8.2 More About Acids

Question Paper

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

Time allowed: 20

Score: /10

Percentage: /100

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Question 1

Which of the following statements is **incorrect** about $0.01\,mol\,dm^{-3}$ CH_3COOH?

A. the pH = 2

B. $[H^+] << 0.01\,mol\,dm^{-3}$

C. $[CH_3COO^-]$ is approximately equal to $[H^+]$

D. CH_3COOH is partially ionized

[1 mark]

Question 2

Two flasks contain two different acids labelled as HA and HB. A student measures the pH of each flask, and finds that they are pH 1 and pH 3 respectively. Which of the following statements is true?

A. HA is a stronger acid than HB

B. HB is a stronger acid than HA

C. The $[H_3O^+]$ in the solution of HB is 3 times greater than the $[H_3O^+]$ in the solution of HA.

D. The $[H_3O^+]$ in the solution of HA is 100 times greater than the $[H_3O^+]$ in the solution of HB.

[1 mark]

Question 3

Which of the following solutions will have the largest amount of H^+ ions in moles?

A. 20 cm^3 of 2.0 $mol\,dm^{-3}$ sulfuric acid

B. 10 cm^3 of 3.0 $mol\,dm^{-3}$ nitric acid

C. 80 cm^3 of 0.5 $mol\,dm^{-3}$ hydrochloric acid

D. 40 cm^3 of 1.0 $mol\,dm^{-3}$ ethanoic acid

[1 mark]

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Question 4

If the pH of two acids, X and Y, are pH 1 and pH 2 respectively, which of the following is true?

I. X and Y could be strong or weak acids
II. The concentration of $[H^+]$ ions in X is higher than in Y
III. Acid X is stronger than acid Y

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

Question 5

A student has two flasks containing 150 cm^3 of nitric acid, $HNO_3(aq)$ and ethanoic acid, $CH_3COOH(aq)$. She writes the following three statements in her notebook about the acids. Which of them are correct?

I. HNO_3 dissociates more than CH_3COOH
II. HNO_3 conducts electricity better than CH_3COOH
III. more NaOH can be neutralized with HNO_3 than CH_3COOH

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

[1 mark]

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Question 6

Which row shows the correct colours for two common indicators used in acid-alkali titrations?

	phenolphthalein		methyl orange	
	colour in acid	**colour in alkali**	**colour in acid**	**colour in acid**
A	pink	colourless	yellow	red
B	colourless	pink	yellow	red
C	pink	colourless	red	yellow
D	colourless	pink	red	yellow

[1 mark]

Question 7

In a titration, the equivalence point is reached when 23.70 cm^3 of 0.02 mol dm^{-3} potassium hydroxide reacts with 0.03 mol dm^{-3} of sulfuric acid. What volume of acid is needed?

A. $\frac{2 \times 0.02 \times 23.70}{0.03}$

B. $\frac{0.03}{2 \times 0.02 \times 23.70}$

C. $\frac{0.02 \times 23.70}{0.03}$

D. $\frac{0.03 \times 23.70}{2 \times 0.02}$

[1 mark]

Question 8

What is the number of moles of barium hydroxide in a 100 cm^3 solution with a pH of 11 at 25 °C?

($K_w = 1.00 \times 10^{-14}$ mol^2 dm^{-6} at 298 K)

A. 1×10^{-11} mol

B. 1×10^{-3} mol

C. 0.5×10^{-3} mol

D. 0.5×10^{-4} mol

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[1 mark]

Question 9

What is the pH of a solution made by adding 6.0 g of sodium hydroxide to 1 dm^3 of water at 298K? (M_r NaOH = 40.0)

(K_w = 1.00 x 10^{-14} mol^2 dm^{-6} at 298 K)

A. $-\log\left(\frac{6.0 \times 10^{-14}}{40.0}\right)$

B. $-\log\left(\frac{40.0 \times 10^{-13}}{6.0 \times 1000}\right)$

C. $-\log\left(\frac{4.0 \times 10^{-15}}{6.0}\right)$

D. $-\log\left(\frac{4.0 \times 10^{-13}}{6.0}\right)$

[1 mark]

Question 10

Which values are correct for a solution that contains 0.056 g of KOH (M_r = 56) in 100 cm^3 of water?

(K_w = 1.00 x 10^{-14} mol^2 dm^{-6} at 298 K)

A. $[H^+]$ = 1.0 10^{-2} mol dm^{-3} and pH = 2.00

B. $[OH^-]$ = 1.0 10^{-2} mol dm^{-3} and pH = 2.00

C. $[H^+]$ = 1.0 10^{-12} mol dm^{-3} and pH = 12.00

D. $[OH^-]$ = 1.0 10^{-12} mol dm^{-3} and pH = 2.00

[1 mark]

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