

UNIVERSITY OF BAHRAIN
CHEMISTRY 101
SECOND HOUR EXAMINATION

30th July, 2005
Time : 60 min.

Examiners: *Drs. M. Al-Arab, A. Saad,*
Saeed & A. Taha

Name _____ I.D. # _____ Sec. _____

Circle the letter of the one correct answer. A double page of foolscap paper is provided for calculations but only the circled answers on this exam copy will be graded. Each question is worth one(1) point. Check that your paper has (13) questions.

1 atm = 760 mmHg = 760 torr, N = 6.022 x 10²³ T(K) = °C + 273.15
--

MULTIPLE CHOICE :

Q.1. The net ionic equation between Potassium Phosphate and Calcium Nitrate will be :

- a. $3\text{Ca}^{2+}(\text{aq}) + 2\text{PO}_4^{3-}(\text{aq}) \rightarrow \text{Ca}_3(\text{PO}_4)_2(\text{s})$
- b. $\text{K}^+(\text{aq}) + \text{NO}_3^-(\text{aq}) \rightarrow \text{KNO}_3(\text{s})$
- c. $2\text{Ca}^{2+}(\text{aq}) + 3\text{PO}_4^{3-}(\text{aq}) \rightarrow \text{Ca}_2(\text{PO}_4)_3(\text{s})$
- d. $3\text{K}^+(\text{aq}) + 3\text{NO}_3^-(\text{aq}) \rightarrow 3\text{KNO}_3(\text{s})$
- e. $\text{Ca}^{2+}(\text{aq}) + \text{PO}_4^{3-}(\text{aq}) \rightarrow \text{CaPO}_4(\text{s})$

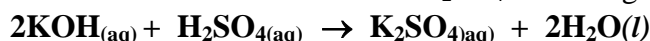
Q.2. Which of the following processes will likely result in a precipitation reaction?

- a) Mixing a NaNO_3 solution with a CuSO_4 .
- b) Mixing BaCl_2 solution with a K_2SO_4 solution.
- c) Mixing KOH solution with HNO_3 solution.
- d) Mixing HCl solution with NaOH solution.
- e) Mixing NaCl with $\text{Ca}(\text{OH})_2$ solution

Q.3. What is the net ionic equation for the reaction of Lithium Hydroxide (LiOH) with Hydroiodic Acid (HI) ?

- a. $\text{H}^+ + \text{I}^- \rightarrow \text{HI}(\text{s})$
- b. $\text{Li}^+ + \text{I}^- \rightarrow \text{LiI}(\text{s})$
- c. $\text{LiOH}(\text{aq}) + \text{HI}(\text{aq}) \rightarrow \text{LiI}(\text{s}) + \text{H}_2\text{O}$
- d. $\text{Li}(\text{OH})_2(\text{s}) + \text{H}^+(\text{aq}) \rightarrow \text{Li}^+(\text{aq}) + \text{H}_2\text{O}$
- e. $\text{OH}^-(\text{aq}) + \text{H}^+(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$

Q.4. 40 ml of KOH is needed to neutralise 50 ml of 0.2 M of H₂SO₄ according to the equation



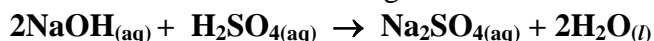
What is the molarity of KOH solution?

- a. 0.5 M b. 1.0 M c. 1.5 M d. 2.0 M e. 2.5 M

Q.5. 4 grams of an alloy contains Pb is treated with excess of HCl to give 3.8 g of PbCl₂. What is the percentage of Pb in the alloy?

- a. 12.3 % b. 80.7 % c. 5.6 % d. 6.8 % e. 70.8 %

Q.6. The volume of 0.1 M H₂SO₄ needed to neutralize 0.8 gram NaOH is :



- a. 50 ml b. 100 ml c. 150 ml d. 125 ml e. 75 ml

Q.7. A gas that initially occupies 75.32 L undergoes a change so that its new pressure is 9.69 atm and its new volume is 64.50 L. what is its initial pressure? (suppose that the temperature and number of moles remain constant).

- a. 26.30 atm b. 11.16 atm c. 34.84 atm d. 8.30 atm e. 46.03 atm

Q.8. 7.05 g of an unknown gas occupy 1500 ml at 38.5°C and 1.5 atm. Identify the gas.

- a. HCl b. O₂ c. O₃ d. SO₂ e. SO₃

Q.9. A sample of gas occupies a volume of 450 mL at 740 mm Hg and 16°C. What will be the volume of the gas at STP?

- a. 0.347 L b. 0.388 L c. 0.414 L d. 0.506 L e. 0.570 L

Q.10. A balloon is filled with helium (He) gas to a volume of 4.80 L at 45°C. What will the **volume** be if the balloon is cooled to - 80°C. (Suppose the pressure and number of moles remain constant).

- a. 8.40 L b. 6.00 L c. 0.375 L d. 4.80 L e. 2.91 L

Q.11. A sample of natural gas contains 131.81 g methane (CH₄), 12.63 g ethane (C₂H₆) and 5.104 g propane (C₃H₈) . If the total pressure of the gases is 1.37 atm, what is the partial pressure of C₂H₆ gas?

- a. 0.0436 b. 0.0658 c. 0.0181 d. 0.0938 e. 0.0281

Q.12. The density of a gas is 1.50 g/L at 2.0 atm at 35.5°C. What is its density at 45.5°C and 3.8 atm.

- a. 4.62 g/L b. 2.76 g/L c. 5.50 g/L d. 7.53 g/L e. 9.95 g/L

Q.13. Given : $\text{MgCO}_3(\text{s}) \rightarrow \text{MgO}(\text{s}) + \text{CO}_2(\text{g})$.

CO₂ gas was collected over water at a total pressure of 1.0 atmosphere. If the volume of the gas collected was 0.326 L, what is the mass of MgCO₃ used ? (vapor pressure of water at 20° C = 18 mmHg)

- a. 1.11 g b. 1.34 g c. 1.56 g d. 1.84 g e. 1.96 g

