}$
    $5.9\times10^{-3} = x^2$

20. An increase in the presence of a common ion will, **Increase** or (Decrease) solubility? Circle

21. If Qsp is greater than Ksp, will a precipitate form? (Yes) or **No**? Circle

22. What is the oxidation number for Cr in $Cr_2O_7^{2-}$? ___+6___
    $^{-2}$ $^{-14}$

23. How many water molecules are required to balance $ClO_4^- \rightarrow Cl^-$ under acidic conditions? ___4___

24. If the following half reaction occurs, $NO_2 \rightarrow NO_3^-$, NO_2 is acting as a __reducing__ agent
    $^{+5}$ $^{--2/-6}$

⭐ 25. Given $Mn_3O_4 + Al \rightarrow Al_2O_3 + Mn$, Which substance makes up the anode? ___Alum.___
    $^{-2}$ ^{0} $^{+3}$ $^{L\text{-}0.}$ $+4 \rightarrow +5$ ↑ oxid.

26. Write the galvanic cell notation for the reaction in the previous question. $Al\,|\,Al^{+3}\,||\,Mn\,|\,Mn^{+2}$

27. Calculate the E°cell for the previous question. ___$3.17V$___ -1.66 $MnO_4^- \leftrightarrows Mn^{+2}$

28. Is the above reaction spontaneous? ___Yes.___   1.51

29. In what type of cell is a battery required? ___electrolytic.___ $E° = cat - an$
    $= 1.51 - (-1.66)$

30. Which substance is the best oxidizing agent? ___$F_2(g)$___ $E° = +2.87V$ $= +3.17V$
    highest reduced element

$N_2 + O_2 \rightarrow 2NO$

$H_2 + I_2 \leftrightarrows 2HF$
2.0   2.0   —
$-x$ $-x$ $+2x$
2.0-x 2-x $+2x$
2.0-1.7 ( )   = 3.4
= 0.3   (0.3)   ∴ x=1.7

$K_{eq} = \dfrac{[HF]^2}{[H_2][F_2]}$
$= \dfrac{(3.4)^2}{(0.3)^2}$
$= 128.4$