BRITISH COLUMBIA CHEMISTRY 12 (MCH--12) · FINAL EXAM · 50 QUESTIONS

# Final Exam — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

**1** **The rate of a reaction is best described as the**

- A change in concentration of a reactant or product per unit time
- B total mass of reactants used in the reaction
- C temperature at which the reaction starts
- D energy released when the reaction finishes

Understand It with Pulse | Flag a mistake

**2** **At equilibrium, the concentrations of reactants and products**

- A remain constant, though not necessarily equal
- B are always equal to each other
- C keep changing until the reaction stops
- D are always zero for the reactants

Understand It with Pulse | Flag a mistake

3 **In a saturated solution with excess solid present, the solid is**

- A no longer dissolving at all
- B dissolving and precipitating at equal rates
- C only precipitating
- D only dissolving

Understand It with Pulse | Flag a mistake

4 **Reduction is the process in which a species**

- A loses electrons
- B gains electrons
- C loses protons
- D gains neutrons

Understand It with Pulse | Flag a mistake

**5** **A powdered solid reacts faster than a single lump of the same solid because**

- **A** the powder has a larger surface area exposed to the other reactant
- **B** the powder has a lower activation energy
- **C** the lump has more total mass
- **D** the powder contains a catalyst

Understand It with Pulse | Flag a mistake

**6** **For $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$, the equilibrium expression is**

- **A** $K_eq = [CaO][CO_2]$
- **B** $K_eq = \frac{[CaO][CO_2]}{[CaCO_3]}$
- **C** $K_eq = [CO_2]$
- **D** $K_eq = \frac{1}{[CO_2]}$

Understand It with Pulse | Flag a mistake

**7** **The $K_{sp}$ of AgCl is $1.8 \times 10^{-10}$. Its molar solubility, in mol/L, is about**

- **A** $1.8 \times 10^{-10}$
- **B** $3.6 \times 10^{-10}$
- **C** $9.0 \times 10^{-11}$
- **D** $1.3 \times 10^{-5}$

Understand It with Pulse | Flag a mistake

**8** **In a redox reaction, the oxidizing agent is the species that**

- **A** is oxidized and causes another species to be reduced
- **B** gains no electrons
- **C** is reduced and causes another species to be oxidized
- **D** loses no electrons

Understand It with Pulse | Flag a mistake

**9** **The activation energy of a reaction is the**

- **A** total energy released by the reaction
- **B** energy of the products alone
- **C** average kinetic energy of all particles
- **D** minimum energy colliding particles need to react

Understand It with Pulse | Flag a mistake

**10** **At equilibrium, $[CO] = 0.20$, $[H_2O] = 0.20$, $[CO_2] = 0.40$, and $[H_2] = 0.40$, all in mol/L, for CO + $H_2O \rightleftharpoons CO_2 + H_2$.**
**The value of $K_eq$ is**

- **A** 1
- **B** 2
- **C** 8
- **D** 4

Understand It with Pulse | Flag a mistake

11 **The graph shows the amount of solid dissolved against time. Points are (0, 0), (1, 3), (2, 5), and (4, 5). The flat section shows the solution has become**

A dilute

B saturated

C unsaturated

D boiling

Understand It with Pulse | Flag a mistake

12 **In a galvanic cell, reduction occurs at the**

A anode

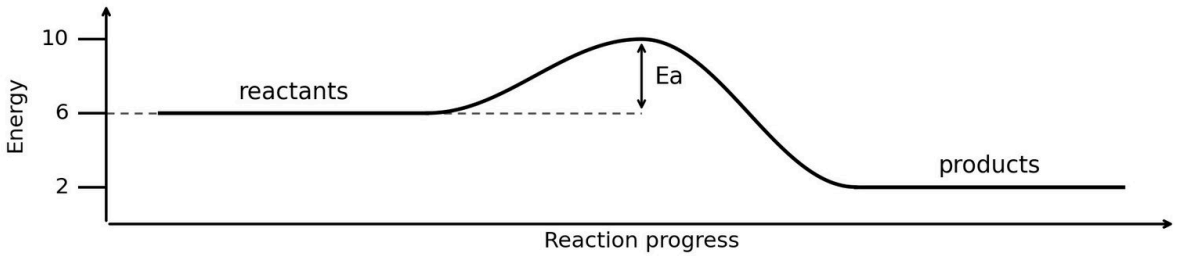
B cathode

C salt bridge

D wire

Understand It with Pulse | Flag a mistake

**13** **The diagram shows the energy profile for a reaction. Reactants are at 6, the peak is at 10, and products are at 2. The activation energy, in the diagram units, is _____**




Question 13

The diagram shows the energy profile for a reaction. Reactants are at 6, the peak is at 10, and products are at 2. The activation energy, in the diagram units, is ____

ANSWER

Understand It with Pulse | Flag a mistake

**14** **For A ⇌ B, an ICE table starts with [A] = 1.00 mol/L and [B] = 0. At equilibrium [B] = 0.20 mol/L. The equilibrium concentration of A, in mol/L, is**

A 0.20

B 0.40

C 1.20

D 0.80

Understand It with Pulse | Flag a mistake

**15** **A solution with $[H_3O^+] = 1.0 \times 10^{-4}$ mol/L has a pH of**

- **A** 2
- **B** 10
- **C** 4
- **D** 12

Understand It with Pulse | Flag a mistake

**16** **A galvanic cell converts**

- **A** chemical energy into electrical energy
- **B** electrical energy into chemical energy
- **C** heat energy into light energy
- **D** mechanical energy into heat

Understand It with Pulse | Flag a mistake

17 **For the reaction A + B → products, the rate law is rate = k[A][B]. Doubling [A] only will**

A double the rate

B quadruple the rate

C halve the rate

D leave the rate unchanged

Understand It with Pulse | Flag a mistake

18 **For the system in the previous type of ICE problem, with $[H_2] = 0.20$, $[I_2] = 0.20$, and [HI] = 0.60, all in mol/L, $K_eq$ is**

A 3

B 6

C 9

D 15

Understand It with Pulse | Flag a mistake

19 **The pH of a 0.020 mol/L NaOH(aq) solution, to the nearest hundredth, is**

A 12.30

B 11.30

C 12.70

D 13.30

Understand It with Pulse | Flag a mistake

20 **Standard reduction potentials are measured relative to the**

A standard zinc electrode

B standard copper electrode

C standard silver electrode

D standard hydrogen electrode

Understand It with Pulse | Flag a mistake

**21** **A reaction is zero order with respect to B. Doubling [B] will**

- **A** leave the rate unchanged
- **B** double the rate
- **C** quadruple the rate
- **D** halve the rate

Understand It with Pulse | Flag a mistake

**22** **For $N_2 + 3H_2 \rightleftharpoons 2NH_3$ + heat, adding more $N_2$ at equilibrium. In which direction does the equilibrium shift, and why?**

- **A** right, forming more $NH_3$
- **B** left, forming more $N_2$
- **C** right, forming more $H_2$
- **D** left, with no change in $NH_3$

Understand It with Pulse | Flag a mistake

**23** **A 0.10 mol/L solution of a weak acid, HX, has a pH of 3.00. The $K_a$ of HX is approximately**

- **A** $1.0 \times 10^{-3}$
- **B** $1.0 \times 10^{-7}$
- **C** $1.0 \times 10^{-2}$
- **D** $1.0 \times 10^{-5}$

Understand It with Pulse | Flag a mistake

**24** **Given $E°(Mg^{2+}/Mg) = -2.37$ V and $E°(Ag^{+}/Ag) = +0.80$ V, the cell potential for $Mg + 2Ag^{+} \rightarrow Mg^{2+} + 2Ag$, in volts, is**

- **A** 1.57
- **B** 3.17
- **C** 2.37
- **D** 3.97

Understand It with Pulse | Flag a mistake

**25** **Two identical reactions are run, one with a catalyst and one without. The catalyzed reaction has a**

- **A** higher activation energy and a larger enthalpy change
- **B** lower activation energy and more product at equilibrium
- **C** lower activation energy and the same enthalpy change
- **D** higher activation energy and less product

Understand It with Pulse | Flag a mistake

**26** **For $N_2 + 3H_2 \rightleftharpoons 2NH_3$, increasing the pressure by decreasing volume will shift the equilibrium toward the side with**

- **A** more moles of gas, the reactant side
- **B** fewer moles of gas, the reactant side
- **C** fewer moles of gas, the product side
- **D** more moles of gas, the product side

Understand It with Pulse | Flag a mistake

**27** **For a conjugate acid-base pair, $K_a \times Kb$ equals**

- A $Kw = 1.0 \times 10^{-7}$
- B $Kw = 1.0 \times 10^{-14}$
- C 14.00
- D 7.00

Understand It with Pulse | Flag a mistake

**28** **In electroplating a spoon with silver, the spoon is the**

- A anode
- B salt bridge
- C cathode
- D power supply

Understand It with Pulse | Flag a mistake

29 **As a reaction proceeds, its rate usually decreases because**

A the activation energy rises steadily

B the catalyst is consumed

C reactant concentrations fall, so collisions become less frequent

D the temperature always falls

Understand It with Pulse | Flag a mistake

30 **Which change alters the value of $K_eq$ for a reaction**

A a change in concentration

B a change in temperature

C a change in pressure

D adding a catalyst

Understand It with Pulse | Flag a mistake

31 **The graph shows the mass of solid dissolved against time. Points are (0, 0), (2, 4), (4, 6), and (6, 6). The solution first becomes saturated at about**

A 2 minutes

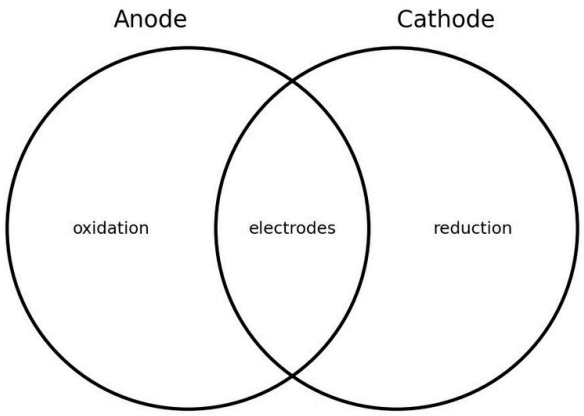
B 6 minutes

C 0 minutes

D 4 minutes

Understand It with Pulse | Flag a mistake

**32** **The diagram shows two sets: anodes and cathodes. Which statement belongs in the overlap of both sets**




Question 32

The diagram shows two sets : anodes and cathodes. Which statement belongs in the overlap of both sets

A) oxidation occurs there

B) reduction occurs there

C) they are electrodes where a half – reaction occurs

D) electrons leave there

**A** oxidation occurs there

**B** reduction occurs there

**C** they are electrodes where a half-reaction occurs

**D** electrons leave there

**Understand It with Pulse** **Flag a mistake**

**33** **The graph shows product concentration against time. Points are (0, 0), (1, 4), (2, 6), and (3, 7). During which time interval is product forming fastest**

- **A** 1 to 2 minutes
- **B** 0 to 1 minute
- **C** 2 to 3 minutes
- **D** The rate is constant

Understand It with Pulse | Flag a mistake

**34** **The equilibrium law expression for $CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$ is**

- **A** $K_eq = \frac{[CO][H_2O]}{[CO_2][H_2]}$
- **B** $K_eq = \frac{[CO_2]}{[CO]}$
- **C** $K_eq = \frac{[CO_2][H_2]}{[CO][H_2O]}$
- **D** $K_eq = [CO_2][H_2]$

Understand It with Pulse | Flag a mistake

**35** **A larger $K_{sp}$ for salts of the same type generally means**

- **A** lower solubility
- **B** greater solubility
- **C** a higher pH
- **D** a lower temperature

Understand It with Pulse | Flag a mistake

**36** **In the reaction $Mg + 2Ag^{+} \rightarrow Mg^{2+} + 2Ag$, the oxidizing agent is**

- **A** Mg
- **B** $Ag^{+}$
- **C** $Mg^{2+}$
- **D** Ag

Understand It with Pulse | Flag a mistake

**37** **Which condition gives the fastest reaction between magnesium and acid**

- A a magnesium block in cold, dilute acid
- B magnesium ribbon in cold, dilute acid
- C a magnesium block in warm, dilute acid
- D magnesium ribbon in warm, concentrated acid

Understand It with Pulse | Flag a mistake

**38** **For X ⇌ Y, with**
**[X] falling from 0.90 to 0.60 mol/L, and [Y] starting at 0, the equilibrium [Y], in mol/L, is**

- A 0.10
- B 0.60
- C 0.90
- D 0.30

Understand It with Pulse | Flag a mistake

**39** **A solution with pOH 3 has a pH of**

- **A** 3
- **B** 7
- **C** 14
- **D** 11

Understand It with Pulse | Flag a mistake

**40** **Given $E°(Mg^{2+}/Mg) = -2.37$ V and $E°(Zn^{2+}/Zn) = -0.76$ V, the cell potential for $Mg + Zn^{2+} \rightarrow Mg^{2+} + Zn$, in volts, is**

- **A** 1.61
- **B** 2.37
- **C** 3.13
- **D** 0.76

Understand It with Pulse | Flag a mistake

**41** **The concentration of a reactant falls from 0.60 mol/L to 0.30 mol/L in 15 seconds. The average rate of consumption, in mol/L/s, is**

- A 0.020
- B 0.010
- C 0.030
- D 0.040

Understand It with Pulse | Flag a mistake

**42** **For $2SO_2 + O_2 \rightleftharpoons 2SO_3$, increasing the pressure will shift the equilibrium to the**

- A left, toward more moles of gas
- B right, toward fewer moles of gas
- C right, toward more moles of gas
- D left, toward fewer moles of gas

Understand It with Pulse | Flag a mistake

**43** **Which 0.10 mol/L solution has the highest pH**

- **A** $NaOH(aq)$
- **B** $HCl(aq)$
- **C** $NH_3(aq)$
- **D** $CH_3COOH(aq)$

Understand It with Pulse | Flag a mistake

**44** **In a zinc-copper galvanic cell, the copper electrode**

- **A** loses mass as copper metal is oxidized
- **B** gains mass as copper metal plates onto it
- **C** does not change in mass
- **D** gains mass as zinc plates onto it

Understand It with Pulse | Flag a mistake

45 **Which change increases both the frequency and the energy of collisions**

A adding a catalyst

B grinding a solid reactant

C diluting a solution

D raising the temperature

Understand It with Pulse | Flag a mistake

46 **When a stress is applied to a system at equilibrium, the system shifts to**

A increase the stress further

B stop both reactions

C partially counteract the stress

D change the temperature to zero

Understand It with Pulse | Flag a mistake

**47** **The conjugate base of HF(aq) is**

- **A** $F^-(aq)$
- **B** $H_2F^+(aq)$
- **C** $H_3O^+(aq)$
- **D** $OH^-(aq)$

Understand It with Pulse | Flag a mistake

**48** **Which equation is a balanced redox half-reaction for the oxidation of aluminium**

- **A** $Al + 3e^- \rightarrow Al^{3+}$
- **B** $Al \rightarrow Al^{3+} + e^-$
- **C** $Al \rightarrow Al^{3+} + 3e^-$
- **D** $Al^{3+} + 3e^- \rightarrow Al$

Understand It with Pulse | Flag a mistake

**49** **Stirring a mixture can increase the reaction rate because**

- **A** it lowers the activation energy
- **B** it brings reactant particles into contact more often
- **C** it changes the enthalpy of reaction
- **D** it acts as a catalyst

Understand It with Pulse | Flag a mistake

**50** **For A + B ⇌ C + D,**
**if [C] is 0.30, [D] is 0.30, [A] is 0.10, and [B] is 0.10, all in mol/L, $K_eq$ is**

- **A** 3
- **B** 6
- **C** 12
- **D** 9

Understand It with Pulse | Flag a mistake

# ANSWER KEY

1. A
2. A
3. B
4. B
5. A
6. C
7. D
8. C
9. D
10. D
11. B
12. B
13. 4
14. D
15. C
16. A
17. A
18. C
19. A
20. D
21. A
22. A
23. D
24. B
25. C
26. C
27. B
28. C
29. C
30. B
31. D
32. C
33. B
34. C
35. B
36. B
37. D
38. D
39. D
40. A
41. A
42. B
43. A
44. B
45. D
46. C
47. A
48. C
49. B
50. D

© 2026 Brett Robbins. All Rights Reserved.