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JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
Dept of Chemical Sciences, 1st Exam, Analytical Chemistry
Chem. 233, March 10, 2013

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

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

1. What is the pH of 0.025 M HCl solution with correct significant figures?
A) 1.6 B) 1.60 C) 1.602 D) 2.602

2. Which statement is correct regarding the ionic strength of 0.05 M $AlCl_3$ solution is:
A. It is independent on its concentration.
B. It is smaller than its concentration.
C. It is six times of its concentration.
D. It is smaller than in 0.20 M NaCl solution.

3. With correct significant figures, calculate the answer of following mathematical formula
$(12.56 \pm 0.05)/ (1.05 \pm 0.03)$
A) 11.96 ± 0.03 B) 12.0 ± 0.03 C) 11.96 ± 0.34 D) 12.0 ± 0.34

4. In which of the following solutions Ag_2CrO_4 has the lowest solubility?.
$K_{sp}\,(Ag_2CrO_4) = 1.2 \times 10^{-12}$
A) 0.01 M $AgNO_3$ B) 0.01 M K_2CrO_4 C) 0.05 M $NaNO_3$ D) 0.10 M KNO_3

5. Which of the following statements is not correct?
A) Accuracy 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) Error is the absolute difference between measured value and true value.

6. How many grams of 85 wt % H_3PO_4 (98.0 g/mol) are required to prepare 500 mL of solution of 0.10 M H_3PO_4?
A) 8.65 g B) 7.10 g C) 5.00 g D) 5.76 g

7. How many mLs of 0.10 M NaI are required to precipitate the lead in a solution containing 0.001 mol Pb^{2+} and giving 20 % excess?
$Pb^{2+} + 2I^- \rightarrow PbI_2\,(s)$
A) 10.0 mL B) 11.0 mL C) 22.0 mL D) 24.0 mL

8. Activity coefficient of M^{n+} in a solution always increases if ionic strength of solution ------- and charge (n) of M^{n+} ----------.

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

9. Which statement is correct about "comparison between two means"?

A) Two sets of replicates are obtained by two different methods.
B) It is necessary that N1 equals N2.
C) Tabulated "t" is calculated at N1+N2-1 degrees of freedom.
D) The true value should be known.

10. What is the concentration of K^+ (39.1 g/mol) in part per million (ppm) in a 1.0×10^{-4} M K_2SO_4 (174.2 g/mol) solution?

A. 3.91 ppm B) 7.82 ppm C) 17.42 ppm D) 8.71 ppm

11. Consider the following set of five replicates; for wt % of iron 5.55, 5.34, 5.27, 5.30, and 5.28. If the replicate 5.55 is questionable; after applying Q-test, the average and standard deviation of these replicates are: (Q(table)= 0.690)

A. 5.30, 0.10 B. 5.35, 0.031 C. 5.30, 0.031 D. 5.35, 0.10

12. What mass (mg) of $K_2C_2O_4$ (166.2 g/mol) is required to completely react with 32.6 mL of 0.0116 M MnO_4^- , according to following equation?

$$5C_2O_4^{2-} + 2MnO_4^- + 16H^+ \rightarrow 2Mn^{+2} + 8H_2O + 10\ CO_2$$

A) 78.56 mg B) 62.8 mg C) 157.1 mg D) 43.2 mg

13. How many mgs of K_3PO_4 (212.3 g/mol) are required to prepare 250 mL solution of 100 ppm P_2O_5 (142 g/mol)?

A) 74.8 mg B) 37.4 mg C) 112.1 mg D) 212.3 mg

14. Consider the following equilibrium constants: $H_2O \leftrightarrow H^+ + OH^-$ K1= 1.0×10^{-14} and $F^- + H_2O \leftrightarrow HF + OH^-$ K2=1.47×10^{-11}. Calculate the equilibrium constant (K) for the reaction: $HF \leftrightarrow H^+ + F^-$

A) 1.47×10^{-11} B) 6.8×10^{-6} C) 1.0×10^{-14} D) 6.8×10^{-4}

15. What is the activity coefficient of OH^- ion in 0.010 M NaCl solution, given that the ion size α= 400 pm

A) 0.964 B) 0.901 C) 0.815 D) 0.77

16. The concentration of Cadmium (Cd) in soil sample is 250 ppb. How many grams of sample are containing 0.15 mg Cd:

A) 6.0 g B) 60 g C) 600 g D) 6000 g

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1. What is the pH of 0.0250 M HCl solution with correct significant figures?
A) 1.6 B) 1.60 C) 1.602 D) 2.602

2. Which statement is correct regarding the ionic strength of 0.005 M $AlCl_3$ solution is:
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C. It is five times of its concentration.
D. It is smaller than in 0.20 M NaCl solution.

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$(12.56 \pm 0.05)/ (1.05 \pm 0.03)$
A) 11.96 ± 0.03 B) 12.0 ± 0.34 C) 11.96 ± 0.34 D) 12.0 ± 0.03

4. In which of the following solutions Ag_2CrO_4 has the lowest solubility?.
$K_{sp}\,(Ag_2CrO_4) = 1.2 \times 10^{-12}$
A. 0.01 M $AgNO_3$ B) 0.01 M K_2CrO_4 C) 0.05 M $NaNO_3$ D) 0.10 M KNO_3

5. Which of the following statements is correct?
A) Accuracy is the degree of agreement between replicates of a measurement
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6. How many grams of 85 wt % H_3PO_4 (98.0 g/mol) are required to prepare 500 mL of solution of 0.15 M H_3PO_4?
A) 8.65 g B) 7.10 g C) 5.00 g D) 5.76 g

7. How many mLs of 0.10 M NaI are required to precipitate the lead in a solution containing 0.001 mol Pb^{2+} and giving 10 % excess?
$Pb^{2+} + 2I^- \rightarrow PbI_2\,(s)$
A) 10.0 mL B) 11.0 mL C) 22.0 mL D) 24.0 mL

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10. What is the concentration of K^+ (39.1 g/mol) in part per million (ppm) in a 5.0×10^{-5} M K_2SO_4 (174.2 g/mol) solution?

A. 3.91 ppm B) 7.82 ppm C) 17.42 ppm D) 8.71 ppm

11. Consider the following set of five replicates; for wt % of iron 5.51, 5.38, 5.27, 5.30, and 5.28. If the replicate 5.55 is questionable; after applying Q-test, the average and standard deviation of these replicates are: (Q(table)= 0.690)

A. 5.30, 0.10 B. 5.35, 0.031 C. 5.30, 0.031 D. 5.35, 0.10

12. What mass (mg) of $K_2C_2O_4$ (166.2 g/mol) is required to completely react with 16.3 mL of 0.0116 M MnO_4^- , according to following equation?

$$5C_2O_4^{2-} + 2MnO_4^- + 16H^+ \rightarrow 2Mn^{+2} + 8H_2O + 10\ CO_2$$

A) 78.56 mg B) 62.8 mg C) 157.1 mg D) 43.2 mg

13. How many mgs of K_3PO_4 (212.3 g/mol) are required to prepare 250 mL solution of 50.0 ppm P_2O_5 (142 g/mol)?

A) 74.8 mg B) 37.4 mg C) 112.1 mg D) 212.3 mg

14. Consider the following equilibrium constants: $H_2O \leftrightarrow H^+ + OH^-$ K1= 1.0×10^{-14} and $HF \leftrightarrow H^+ + F^-$ K2=6.8×10^{-4}. Calculate the equilibrium constant (K) for the reaction: $F^- + H_2O \leftrightarrow HF + OH^-$

A) 1.47×10^{-11} B) 6.8×10^{-6} C) 1.0×10^{-14} D) 6.8×10^{-4}

15. What is the activity coefficient of OH^- ion in 0.050 M NaCl solution, given that the ion size α= 400 pm

A) 0.964 B) 0.901 C) 0.815 D) 0.77

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