

8.2 More About Acids

Question Paper

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

Time allowed: 20
Score: /10
Percentage: /100

Question 1

Which of the following statements is **incorrect** about $0.01 \text{ mol dm}^{-3} \text{ CH}_3\text{COOH}$?

- A. the $\text{pH} = 2$
- B. $[\text{H}^+] \ll 0.01 \text{ mol dm}^{-3}$
- C. $[\text{CH}_3\text{COO}^-]$ is approximately equal to $[\text{H}^+]$
- 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 $\text{pH } 1$ and $\text{pH } 3$ 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 $[\text{H}_3\text{O}^+]$ in the solution of HB is 3 times greater than the $[\text{H}_3\text{O}^+]$ in the solution of HA.
- D. The $[\text{H}_3\text{O}^+]$ in the solution of HA is 100 times greater than the $[\text{H}_3\text{O}^+]$ 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]

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, $\text{HNO}_3(\text{aq})$ and ethanoic acid, $\text{CH}_3\text{COOH}(\text{aq})$. 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]

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 $25 \text{ }^\circ\text{C}$?

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

- A. $1 \times 10^{-11} \text{ mol}$
- B. $1 \times 10^{-3} \text{ mol}$
- C. $0.5 \times 10^{-3} \text{ mol}$
- D. $0.5 \times 10^{-4} \text{ mol}$

[1 mark]

Question 9What is the pH of a solution made by adding 6.0 g of sodium hydroxide to 1 dm³ of water at 298K? (M_r NaOH = 40.0)($K_w = 1.00 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$ 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 10Which values are correct for a solution that contains 0.056 g of KOH ($M_r = 56$) in 100 cm³ of water?($K_w = 1.00 \times 10^{-14} \text{ mol}^2 \text{ dm}^{-6}$ at 298 K)

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

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

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

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

[1 mark]