


Name:**Score:** 0 / 20 points (0%)

Chapter 6 Review Quiz

Multiple Choice


Identify the choice that best completes the statement or answers the question.

-  — 1. The process when an acid reacts with water is known as:
- dissociation.
 - acidification.
 - ionisation.
 - neutralisation.

ANSWER: C

The acid is a covalent molecular substance, so when it reacts with water ions are formed. This reaction is called ionisation.

POINTS: 0 / 1**FEEDBACK:****REF:** 152

-  — 2. The process when a base reacts with water is known as:
- dissociation.
 - acidification.
 - ionisation.
 - neutralisation.

ANSWER: A

An inorganic base is an ionic substance, so when a base dissolves in water it dissociates into a cation and anion.

POINTS: 0 / 1**FEEDBACK:****REF:** 152

-  — 3. Which of the following acids are weak acids?


HCl CH₃COOH HF H₂SO₄

- HCl, CH₃COOH and H₂SO₄
- HCl and H₂SO₄
- CH₃COOH and HF.
- CH₃COOH and H₂SO₄

ANSWER: C

HCl and H₂SO₄ are strong acids while CH₃COOH and HF are weak acids.

POINTS: 0 / 1**FEEDBACK:****REF:** 152

-  — 4. Which of the following statements is correct?
- All molecules in strong acids will dissociate.
 - All molecules in a strong base will dissociate.
 - All molecules in a strong base will ionise.
 - All molecules in a weak base will dissociate.


ANSWER: B

Acids ionise and bases dissociate. Strong means all molecules dissociate.

POINTS: 0 / 1

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 5. Which of the following statements regarding the concentration and strength of solutions is correct?

- a. A weak acid will produce more ions than a strong acid of the same concentration.
- b. A dilute solution has more solute than solvent.
- c. A concentrated strong acid will contain more ions than a dilute strong acid.
- d. Weak acids are more dilute than strong acids.


ANSWER: C

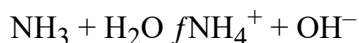
A strong acid will produce more ions than a weak acid and a concentrated solution has more ions than a dilute solution.

POINTS: 0 / 1

FEEDBACK:

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 6. In the reaction:



- a. NH_3 is an acid.
- b. H_2O is an acid.
- c. NH_4^+ is a base.
- d. neither NH_3 nor H_2O are bases.


ANSWER: B

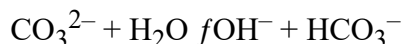
H_2O is an acid because it donates a proton to NH_3 .

POINTS: 0 / 1

FEEDBACK:

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 7. In the reaction:



- a. CO_3^{2-} is an acid.
- b. OH^- is a conjugate base.
- c. H_2O is a base.
- d. HCO_3^- is a conjugate base.


ANSWER: B

H_2O is acting as an acid donating a proton thus producing its conjugate base OH^- .

POINTS: 0 / 1

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 8. Which acid–conjugate base pair is correct?

- a. H_3O^+ , H_2O
- b. HSO_4^- , H_2SO_4
- c. OH^- , H_2O
- d. SO_4^{2-} , H_2SO_4

ANSWER: A

When H_3O^+ donates a proton, it produces the conjugate base H_2O is the result.

POINTS: 0 / 1

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 9. Which of the following is not a polyprotic acid?

- a. H_2SO_4
- b. CH_3COOH
- c. H_2CO_3
- d. H_3PO_4


ANSWER: B

CH_3COOH has only one proton, which can be donated.

POINTS: 0 / 1

FEEDBACK:

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 10. In pure water, the value of the ionic product, K_w is numerically equal to:

- a. $[\text{H}_3\text{O}^+][\text{OH}^-]/[\text{H}_2\text{O}]$
- b. $[\text{H}_2\text{O}] / [\text{OH}^-][\text{H}_3\text{O}^+]$
- c. $[\text{H}_3\text{O}^+]^2$
- d. $[\text{H}_3\text{O}^+][\text{OH}^-]^2$


ANSWER: C

$K_w = [\text{H}_3\text{O}^+][\text{OH}^-]$ and in pure water $[\text{H}_3\text{O}^+] = [\text{OH}^-]$

POINTS: 0 / 1

FEEDBACK:

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 11. The concentration of hydrogen ions in a 2 mol L^{-1} solution of NaOH is:

- a. 2 mol L^{-1}
- b. 5 mol L^{-1}
- c. $2 \times 10^{-15} \text{ mol L}^{-1}$
- d. $5 \times 10^{-15} \text{ mol L}^{-1}$


ANSWER: D

NaOH is a strong base so $[\text{OH}^-] = 2 \text{ mol L}^{-1}$, so $[\text{H}^+] = 10^{-14}/2$

POINTS: 0 / 1

FEEDBACK:

REF: 160

 12. What is the pH of a 1.2 mol L^{-1} solution of HNO_3 ?

- a. 1.2
- b. 0.079
- c. -0.079
- d. -1.2


ANSWER: C

$\text{pH} = -\log[\text{H}^+] = -\log(1.2) = -0.079$

POINTS: 0 / 1

FEEDBACK:

REF: 3

-  13. The concentration of hydroxide ions in a solution of pH 5.4 is:
- $2.51 \times 10^{-9} \text{ mol L}^{-1}$
 - $3.98 \times 10^{-6} \text{ mol L}^{-1}$
 - $5.4 \times 10^{-6} \text{ mol L}^{-1}$
 - $2.51 \times 10^5 \text{ mol L}^{-1}$


ANSWER: A

pH = 5.4, pOH = 14 - 5.4 = 8.6 so $[\text{OH}^-] = 10^{-8.6} = 2.51 \times 10^{-9} \text{ mol L}^{-1}$

POINTS: 0 / 1

FEEDBACK:

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-  14. The percentage ionisation of a 0.1 mol L^{-1} solution of acetic acid that has a pH of 2.876 is:
- 1.33%
 - 3.4%
 - 10.0%
 - 28.76%

ANSWER: A

$[\text{CH}_3\text{COOH}] = 0.1 \text{ mol L}^{-1}$,


$[\text{H}^+] = 10^{-2.876} = 1.33 \times 10^{-3} = [\text{CH}_3\text{COO}^-]$,

% ionisation = $[\text{CH}_3\text{COO}^-] \times 100 / [\text{CH}_3\text{COOH}] = 1.33 \times 10^{-3} \times 100 / 0.1 = 1.33\%$

POINTS: 0 / 1

FEEDBACK:

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-  15. Which of the following statements regarding the ionisation of acids is true?
- A weak acid will have a large magnitude of K_a because a high percentage of the molecules will ionise.
 - A strong acid will have a large magnitude of K_a because a high percentage of the molecules will ionise.
 - A weak acid will have a small magnitude of K_a because a high percentage of the molecules will ionise.
 - A strong acid will have a small magnitude of K_a because a low percentage of the molecules will ionise.


ANSWER: B

A strong acid ionises completely so K_a will be large.

POINTS: 0 / 1

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-  16. Which of the following is not true when determining the K_a of monoprotic weak acids?
- The concentration of H_3O^+ from the self-ionisation of water must be included.
 - The amount of acid that ionises is so small that it is ignored.
 - The concentration of the cation and anion formed in the ionisation are the same.
 - The concentration of the acid is on the bottom of the fraction.

ANSWER: A


The concentration of H_3O^+ from the self-ionisation of water will be small so can be ignored.

POINTS: 0 / 1

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-  17. In an experiment, 0.100 mol L^{-1} solutions of each of the following acids were prepared. Which acid solution would have the highest pH?

- a. HF $K_a = 7.6 \times 10^{-4}$
- b. CH_3COOH $K_a = 1.7 \times 10^{-5}$
- c. HCN $K_a = 6.3 \times 10^{-10}$
- d. HCOOH $K_a = 2 \times 10^{-4}$


ANSWER: C

The smaller the K_a the less the acid ionises, so fewer H^+ ions are present in solution.

POINTS: 0 / 1

FEEDBACK:

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-  18. In an experiment, 50 mL of 1.0 mol L^{-1} solutions of each of the following acids were prepared.

 HClO_2 $\text{p}K_a = 1.95$ HCOOH $\text{p}K_a = 3.74$ HOI $\text{p}K_a = 10.64$

Which acid would require the greatest volume of 1.0 mol L^{-1} to neutralise it?

- a. HClO_2
- b. HCOOH
- c. HOI
- d. The four acids would require the same volume of NaOH .


ANSWER: D

All three acids are monoprotic and the same concentration. As a neutralisation reaction goes to completion all three acid would require the same volume of base.

POINTS: 0 / 1

FEEDBACK:

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-  19. Listed below are the K_b of four organic bases.

 $\text{C}_2\text{H}_5\text{NH}_2$ $K_b = 4.3 \times 10^{-4}$ $\text{C}_9\text{H}_7\text{N}$ $K_b = 2.5 \times 10^{-9}$ $(\text{C}_2\text{H}_5)_3\text{N}$ $K_b = 5.2 \times 10^{-4}$ $\text{C}_{18}\text{H}_{21}\text{O}_3\text{N}$ $K_b = 8.9 \times 10^{-7}$

The strongest acid in the list below is:

- a. $\text{C}_2\text{H}_5\text{NH}_3^+$
- b. $\text{C}_9\text{H}_7\text{NH}^+$
- c. $(\text{C}_2\text{H}_5)_3\text{NH}^+$
- d. $\text{C}_{18}\text{H}_{21}\text{O}_3\text{NH}^+$

ANSWER: B

The weaker the base the stronger the conjugate acid.

POINTS: 0 / 1

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20. Which of the following compounds is a basic salt?

- a. NaOH
- b. CH_3COONa
- c. NH_4Cl
- d. NaNO_3

ANSWER: C

This salt is formed from the reaction of a weak acid and strong base so will be basic.

POINTS: 0 / 1**FEEDBACK:****REF:** 181**Retake**