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JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
Dept of Chemical Sciences, 1st Exam, Analytical Chemistry
Chem. 233, October 18, 2012

الاسم:----------الرقم الجامعي:----------الشعبة:---------- التسلسل:----------
----------الدكتور:----------

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

1. Which of the following statements is not correct regarding activity coefficient?
A. It approaches unity for very dilute solution ($\mu=0$)
B. Activity coefficient of Na^+ increases as ionic strength of solution decreases.
C. For a solution of $\mu=0.01$, activity coefficient of Ca^{2+} is larger than Na^+.
D. It equals unity for neutral species.

2. The ionic strength of 0.05 M $MgCl_2$ is:
A) $\mu=0.05$ M B) $\mu=0.10$ M C) $\mu=0.15$ M D) $\mu=0.30$ M

3. Considering correct significant figures, the pH of 0.025 M HCl is -------, and $[H^+]$ for a solution having pH= 5.50 is ----------.
A. 1.60, 3.2×10^{-6} B) 2.60, 3.2×10^{-7} C) 1.6, 3.16×10^{-6} D) 1.06, 0.74

4. In an aqueous solution containing CrO_4^{2-}, Br^- and Cl^-. The precipitation order with gradual addition of Ag^+ is: (K_{sp} (AgBr)= 5.0×10^{-13}; K_{sp} (Ag_2CrO_4) = 1.2×10^{-12} & K_{sp} (AgCl)=1.8×10^{-10})
A) AgCl, Ag_2CrO_4 then AgBr B) AgBr, Ag_2CrO_4 then AgCl
C) AgBr, AgCl then Ag_2CrO_4 D) Ag_2CrO_4, AgBr then AgCl

5. Which of the following statements is correct?
A) Precision is the degree of agreement between measured value & true value
B) F- test examines agreement between two standard deviations.
C) Confidence limits & t- test assumed that only systematic error is present
D) ppm = ng/ g

6. How many grams of 85 wt % NaOH (40g/mol) are required to prepare 500 mL of solution of 0.10 M NaOH?
A) 4.0 g B) 40.0 g C) 2.35 g D) 4.70 g

7. How many mLs of 0.10 M $BaCl_2$ are required to precipitate the sulfate In a solution containing 0.142 g Na_2SO_4 (142 g/mol) and giving 10 % excess?
$Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$ (s)
A) 11.0 mL B) 10.0 mL C) 12.0 mL D) 13.0 mL

8. The width of confidence interval increases, if standard deviation ------- and confidence level ----------.

A) Increases, increases B) Decreases, decreases
C) Increases, decreases D) Decreases, increases

9. Which statement is not correct about "comparison between two means"?

A) Two sets of replicates are obtained by two different methods.
B) It is not necessary that N1 equals N2.
C) Tabulated "t" is calculated at N1+N2-2 degrees of freedom.
D) The true value must be known.

10. A 500 mL solution was prepared by dissolving 0.05 mol of NaCl and 0.05 mol of Na_2SO_4. What is the molarity of Na^+ in this solution?

A. 0.15 M B) 0.30 M C) 0.45 M D) 0.60 M

11. Consider the following set of five replicates; for wt % of sulfur 3.45, 3.29, 3.22, 3.30, and 3.23. If the replicate 3.45 is questionable; after applying Q-test or Grubs test, the average and standard deviation of these replicates are: (Q(table)= 0.630 , G(table)= 1.60)

A. 3.298, 0.092 B. 3.260, 0.041 C. 3.288, 0.072 D. 3.240, 0.082

12. If 42.68 mg of $H_2C_2O_4$ (90g/mol) is required to completely react with 32.6 mL of MnO_4^- , according to following equation. What is the molarity of MnO_4^- solution?

$$5H_2C_2O_4 + 2MnO_4^- + 6H^+ \rightarrow 2Mn^{+2} + 8H_2O + 10\,CO_2$$

A) 5.82×10^{-3} M B) 3.82×10^{-3} M C) 3.12×10^{-3} M D) 0.0116 M

13. How many mgs of K_2SO_4 (174.2g/mol) are required to prepare 250 mL solution of 100 ppm K^+ (39.1 g/mol)?

A) 111.38 mg B) 222.8 mg C) 55.69 mg D) 5.73 mg

14. Consider the following equilibrium constants: $H_2O \leftrightarrow H^+ + OH^-$ K1= 1.0×10^{-14} and $HA \leftrightarrow H^+ + A^-$ K2= 1.8×10^{-5}. Calculate the equilibrium constant (K) for the reaction: $A^- + H_2O \leftrightarrow HA + OH^-$

A) 5.56×10^{-20} B) 1.8×10^{-5} C) 1.0×10^{-14} D) 5.56×10^{-10}

15. What is the solubility of $PbCl_2$ in saturated solution of H_2O ? ($k_{sp}= 1.7 \times 10^{-5}$)

A) 0.0162 M B) 0.0075 M C) 0.0041 M D) 0.0013 M

16. A 100 mg sample was found to contain 0.0053 µg Hg. The concentration of Hg in ppb is:

A) 5.3×10^{-5} ppb B) 5.3×10^{-2} ppb C) 53 ppb D) 530 ppb

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2. The ionic strength of 0.10 M $MgCl_2$ is:
A) μ=0.05 M B) μ=0.10 M C) μ=0.15 M D) μ=0.30 M

3. Considering correct significant figures, the pH of 0.0025 M HCl is -------, and $[H^+]$ for a solution having pH= 6.50 is ----------.
A. 1.60, 3.2×10^{-6} B) 2.60, 3.2×10^{-7} C) 1.6, 3.16×10^{-6} D) 1.06, 0.74

4. In an aqueous solution containing CrO_4^{2-}, Br^- and Cl^-. The precipitation order with gradual addition of Ag^+ is: (K_{sp} (AgBr)= 5.0×10^{-13}; K_{sp} (Ag_2CrO_4) = 1.2×10^{-12} & K_{sp} (AgCl)=1.8×10^{-10})
A) AgCl, Ag_2CrO_4 then AgBr B) AgBr, AgCl then Ag_2CrO_4
C) AgBr, Ag_2CrO_4 then AgCl D) Ag_2CrO_4, AgBr then AgCl

5. Which of the following statements is correct?
A) Accuracy is the degree of agreement between measured value & true value
B) F- test examines agreement between two means.
C) Confidence limits & t- test assumed that only systematic error is present
D) ppm = ng/ g

6. How many grams of 85 wt % NaOH (40g/mol) are required to prepare 500 mL of solution of 0.20 M NaOH?
A) 4.0 g B) 40.0 g C) 2.35 g D) 4.70 g

7. How many mLs of 0.10 M $BaCl_2$ are required to precipitate the sulfate In a solution containing 0.142 g Na_2SO_4 (142 g/mol) and giving 20 % excess?
$Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$ (s)
A) 11.0 mL B) 10.0 mL C) 12.0 mL D) 13.0 mL

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10. A 500 mL solution was prepared by dissolving 0.10 mol of NaCl and 0.10 mol of Na_2SO_4. What is the molarity of Na^+ in this solution?

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12. If 42.68 mg of $H_2C_2O_4$ (90g/mol) is required to completely react with 16.3 mL of MnO_4^- , according to following equation. What is the molarity of MnO_4^- solution?

$$5H_2C_2O_4 + 2MnO_4^- + 6H^+ \rightarrow 2Mn^{+2} + 8H_2O + 10\,CO_2$$

A) 5.82×10^{-3} M B) 3.82×10^{-3} M C) 3.12×10^{-3} M D) 0.0116 M

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A) 111.38 mg B) 222.8 mg C) 55.69 mg D) 5.73 mg

14. Consider the following equilibrium constants: $H_2O \leftrightarrow H^+ + OH^-$ K1= 1.0×10^{-14} and $A^- + H_2O \leftrightarrow HA + OH^-$ K2= 5.56×10^{-10}. Calculate the equilibrium constant (K) for the reaction: $HA \leftrightarrow H^+ + A^-$

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