Chem15, Fall 2016, SJCC, FinalTest Name KEY

Please read all the questions VERY carefully before answering. If you do not understand any question, please ask. Use the reverse side of the question paper as scratch. Use the periodic table and constant chart in the last page. No outside paper is allowed. Total points = 26+(31x3=)93=119

SHORT ANSWER. Please write the set-up equation and insert the raw data with units in the equation before doing your calculations. Write the word or phrase that best completes each statement or answers the question.

1) Calculate the mass (in grams) of 1.56×10^{21} atoms of oxygen (O_2). (6 pts.) 1) 0.0414 g O_2

$$1.56 \times 10^{21} \text{ atoms } O_2 \times \frac{1 \text{ mol } O_2}{(6.022 \times 10^{23})(2) \text{ atoms } O_2} \times \frac{32 \text{ g } O_2}{1 \text{ mol } O_2} = 0.0414 \text{ g } O_2$$

2) Calculate the molarity of a sulfuric acid (H_2SO_4) solution, when 1.178g of the acid is dissolved in water and diluted to a final volume of 25.0 mL. MW of H_2SO_4 = 98.1 g/mol (6 pts.) 2) 0.480 M

$$n_{H_2SO_4} = 1.178 \text{ g } H_2SO_4 \times \frac{1 \text{ mol } H_2SO_4}{98.1 \text{ g } H_2SO_4} = 0.01201 \text{ mol } H_2SO_4$$

$$V = 25.0 \text{ mL} \times \frac{1 \text{ L}}{10^3 \text{ mL}} = 0.025 \text{ L}$$

$$M = \frac{0.01201 \text{ mol}}{0.025 \text{ L}} = 0.4804 \text{ M} \Rightarrow 0.480 \text{ M}$$

3) Use a noble gas core to draw the ground state electron configuration for (4 pts./each; Total = 8 pts.) 3)

(a) Galium (Ga; Z=31): $[Ar]\ 4s^2\ 3d^{10}\ 4p^1$

(b) Strontiume (Sr, Z=38) $[Kr]\ 5s^2$

4) Calculate the pH of a solution where $[OH^-] = 3.0 \times 10^{-6}$ M. (6 pts.) 4) pH = 8.5

$$pOH = -\log(3.0 \times 10^{-6}) = 5.5$$

$$pH + pOH = 14$$

$$pH = 14 - pOH = 14 - 5.5 = \boxed{8.5}$$

MULTIPLE CHOICE. On scantron, fill up the circles of the same number as that of the question number. Choose the one alternative that best completes the statement or answers the question. (3 poins each)

5) How many moles of ions are present in a 1-L 0.20 M solution of $MgCl_2(aq)$? 5) A/B

(a) 0.20 moles of ions (c) 0.40 moles of ions

(b) 0.60 moles of ions (d) 0.80 moles of ion

A) B) C) D)

6) How many moles of $AgNO_3$ are needed to prepare 100.0 mL of 0.250 M solution? 6) C

(a) 0.250 moles (c) 0.0250 moles

(b) 0.100 moles (d) 0.0100 moles

$0.100\ \cancel{L} \times \frac{0.250\ mol}{1\ \cancel{L}} = 0.025\ mol$

A) B) C) D)

7) How can one safely draw solutions into a pipette? 7) C

(a) Solutions can be drawn by covering the pipette with your mouth and drawing up the solutions.

(b) Solutions can be drawn by using your hand to cover the opening of the pipette and then drawing up the solutions with your mouth over the hand.

(c) Solutions can be drawn by using a pipette bulb that has been mostly emptied of air and drawing solutions up by pressure differential.

(d) Solutions can be drawn by using a straw attached to the mouth of the pipette and sucking on the straw to draw solutions up.

A) B) C) D)