University of Bahrain
Department of Chemistry
CHEMY 101 (2nd Hour Exam)

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Name:---------- I.D. #---------- Section #----------

K= t(°C) + 273.15; 760 mm Hg= 1 atm
R= 0.0821 L.atm / Mol.K

Q.1. The **net ionic equation** between $Ba(OH)_2$ and HBr is

a) $OH^-_{(aq)} + H^+_{(aq)} \rightarrow H_2O_{(\ell)}$

b) $Ba(OH)_{2(aq)} + 2HBr_{(aq)} \rightarrow BaBr_{2(aq)} + 2H_2O_{(\ell)}$

c) $OH^-_{(aq)} + HBr_{(aq)} \rightarrow Br^-_{(aq)} + H_2O_{(\ell)}$

d) $Ba(OH)_2 + 2H^+_{(aq)} \rightarrow Ba^{++}_{(aq)} + 2H_2O_{(\ell)}$

e) $Ba^{++}_{(aq)} + 2Br^-_{(aq)} \rightarrow BaBr_{2(aq)}$

Q.2. The **net ionic equation** of precipitation reaction between $Pb(NO_3)_{2(aq)}$ and $HCl_{(aq)}$ is

a) $Pb(NO_3)_{2(aq)} + 2HCl_{(aq)} \rightarrow PbCl_{2(s)} + 2HNO_{3(aq)}$

b) $Pb^{++}_{(aq)} + 2HCl_{(aq)} \rightarrow PbCl_{2(s)} + 2H^+_{(aq)}$

c) $Pb^{++}_{(aq)} + 2Cl^-_{(aq)} \rightarrow PbCl_{2(s)}$

d) $Pb\ (NO_3)_{2(aq)} + 2Cl^-_{(aq)} \rightarrow PbCl_{2(s)} + 2NO^-_{3(aq)}$

e) $Pb(NO_3)_{2\ (aq)} + 2H^+_{(aq)} \rightarrow PbH_{2(s)} + 2NO^-_{3(aq)}$

Q.3. Which **list** contains only strong acids?

a) HCl, HNO_3, HF, $HClO_4$

b) H_2SO_4, H_3PO_4, $HClO_4$, NH_3

c) HCl, HNO_3, H_3PO_4, $HClO_4$

d) HCl, H_2SO_4, $HClO_4$, HI

e) HNO_3, H_2SO_4, $NaOH$, H_3PO_4

Q.4. 5 g of unknown compound contains sulfate $(SO_4)^{2-}$ is treated with excess of $Ba(NO_3)_2$ gives 1.32 g of $BaSO_4$ precipitate. What is the **% of Oxygen (O)** in the compound?

a) 7.25% b) 3.62% c) 12.3% d) 16.6% e) 25.3%

Q.5. What **volume** of 0.1 M of H_2SO_4 is needed to neutralize 25 ml of 0.05 M of NaOH

$$H_2SO_{4(aq)} + 2NaOH_{(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O$$

a) 12.0 ml b) 6.25 ml c) 14.3 ml d) 15.6 ml e) 24.8 ml

Q.6. 15 ml of 0.1 M of $HCl_{(aq)}$ neutralize 20 ml of an aqueous solution of $Ca(OH)_{2(aq)}$

$$Ca(OH_2)_{(aq)} + 2HCl_{(aq)} \rightarrow CaCl_{2(aq)} + 2H_2O_{(\ell)}$$

What is the **Molarity of $Ca(OH)_2$**

a) 0.25 M b) 0.012 M c) 0.0375 M d) 0.062 M e) 0.085 M

Q.7. 5.60 g of glucose $C_6H_{12}O_6$ was dissolved in 600 ml of H_2O
(density of H_2O = 1 g/ml)
(density of solution = 1.1 g/ml)
What is the **Molarity of the solution**?

a) 0.0563 M b) 0.324 M c) 0.684 M d) 0.123 M e) 0.784 M

Q.8. What is the **molality** of 0.5 M of Na_2CO_3 solution (density of solution= 1.2 g/ml)

a) 0.12 m b) 1.26 m c) 0.88 m d) 0.44 m e) 1.65 m

Q.9. What is the **mole fraction** of NaOH in a 36.6 % by mass of NaOH solution?

a) 0.102 b) 0.612 c) 0.206 d) 0.052 e) 0.036

Q.10. What is the **% by mass** of $NaNO_3$ in a 0.94 m solution?

a) 17.9% b) 16.9% c) 26.3% d) 35.4% e) 7.4%

Q.11. The volume of a gas is 841 ml at 62°C. What is **its volume** if it is heated to 84°C? (Suppose the pressure and no. of moles remains constant).

a) 896 ml b) 377 ml c) 958 ml d) 1020 ml e) 1103 ml

Q.12. The density of a gas is 1.6 g/L at 640 mm Hg and 35°C. What is its **density** at 1.1 atm and 28°C.

a) 4.2 g/L b) 2.14 g/L c) 6.4 g/L d) 3.6 g/L e) 8.9 g/L

Q.13. Given $2KClO_{3(s)} \xrightarrow{\Delta} 2\,KCl_{(s)} + 3O_{2(g)}$

What **volume of O_2** was obtained at 540 mm Hg and 30°C if 2.6 g of $KClO_3$ was used up?

a) 1.12 L b) 3.62 L c) 2.45 L d) 6.35 L e) 9.96 L

Q.14. Given

$$Br_{2(g)} + 3Cl_{2(g)} \rightarrow Br_2Cl_{6(g)}$$

What volume of $Br_2Cl_{6(g)}$ was obtained from 6L of Br_2 and 6L of Cl_2 if the two gas reacted at the same temperature and pressure?

a) 6L b) 2L c) 8L d) 10L e) 12L

Q.15. Given

$$NaHCO_{3(s)} + HCl_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(\ell)} + CO_{2(g)}$$

Suppose that 280 ml of CO_2 was obtained over water at 980 mm Hg. At **what temperature** the gas CO_2 exists if 0.012 mole of $NaHCO_3$ was dissolved. (Vapour pressure of H_2O at 28°C = 23.1 mm Hg)

a) 62.6°C b) 52.6°C c) 73.4°C d) 84.8°C e) 43.4°C