Name:

Year 11 Chemistry
Acids and Bases Practice Test

Question 1

Carbonic Acid, H_2CO_3, is a diprotic acid.

(a) Write two equations to show the stages of its ionisation.

(b) Label the conjugate acid-base pairs in the equations above.

(c) State one substance from the equations above that is amphiprotic.

(d) Explain how H_2CO_3 is acting as an acid in one of the equations above.

Question 2

Potasium oxide, K_2O, is a base. Write its hydrolysis (reaction with water) equation and use this equation to explain why it is a base.

Question 3

(a) In the laboratory, an unknown white power is suspected to be either a metal or metal carbonate of some kind. When a small amount is added to hydrochloric acid (HCl), bubbles of gas are produced rapidly. Describe clearly the procedures you could use to identify the gas and hence rule out that it is either a metal or a metal carbonate.

(b) Write the equation for the reaction between hydrochloric acid (HCl) and magnesium metal (Mg).

(c) Write the equation for the reaction between hydrochloric acid (HCl) and magnesium carbonate ($MgCO_3$).

Question 4

Write balanced equations for these reactions:

(a) Calcium Hydroxide ($Ca(OH)_2$) and sulfuric acid (H_2SO_4).

(b) Ammonia (NH_3) and phosphoric acid (H_3PO_4).

(c) Alumina or aluminum oxide (Al_2O_3) hydrochloric acid (HCl).

Question 5

Describe clearly, with the use of a diagram to aid if helpful, why you can have dilute carbonic acid (H_2CO_3) solution and concentrated carbonic acid solution, even though carbonic acid is said to be a "weak" acid.

Question 6

Calculate the pH of the following:

(a) A solution in which the concentration of H_3O^+ is 10^{-4}M.

(b) A solution in which the concentration of H_3O^+ is 3.2×10^{-5}M.

(c) A solution of 1.7×10^{-3}M sulphuric acid (H_2SO_4).

(d) What assumptions have you made in your calculation in part (c) above? Are these assumptions reasonable in this case?
