

November, 2019
NEW TRIER TRYOUT

H_2SO_4 : 2
Asher and Eric: 0

KEY: Chem Lab C

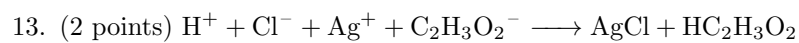
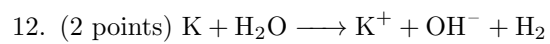
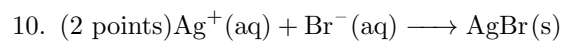
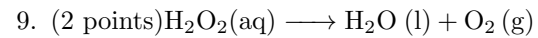
Written by: Asher Noel

Directions:

Unless otherwise stated, each question is worth one point. Do not give partial credit.

Answer Key A: Section 1-3

1. Supersaturated
2. (2 points) $s = (K_{sp}/256)^{1/5}$
3. Colligative: depend only on the solute, not the (+1). Solubility varies with identity (+1).
4. The dissolution of gases is exothermic (+1). In accord with Le'Chatelier's principle, the reaction will be shifted to the left (+1).
5. (2 points) Freezing temperature of the solute
6. (2 points) 24g
7. (a) 3.4 mmol kg-I (+1) (b) 34 mmolkg-I (+1)
8. (2 points) 6.4e3 kPa
9. (2 points) 1.3e2 kPa
1. 178 g/mol
2. -0.077C
3. 18cc
4. Clear(+0.5), Green(+0.5), Purple (+1)
5. Solution in which the solvent is water
6. 2
7. $A = \epsilon lc$ where ϵ = molar absorptivity, l = length of solution, and c = concentration of solution
8. $[\text{Ni}(\text{H}_2\text{O})_6]_2^+$
9. H_2O
10. Octahedral
11. 0.0015 M
12. 0.00003
13. 0.003%
14. 30,000
1. a: 1:1 (+1), b: 0.7358 (+1)
2. 0.320
3. mixture (+0.5) of substances with lower melting point than any of constituents. (+0.5)
4. Colloid (+1), it stays mixex with water and does not settle (like a suspension would) (+1)
5. (2 points) $\text{PBr}_3(\text{l}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{H}_3\text{PO}_3(\text{aq}) + \text{H}_3\text{O}^+(\text{aq}) + \text{Br}^-(\text{aq})$
6. (2 points) $\text{Ni}^{2+}(\text{aq}) + \text{H}_2\text{S}(\text{aq}) \longrightarrow \text{NiS}(\text{s}) + \text{H}^+(\text{aq})$
7. (2 points) $\text{Pb}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) \longrightarrow \text{PbSO}_4(\text{s})$
8. (2 points) $\text{PbCO}_3(\text{s}) + \text{H}_3\text{O}^+(\text{aq}) + \text{Br}^-(\text{aq}) \longrightarrow \text{PbBr}_2(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$



Answer Key B: Sections 4-6

1. 5.3
2. 4.1
3. 0.5
4. 9.03
5. 5.35
6. 5.47
7. .02
8. yes (+0.5)
9. yes (+0.5)
10. no (+0.5)
11. no (+0.5)
12. 4.53
13. 4.5
14. 0.756gNaOH
 1. (2 points) 0.07048M
 2. 7.98
 3. 4.28
 4. 0.0667M
 5. 8.10
 6. 11.80
 7. (2 points) $\text{pH} = -\log \frac{\sqrt{(Ka)^2 + 4(Ka)[A]} - Ka}{2}$
 8. (2 points) $\text{pH} = -\log Ka - \log \frac{[A]Va - [B]Vb}{[B]Vb}$
 9. (5 points) $\text{pH} = 14 + \log \frac{\sqrt{(Kw/Ka)^2 + 4(Kw/Ka)(\frac{[A][B]}{[A]+[B]})} - Kw/Ka}{2}$
 10. (3 points) $\text{pH} = 14 + \log \frac{[B]Vb - [A]Va}{Va + Vb}$
 1. 7.425
 2. 2.7
 3. Co
 4. All lewis acids (+2 points if all correct, +1 point if 1 incorrect)
 5. Lewis acid: BH_3
 6. 2N
 7. (2 points) 4.5e-6