UNIVERSITY OF BAHRAIN
CHEMISTRY 101
SECOND HOUR EXAMINATION

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Examiners: ***Drs. Ameera, Awatif, Sadeq Al Alawi, Osama, Saad, Reema, Layla Saleem, Salim, A. Taha & Jameela***

Time : *60 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 ***(12)*** *questions.*

1 atm = 760 mmHg = 760 torr, N = 6.022×10^{23} T(K) = °C + 273.15

MULTIPLE CHOICE :

Q.1. The net ionic equation between Barium hydroxide $Ba(OH)_2$ and nitrous acid HNO_2 is :

a. $Ba(OH)_2 + 2HNO_{2(aq)} \rightarrow Ba(NO_2)_{2\,(aq)} + 2H_2O_{(aq)}$

b. $Ba^{2+}_{(aq)} + 2NO^{-}_{2\,(aq)} \rightarrow Ba(NO_2)_{2(aq)}$

c. $OH^{-}_{\,(aq)} + HNO_{2(aq)} \rightarrow H_2O_{(l)} + NO^{-}_{2\,(aq)}$

d. $OH^{-}_{\,(aq)} + H^{+}_{\,(aq)} \rightarrow H_2O_{(l)}$

e. $(OH^{-})_{2(aq)} + 2H^{+}_{(aq)} \rightarrow Ba^{2+}_{(aq)} + 2H_2O_{(l)}$

Q.2. The net ionic equation of the precipitation reaction between $SrCl_2$ and $CaSO_4$ is :

a) $SrCl_{2(aq)} + CaSO_{4(aq)} \rightarrow CaCl_{2(aq)} + SrSO_{4(s)}$

b) $Sr^{2+}_{(aq)} + SO^{2-}_{4(aq)} \rightarrow SrSO_{4(s)}$

c) $SrCl_2 + Ca^{2+} \rightarrow Sr^{2+}_{(aq)} + CaCl_{2(aq)}$

d) $SrCl_{2(aq)} + SO^{2-}_{4(aq)} \rightarrow SrSO_{4(s)} + 2Cl^{-}_{(aq)}$

e) $2Cl^{-}_{(aq)} + Ca^{2+}_{\,(aq)} \rightarrow CaCl_{2(aq)}$

Q.3. What volume of 0.375 M of HNO_3 are needed to neutralize 75.0 ml of 0.2 M of $Ca(OH)_2$

$$Ca(OH)_{2(aq)} + 2HNO_{3(aq)} \rightarrow Ca(NO_3)_2 + 2H_2O_{(l)}$$

a. 37.5 ml b. 48.5 ml c. 60.0 ml d. 70.0 ml e. 80.0 ml

Q.4. 140 ml of 0.8 M of H_2SO_4 are needed to neutralise 66.9 ml of NaOH. What is the molarity of NaOH.

$$\mathbf{2\ NaOH_{9aq)} + H_2SO_{4(aq)} \rightarrow Na_2SO_{4(aq)} + 2H_2O_{(l)}}$$

a. 1.52 M b. 2.36 M c. 6.03 M d. 3.35 M e. 4.45 M

Q.5. A gas was initially at 74 mmHg and 95°C; has a volume of 1500 ml undergoes a change so that its final volume and temperature are 1.06 L and 300 K. What is its final pressure.

a. 121 mmHg b. 50 mmHg c. 181 mmHg d. 85 mmHg e. 260 mmHg

Q.6. A gas container has a pressure of 1.86 atm at 12°C. What will be its pressure at a temperature of 35°C?

a. 0.51 atm b. 1.01 atm c. 1.51 atm d. 2.01 atm e. 2.51 atm

Q.7. The molarity of a solution made by dissolving 2.38 g of NH_4NO_3 in 12.1 ml of solution is :

a. 0.045 M b. 0.095 M c. 0.952 M d. 1.19 M e. 2.46 M

Q.8. The density of a gas at 1.5 atm and 60°C is 1.78 g/l. At what temperature the density will be 2.85 g/l at 5 atm.

a. 246.9 °C b. 420.3°C c. 120.8°C d. 73.6°C e. 90.9°C

Q.9. Given the reaction:

$$\mathbf{4NH_{3(g)} + 5O_{2(g)} \rightarrow 4NO_{(g)} + 6H_2O_{(g)}}$$

What volume of NO was obtained from the reaction of 100 L of NH_3 and 10.5 L of O_2 at the same temperature and pressure.

a. 10.0 L b. 6.40 L c. 4.50 L d. 8.40 L e. 3.20 L

Q.10. Which of the following is insoluble in water.

a. $Ca(OH)_2$ b. $CaCl_2$ c. $CaCO_3$ d. $NaNO_3$ e. Na_2SO_4

Q.11. 0.5662 g of an ionic compound containing bromide ion (Br^-) is dissolved in water and treated with excess $AgNO_3$. If the mass of AgBr precipitate is 0.5434 g. What is % Br in the compound.

a. 31.0 % b. 51.0 % c. 41.0 % d. 61.0 % e. 71.0 %

Q.12. What are the number of moles of O_2 in 22.4 L of O_2 gas at STP ?

a. 0.500 moles of O_2
b. 1.00 moles of O_2
c. 1.50 moles of O_2
d. 2.00 moles of O_2
e. 2.50 moles of O_2