

BCM SCHOOL BASANT AVENUE DUGRI ROAD LUDHIANA PUNJAB

Assignment

Class XI

Chapter -Equilibrium

25 October 2024

Subjective Questions

Q-1 When does a reversible reaction become an irreversible reaction? Give example.

Q-2 The equilibrium constant for the reaction $\text{SO}_3(\text{g}) \rightleftharpoons \text{SO}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g})$ is 0.18 at 900 K. What will be the equilibrium constant for the reaction $\text{SO}_2(\text{g}) + \frac{1}{2} \text{O}_2(\text{g}) \rightleftharpoons \text{SO}_3(\text{g})$?

Q-3 What is the relation between K_c and K_p for the reaction: $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$

Q-4 What is an Ionic equilibrium? Give example.

Q-5 On what factors does equilibrium depend?

MCQs

Q-6 What does it indicate having a higher equilibrium constant?

- a) reaction occurs faster
- b) rate of backward reaction is faster
- c) both the backward and forward reactions are equal
- d) reaction may be slower than usual

Q-7 The equilibrium constant of a reaction is 20 units and the equilibrium constant of other reaction is 30 units when both the reactions are added up together then the equilibrium constant of the resultant reaction is given by _____

- a) 20 units
- b) 600 units
- c) 50 units
- d) 10 units

Q-8 If the initial concentrations of reactants in a reaction increase then the equilibrium constant _____

- a) also increases
- b) decreases

- c) remains constant
- d) may increase or decrease.

Assertion Reason Type Questions

In each of the following questions, a statement of Assertion (A) is given followed by a corresponding

statement of Reason (R) just below it. Of the statements, mark the correct answer as –

- a. If both assertion and reason are true, and reason is the true explanation of the assertion.
- b. If both assertion and reason are true, but reason is not the true explanation of the assertion.
- c. If assertion is true, but reason is false.
- d. If both assertion and reason are false.

Q-9. Assertion (A). The equilibrium constant is fixed and characteristic for any given chemical reaction at a specified temperature

Reason (R). The composition of the final equilibrium mixture at a particular temperature depends upon the starting amount of reactants.

Q-10. Assertion (A). When a catalyst is added to a reaction mixture in equilibrium, the amount of the products increases.

Reason (R). The forward reaction becomes faster on adding the catalyst.

Q-11. Assertion (A). If standard free energy change of a reaction is zero, this implies that equilibrium constant of the reaction is unity.

Reason (R). For a reaction in equilibrium, equilibrium constant is always unity.

Q-12. Assertion (A). If to the equilibrium $\text{PCl}_5(\text{g}) \rightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$, in a closed vessel, an inert gas is

added, total pressure will increase and hence, equilibrium will shift backward.

Reason (R). Addition of an inert gas to an equilibrium mixture at constant volume shifts the equilibrium in

the backward direction

Q-13. Assertion (A). If reaction quotient (Q_c) is less than the equilibrium constant (K_c), the equilibrium tends

to shift in the direction of products.

Reason (R). The expression for equilibrium constant is different than the expression for reaction quotient.

Q-14. Assertion (A). K_p can be equal to or less than or even greater than the value of K_c .

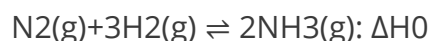
Reason (R). $K_p = K_c (RT)^{\Delta n}$

Case study based Question

Q-15. Read the passage given below and answer the following questions.

The Haber process for the synthesis ammonia from molecular hydrogen and nitrogen is represented by the

following thermochemical equations.



$= -92.6 \text{ kJ/mol}$ the reaction is carried out in the presence of a heterogeneous

catalyst containing iron the value of K_c for the reaction is 1.2 at 375 degree Celcius

1. Write the equilibrium constant expression for the reaction taking place during Haber process.

2. How does the value of K_c for this reaction change with increase in temperature?

3. Write the expression which represents the relationship between K_p and K_c for this reaction.

4. Starting with two mol each (N_2 , H_2 , NH_3) predict the direction of reaction.