8.2 More About Acids

Question Paper

Course	DP IB Chemistry
Section	8. Acids & Bases
Topic	8.2 More About Acids
Difficulty	Easy

Time allowed: 40

Score: /27

Percentage: /100

Question 1a

a)

Using section 22 of the data booklet, identify an indicator that would show a yellow colour in ammonia solution?

[1]

[1 mark]

Question 1b

b)

Suggest **two** characteristics that make a good indicator for a titration?

[2]

[2 marks]

Question 1c

c)

A typical set of acid-base titration results in shown in the table.

	Rough	Run 1	Run 2
Initial burette reading /±0.05 mL	0.00	0.30	0.60
Final burette reading/±0.05 mL	24.15	22.55	22.95

Determine the mean volume from these results.

[1]

[1 mark]

Question 1d

d)

What is the recorded uncertainty on the mean volume calculated in part c)?

[1]

[1 mark]

Question 2a

a)
State the relationship between pH and hydrogen ion concentration.

[1]

[1 mark]

Question 2b

b)
Determine the pH of 0.200 mol dm^{-3} hydrochloric acid.

[1]

[1 mark]

Question 2c

c)
Determine the hydrogen ion concentration in a sample of lake water of pH 5.60.

[1]

[1 mark]

Question 2d

d)
The table below shows the hydrogen ion concentration in three solutions:

	P	Q	R
[H$^+$]	0.001	1×10^{-5}	1.00

List the three solutions in order from low pH to high pH

[1]

[1 mark]

Question 3a

a)
State what is meant by the ionic product of water.

[1]

[1 mark]

Question 3b

b)
Calculate the concentration of [H^+] in a solution of sodium hydroxide, NaOH, whose concentration is $0.001 \, mol \, dm^{-3}$.

[1]

[1 mark]

Question 3c

c)
Calculate the pH of $0.001 \, mol \, dm^{-3}$ NaOH solution.

[1]

[1 mark]

Question 3d

d)
The ionic product of water is $2.916 \times 10^{-14} \, mol^2 \, dm^{-6}$ at 313 K. What is the pH of water at this temperature?

[1]

[1 mark]

Question 4a

a)
State one **advantage** and one **disadvantage** of using a pH meter instead of universal indicator to measure pH.

[2]

[2 marks]

Question 4b

b)
State the name and formula of a strong alkali and a weak alkali.

[2]

[2 marks]

Question 4c

c)
State the meaning of the term *dissociation* as applied to acids and bases

[1 mark]

Question 4d

d)
Write equations for the dissociation of:

  Nitric acid, HNO_3: ....

   Methanoic acid, HCOOH: ....

[2]

[2 marks]

Question 4e

e)
Identify the formula of the weakest conjugate base produced in the two acids in part d).

[1]

[1 mark]

Question 5a

a)

Explain the difference between the terms *strong* acid and *weak* acid.

[2]

[2 marks]

Question 5b

b)

Other than measuring the pH, describe how you could distinguish between dilute solutions of the same concentration of hydrochloric acid and ethanoic acid.
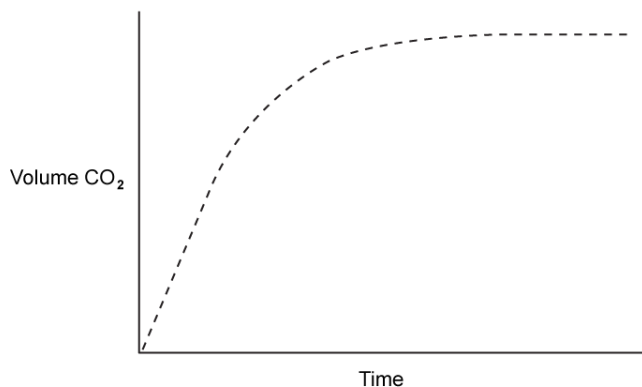
[2]

[2 marks]

Question 5c

c)
A solution of 2.00 mol dm^{-3} hydrochloric acid was added to marble chips and the volume of carbon dioxide recorded. A graph of the result is shown below:

On the same graph, sketch the result of repeating the experiment with 2.00 mol dm^{-3} ethanoic acid.

[1]

[1 mark]

Question 5d

d)
The same experiment in part c) can be carried out by measuring how the mass of the reaction flask changes with time.

Sketch a graph of the expected result.

[1]

[1 mark]