Equilibrium – MCQs

1.Chemical equilibrium is a state in which:
A) Reactants are completely converted into products
B) Products react to form reactants
C) The rate of forward and reverse reactions are equal
D) Concentrations of reactants and products are zerO

2. The equilibrium constant (Kc) is expressed in terms of:
A) Temperature
B) Concentrations
C) Pressure
D) Volume

3. If the value of Kc is very high, the reaction is:
A) Slow
B) Fast
C) Product-favoured
D) Reactant-favoured

4. Le Chatelier's principle is used to predict:
A) Catalyst use
B) Reaction speed
C) Direction of shift in equilibrium
D) Atomic structure

5. The equilibrium constant is affected by:
A) Pressure
B) Volume
C) Temperature
D) Catalyst

6. In a reversible reaction, equilibrium is attained when:
A) Products dominate
B) Reactants dominate
C) Rates of forward and reverse reactions are equal
D) Catalyst is added

7. Which of the following will not affect the equilibrium position?
A) Change in concentration
B) Change in temperature
C) Catalyst
D) Change in pressure

8. If Qc < Kc, the reaction will:
A) Be at equilibrium
B) Proceed in the forward direction
C) Proceed in the reverse direction
D) Stop

9. Which of the following is not true about equilibrium?

A) It is dynamic in nature

B) It can be achieved in open systems

C) It can be physical or chemical

D) Rates of both reactions are equal at equilibrium

10. In the reaction:

$N_2+3H_2 \rightleftharpoons 2NH_3$, Increasing pressure will shift the equilibrium:

A) To the right

B) To the left

C) No change

D) Depends on temperature

11. The unit of Kp for the reaction

$A(g)+B(g) \rightleftharpoons C(g)$ is:is:

A) atm

B) atm^2

C) atm^{-1}

D) unitless

12. What is the relationship between Kp and Kc?

A) Kp = Kc

B) Kp = Kc × RT^Δn

C) Kp = Kc / RT^Δn

D) Kp = Kc / P

13. The ionization of a weak acid is an example of:

A) Irreversible reaction

B) Non-spontaneous reaction

C) Equilibrium reaction

D) Decomposition reaction

14. For a strong electrolyte, the degree of dissociation (α) is:

A) Zero

B) 1

C) Between 0 and 1

D) Cannot be determined

15. The pH of a neutral solution at 25°C is:

A) 0

B) 14

C) 7

D) 1

16. The value of Kw at 25°C is:

A) 1×10^{-14}

B) 1×10^{-7}

C) 7

D) 14

17. In the reaction
$CH_3COOH \rightleftharpoons CH_3COO^- + H^+$,
Adding HCl will:
A) Increase ionization
B) Decrease ionization
C) Have no effect
D) Shift equilibrium to the right

18. Which expression represents the ionic product of water?
A) $[H^+] + [OH^-]$
B) $[H^+]/[OH^-]$
C) $[H^+] \times [OH^-]$
D) $[H^+] - [OH^-]$

19. For a weak acid, the value of Ka is typically:
A) Very large
B) Close to 1
C) Less than 1
D) Zero

20. The common ion effect is used in:
A) Increasing ionization
B) Decreasing solubility
C) Enhancing conductivity
D) None of the above

Answer Key (Single-Letter Series):

1. C
2. B
3. C
4. C
5. C
6. C
7. C
8. B
9. B
10. A
11. C
12. B
13. C
14. B
15. C
16. A
17. B
18. C
19. C
20. B