

UNIVERSITY OF BAHRAIN
CHEMISTRY 101
SECOND HOUR EXAMINATION

29th November, 2005

*Examiners: Drs. Saeed, Osama, Saad,
Sadeq, Awatef, Reema, Layla
Saleem, Salim, A. Taha & Jameela*

Time : 70 min.

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 (15) questions.

$1 \text{ atm} = 760 \text{ mmHg}, K = ^\circ\text{C} + 273.15, R = 0.0821 \text{ L.atm/K.mol}$

MULTIPLE CHOICE :

Q.1. Write the net ionic equation between HF and Ca(OH)₂.

- a. $\text{HF}_{(\text{aq})} + \text{OH}^{-}_{(\text{aq})} \longrightarrow \text{F}^{-}_{(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$
- b. $2\text{F}^{-}_{(\text{aq})} + \text{Ca}(\text{OH})_{2(\text{aq})} \longrightarrow \text{CaF}_{2(\text{aq})} + 2\text{OH}^{-}_{(\text{aq})}$
- c. $\text{H}^{+}_{(\text{aq})} + \text{OH}^{-}_{(\text{aq})} \longrightarrow \text{H}_2\text{O}_{(\text{l})}$
- d. $2\text{F}^{-}_{(\text{aq})} + \text{Ca}^{2+}_{(\text{aq})} \longrightarrow \text{CaF}_{2(\text{aq})}$
- e. $2\text{HF}_{(\text{aq})} + \text{Ca}(\text{OH})_{2(\text{aq})} \longrightarrow \text{CaF}_{2(\text{aq})} + 2\text{H}_2\text{O}_{(\text{l})}$

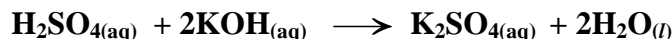
Q.2. The net ionic equation of the precipitation reaction between Ba(NO₃)₂ and Na₂SO₄ is :

- a) $\text{Ba}^{2+}_{(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \longrightarrow \text{BaSO}_{4(\text{s})}$
- b) $\text{Ba}(\text{NO}_3)_{2(\text{aq})} + \text{Na}_2\text{SO}_{4(\text{aq})} \longrightarrow \text{BaSO}_{4(\text{s})} + 2\text{NaNO}_{3(\text{aq})}$
- c) $2\text{NO}_3^{-}_{(\text{aq})} + \text{Na}_2\text{SO}_{4(\text{aq})} \longrightarrow \text{SO}_4^{2-}_{(\text{aq})} + 2\text{NaNO}_{3(\text{aq})}$
- d) $\text{Ba}(\text{NO}_3)_{2(\text{aq})} + \text{SO}_4^{2-}_{(\text{aq})} \longrightarrow \text{BaSO}_{4(\text{s})} + 2\text{NO}_3^{-}_{(\text{aq})}$
- e) $2\text{NO}_3^{-}_{(\text{aq})} + 2\text{Na}^{+}_{(\text{aq})} \longrightarrow 2\text{NaNO}_{3(\text{aq})}$

Q.3. 1.338 g of an ionic compound containing hydroxide ion (OH⁻) is treated with excess of Fe(NO₃)₃ solution. If the mass of precipitate [Fe(OH)₃] formed was 1.96 g. What is the percentage of oxygen (O) in the compound?

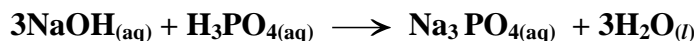
- $\text{Fe}^{3+}_{(\text{aq})} + 3(\text{OH}^{-})_{(\text{aq})} \rightarrow \text{Fe}(\text{OH})_{3(\text{s})}$
- a. 19.4%
 - b. 36.8%
 - c. 42.8%
 - d. 58.9%
 - e. 65.8%

Q.4. What volume of 0.196 M of H_2SO_4 is needed to neutralize 54.4 ml of 0.3M of KOH?



- a. 25.3 ml b. 13.6 ml c. 35.4 ml d. 8.3 ml e. 41.6 ml

Q.5. 19.9 ml of NaOH solution was needed to neutralise 5.4 g of H_3PO_4 .



What is the molarity of NaOH?

- a. 1.8 M b. 2.6 M c. 3.8 M d. 5.4 M e. 8.3 M

Q.6. 502 ml of a gas was heated to 150°C so its final volume was 840 ml. What was its initial temperature? (assuming the pressure and number of mole remain constant).

- a. -10.5°C b. -20.3°C c. 5.5°C d. -147.1°C e. 32.5°C

Q.7. A gas sample was initially at -131.3°C and 480 mmHg was cooled to 23.4°C . What is its new pressure? (volume and number of moles are constant)

- a. 1.32 atm b. 0.52 atm c. 0.93 atm d. 2.63 atm e. 4.60 atm

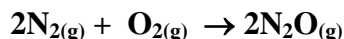
Q.8. The density of a gas is 4.86 g/L at 5.37 atm. What will the density be at 5.9 atm? (Assuming the temperature remains constant).

- a. 12.30 g/L b. 8.62 g/L c. 9.75 g/L d. 6.67 g/L e. 5.34 g/L

Q.9. 0.2 g of an unknown gas occupy 58 ml at 30°C and 2.5 atm. Identify the gas.

- a. H_2S b. NO_2 c. N_2O d. SO_3 e. O_3

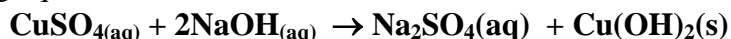
Q.10. Given :



What volume of $\text{N}_2\text{O}_{(\text{g})}$ can be obtained from reaction of 30 L of N_2 with 10 L of O_2 ?(at the same temperature and pressure)

- a. 10 L b. 30 L c. 20 L d. 15 L e. 25 L

Q.11. Given the following equation:



What volume of 0.333 M CuSO_4 solution will be required to react completely with 35.6 mL of 0.874 M NaOH?

- a) 16.8 mL b) 20.6 mL c) 26.7 mL d) 28.9 mL e) 46.7 mL

Q.12. A sample of gas occupies a volume of 450 mL at 740 mmHg and -36.7°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.13. A 15.0 L vessel contains 190 g of CO₂ gas. What is the pressure of the gas inside the vessel at 65.3°C?

- a. 5.0 atm b. 6.0 atm c. 7.0 atm d. 8.0 atm e. 9.0 atm

Q.14. Given : $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2(\text{g})$
If 10.9 g of KClO₃ were decomposed, how many liters (L) of O₂(g) can be collected at STP?

- a. 0.800 L b. 1.097 L c. 3.00 L d. 0.167 L e. 0.500 L

Q.15. A 5.71 g sample SX₆(g) has a volume of 0.94 L at 1 atm and 217.5°C. Identify X:

- a. Cl b. O c. N d. Br e. F