Exam Time: 00:20 Hrs

Date: 2025-10-11

Total Marks: 10

Questions:

Assertion and reason

1. **Assertion:** The ionisation of hydrogen sulphide in water is low in the presence of hydrochloric acid.

   Reason: Hydrogen sulphide is a weak acid.

   Codes:

   (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.

   (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

   (c) Assertion is true but Reason is false.

   (d) Both Assertion and Reason are false.

2. **Assertion:** K_p = K_c for all reactions.

   Reason: At constant temperature, the pressure of the gas is proportional to its concentration.

   Codes:

   (a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

   (b) If both assertion and reason are true but the reason is not the correct explanation of the assertion.

   (c) If the assertion is true but the reason is false.

   (d) If the assertion is false but the reason is true.

3. **Assertion:** The equilibrium constant for the reaction. $CaSO_4. 5H_2O$ (s) $\rightleftharpoons CaSO_4. 3H_2O$ (s) + $2H_2O$ (g) is

   $$K_C = \frac{[CaSO_4.3H_2O][H_2O]^2}{[CaSO_4.5H_2O]}$$

   Reason: Equilibrium constant is the ratio of the product of the molar concentration of the substances produced to the product of the molar concentrations of reactants with each concentrations term raised to the power equal to the respective stoichiometric constant.

   Codes:

   (a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

   (b) If both assertion and reason are true but the reason is not the correct explanation of the assertion.

   (c) If the assertion is true but the reason is false.

   (d) If the assertion is false but the reason is true.

4. **Assertion:** The physical equilibrium is not static but dynamic in nature.

   Reason: The physical equilibrium is a state in which two opposing processes are

proceeding at the same rate.

Codes:

(a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but the reason is not the correct explanation of the assertion.

(c) If the assertion is true but the reason is false.

(d) If the assertion is false but the reason is true.

5. **Assertion:** If water is heated to 59°C, the pH will increase.

Reason: K_w increases with an increase in temperature.

Codes:

(a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but the reason is not the correct explanation of the assertion.

(c) If the assertion is true but the reason is false.

(d) If the assertion is false but the reason is true.

6. **Assertion: The addition** of HCl(aq.) to CH_3COOH (aq.) decrease the ionisation of CH_3COOH (aq.).

Reason: Due to the common ion effect H^+, ionisation of CH_3COOH decreases.

Codes:

(a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but the reason is not the correct explanation of the assertion.

(c) If the assertion is true but the reason is false.

(d) If the assertion is false but the reason is true.

7. **Assertion:** NaCl solution can be purified by passage of hydrogen chloride through brine.

Reason: This type of purification is based on Le-Chaterlier's principle.

Codes: A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

C) If assertion is true but reason is false.

D) If the assertion and reason both are false.

E) If assertion is false but reason is true.

8. **Assertion:** Equilibrium constant for the reverse reaction is the inverse of the equilibrium constant for the reaction in the forward direction.

Reason: Equilibrium constant depends upon the way in which the reaction is written.

Codes:

A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

C) If assertion is true but reason is false.

D) If the assertion and reason both are false.

E) If assertion is false but reason is true.

9. **Assertion:** The value of K gives us a relative idea about the extent to which a reaction proceeds.

   Reason: The value of K is independent of the stochiometry of reactants and products at the point of equilibrium.

   Codes:

   A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

   B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

   C) If assertion is true but reason is false.

   D) If the assertion and reason both are false.

   E) If assertion is false but reason is true.

10. **Assertion:** Catalyst affects the final state of the equilibrium.

   Reason: It enables the system to attain a new equilibrium state by complexing with the reagents.

   Codes:

   A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

   B) If both assertion and reason are true but reason is not the correct explanation of the assertion.

   C) If assertion is true but reason is false.

   D) If the assertion and reason both are false.

   E) If assertion is false but reason is true.

Answers Key:

Assertion and reason

1. (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

2. (d) If the assertion is false but the reason is true.

3. (d) If the assertion is false but the reason is true.

4. (a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

5. (d) If the assertion is false but the reason is true.

6. (a) if both assertion and reason are true and the reason is the correct explanation of the assertion.

7. C) If assertion is true but reason is false.

8. A) If both assertion and reason are true and the reason is the correct explanation of the assertion.

9. C) If assertion is true but reason is false.

   Explanation:

   The value of K depends on the stoichiometry of reactants and products at the point of equilibrium. For e.g., if the reaction is multiplied by 2, the equilibrium constant is squared.

10. D) If the assertion and reason both are false.

   Explanation:

   Catalyst does not affect the final state of the equilibrium. It enables the system to attain

equilibrium state earlier by providing an alternative path which involve lower energy of activation.