THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

# Secondary School Mathematics & Science Competition

Chemistry

Sample Past Paper 2011

1. Which of the followings are the applications of the products obtained from the electrolysis of seawater?

   (1) Soap production
   (2) Manufacture of plastics
   (3) Bleaching agent

   A. (1) and (2) only
   B. (1) and (3) only
   C. (2) and (3) only
   D. (1), (2) and (3)

2. Compound **C** contains carbon, hydrogen and oxygen only. 1.367 g of **C** burns completely in oxygen to give 3.002 g of $CO_2(g)$ and 1.640 g of $H_2O(g)$. What is the empirical formula of **C**?

   A. C_3H_8O
   B. $C_4H_8O_2$
   C. $C_3H_7O_2$
   D. C_3H_7O

3. A phosphoric acid fuel cell, PAFC, can provide power for buses. The electrolyte is concentrated phosphoric acid and the reactants are hydrogen and oxygen gases. A schematic diagram of a phosphoric acid fuel cell is given below.
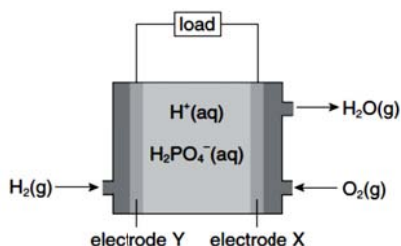
Which of the following combinations concerning the fuel cell is correct?

	Flow of electrons in the external circuit	$H_2PO_4^-$ (aq) ions move towards
A	From X to Y	X
B	From X to Y	Y
C	From Y to X	X
D	From Y to X	Y

4. In an experiment to determine the concentration of sulphuric acid in a brand of toilet cleaner, 50.0 cm^3 of the cleaner was first diluted to 250.0 cm^3 with distilled water. Upon titration with 0.850 M sodium hydroxide solution using phenolphthalein as indicator, 25.0 cm^3 of the diluted cleaner required 24.7 cm^3 of the sodium hydroxide solution to reach the end point. What is the concentration of sulphuric acid in the undiluted toilet cleaner?

    A. 0.42 M
    B. 0.84 M
    C. 2.10 M
    D. 4.20 M

5. Which of the following species is non-polar?

    A. BrF_5
    B. XeF_4
    C. IBr_3
    D. PCl_3

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Answer

1.	D	2.	A	3.	D	4.	C	5.	B