

Brett Robbins Academic Consulting

Chemistry 30 Practice Test

Unit D: Equilibrium, Acids & Bases

10 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

The equilibrium law expression for the reaction $2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$ is

A) $\frac{[SO_2]^2[O_2]}{[SO_3]^2}$

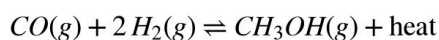
B) $\frac{[SO_3]^2}{[SO_2]^2[O_2]}$

C) $\frac{[SO_3]}{[SO_2][O_2]}$

D) $\frac{[2SO_3]}{[2SO_2][O_2]}$

Question 2

The synthesis of methanol is represented by the equation



Which of the following changes will increase the amount of $CH_3OH(g)$ at equilibrium?

A) Increasing the temperature

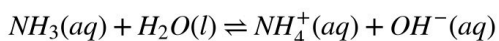
B) Adding a catalyst

C) Increasing the pressure

D) Increasing the volume of the container

Question 3

Use the following equation to answer this question.



In this equation, the species that acts as a Brønsted – Lowry base is

A) $NH_3(aq)$

B) $H_2O(l)$

C) $NH_4^+(aq)$

D) $OH^-(aq)$

Question 4

Which of the following pairs of species is a conjugate acid – base pair?

A) $HNO_3(aq)$ and $NO_2^-(aq)$

B) $H_2SO_4(aq)$ and $SO_4^{2-}(aq)$

C) $NH_4^+(aq)$ and $NH_2^-(aq)$

D) $HF(aq)$ and $F^-(aq)$

Question 5

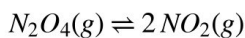
A solution has a hydronium ion concentration of 1.0×10^{-4} mol/L.

The pH of the solution is

- A) -4.0
- B) 4.0
- C) 10.0
- D) 1.0×10^{-10}

Question 6

At a certain temperature, the following system is at equilibrium.



The equilibrium concentrations are $[N_2O_4] = 0.20$ mol/L and $[NO_2] = 0.40$ mol/L.

The value of K_c , to two decimal places, is

Question 7

A system is at equilibrium. Which of the following changes will change the value of the equilibrium constant, K_c , for the system?

- A) Adding a catalyst
- B) Increasing the concentration of a reactant
- C) Increasing the temperature
- D) Decreasing the volume of the container

Question 8

Which of the following species is amphoteric?

- A) $HCO_3^-(aq)$
- B) $CO_3^{2-}(aq)$
- C) $NH_4^+(aq)$
- D) $CH_3COOH(aq)$

Question 9

The pH of a 0.020 mol/L $\text{NaOH}(\text{aq})$ solution, to the nearest hundredth, is

Question 10

Which of the following pairs of solutions, when mixed together, will form a buffer solution?

A) $\text{HCl}(\text{aq})$ and $\text{NaCl}(\text{aq})$

B) $\text{HNO}_3(\text{aq})$ and $\text{KNO}_3(\text{aq})$

C) $\text{NaOH}(\text{aq})$ and $\text{NaCl}(\text{aq})$

D) $\text{CH}_3\text{COOH}(\text{aq})$ and $\text{NaCH}_3\text{COO}(\text{aq})$

Answer Key

- | | | |
|------|---------|----------|
| 1. B | 5. B | 9. 12.30 |
| 2. C | 6. 0.80 | 10. D |
| 3. A | 7. C | |
| 4. D | 8. A | |

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