



CHEMISTRY

NCERT - FULL MARKS

CHEMISTRY(TAMIL)

CHEMICAL EQUILIBRIUM - II

Self Evaluation A Choose The Correct Answer

1. What is meant by 'chemical equilibrium' ?

A. dynamic

B. stationery

C. none

D. both

Answer: A



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2. If the equilibrium constants of following reactions are $2A \rightleftharpoons B$ is K_1 and $B \rightleftharpoons 2A$ is K_2 , then

A. $K_1 = 2K_2$

B. $K_1 = 1/K_2$

C. $K_2 = (K_1)^2$

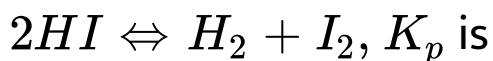
D. $K_1 = 1/K_2^2$

Answer: B



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3. In the reversible reaction



A. greater than K_c

B. less than K_c

C. Equal to K_c

D. Zero

Answer: C



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4. For the reaction



reaction in terms of ammonia is _____

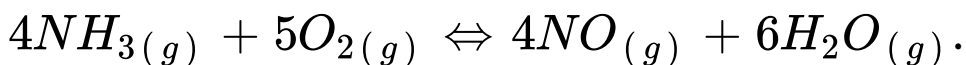
- A. low pressure and high temperature
- B. low pressure and low temperature
- C. high temperature and high pressure
- D. high pressure and low temperature

Answer: D



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5. For the homogeneous reaction at 600 K,



The equilibrium K_c has the unit.

A. $\left(\text{mol dm}^{-3}\right)^{-1}$

B. $\left(\text{mol dm}^{-3}\right)$

C. $\left(\text{mol dm}^{-3}\right)^{10}$

D. $\left(\text{mol dm}^{-3}\right)^{-9}$

Answer: B



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6. Two moles of ammonia gas are introduced into a previously evacuated 1.0 dm^3 vessel in which it partially dissociates at high

temperature. At equilibrium 1.0 mole of ammonia remains. The equilibrium constant K_c for the dissociation is

A. $27 / 16 \left(\text{mole dm}^{-3} \right)^2$

B. $27 / 8 \left(\text{mole dm}^{-3} \right)^2$

C. $27 / 4 \left(\text{mole dm}^{-3} \right)^2$

D. None of these

Answer: A



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7. An equilibrium reaction is endothermic if K_1 and K_2 are the equilibrium constants at T_1 and T_2 temperatures respectively and if T_2 is greater than T_1 then

- A. K_1 is less than K_2
- B. K_1 is greater than K_2
- C. K_1 is equal to K_2
- D. None

Answer: A



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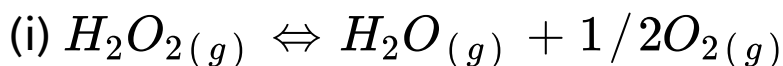
Self Evaluation B Answer In One Or Two Sentences

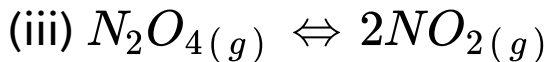
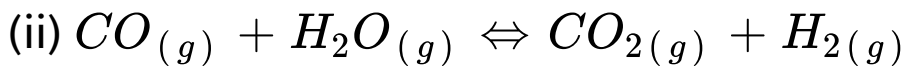
1. Dissolution of ammonium nitrate increases with increase in temperature. why ?



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2. Write the equilibrium constant for the following





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3. State Le-Chatelier principle.



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4. How will you arrive at the unit of equilibrium constant ?



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5. The Cyanobacteria are also referred to as



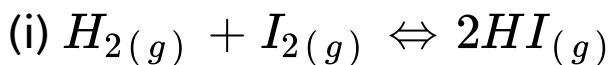
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6. Derive the relation $K_p = K_c(RT)^{\Delta n_g}$ for a general chemical equilibrium reaction.

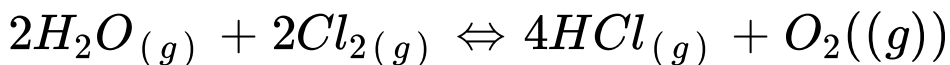


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7. Calculate Δn_g , for the following reactions



(ii)



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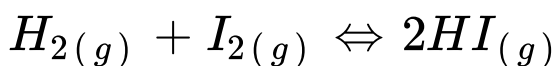
Self Evaluation C Answer Not Exceeding 60 Words

1. Derive the relation $K_p = K_c(RT)^{\Delta n_g}$ for a general chemical equilibrium reaction.



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2. For the equilibrium reaction



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3. Derive the relationship between C_p and C_v for an ideal gas.



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Self Evaluation D Practice Problems

1. The equilibrium constant K_c for $A_{(g)} \rightleftharpoons B_{(g)}$ is 2.5×10^{-2} . The rate constant of the forward reaction is 0.05 sec^{-1} . Calculate the rate constant of the reverse reaction.



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2. In the equilibrium $H_2 + I_2 \rightleftharpoons 2HI$ the number of moles of H_2 , I_2 and HI are 1,2,3

moles respectively. Total pressure of the reaction mixture is 60 atm. Calculate the partial pressures of H_2 , I_2 and HI in the mixture.



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3. In 1 litre volume reaction vessel, the equilibrium constant K_c of the reaction



What will be the degree of dissociation

assuming only a small of 1 mole of PCl_5 has dissociated ?



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4. At temperature T_1 , the equilibrium constant of reaction is K_1 . At a higher temperature T_2 , K_2 is 10 % of K_1 . Predict whether the equilibrium is endothermic or exothermic.



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5. At $35^{\circ}C$, the value of K_p for the equilibrium reaction $N_2O_4 \rightleftharpoons 2NO_2$ is 0.3174, Calculate the degree of dissociation when P is 0.2382 atm



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6. For the equilibrium $2NOCl_{(g)} \rightleftharpoons 2NO_{(g)} + Cl_{2(g)}$ the value of the equilibrium constant K_c is 3.75×10^{-6} at

$790^{\circ}C$. Calculate K_p for this equilibrium at the same temperature.



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7. For the equilibrium

$2SO_3(g) \rightleftharpoons SO_2(g) + O_2(g)$, the value of equilibrium constant is 4.8×10^{-3} at $700^{\circ}C$.

At equilibrium, if the concentration of SO_3 and SO_2 are $0.60M$ and $0.15M$ respectively.

Calculate the concentration of O_2 in the equilibrium mixture.



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8. Hydrogen iodide is injected into a container at $458^{\circ}C$. Certain amount of HI dissociates to H_2 and I_2 . At equilibrium, concentration of HI is found to be $0.421M$ while $[H_2]$ and $[I_2]$ each equal to $6.04 \times 10^{-2}M$, at $458^{\circ}C$. Calculate the value of the equilibrium constant of the dissociation of HI at the same temperature.



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9. Dissociation equilibrium constant of HI is 2.06×10^{-2} at 458°C . At equilibrium, concentrations of HI and I_2 are 0.36M and 0.15M respectively. What is the equilibrium concentration of H_2 at 458°C .



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10. The equilibrium constant for the reaction $2\text{SO}_{3(g)} \rightleftharpoons 2\text{SO}_{2(g)} + \text{O}_{2(g)}$ is 0.15 at 900 K. Calculate the equilibrium constant for the

reaction $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$ at

the same temperature.



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11. For the reaction $A + B \rightleftharpoons 3C$ at $25^\circ C$, a 3 litre volume reaction vessel contains 1,2 and 4 moles of A,B and C respectively at equilibrium, calculate the equilibrium constant K_c of the reaction at $25^\circ C$.



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12. How much PCl_5 must be added to one litre volume reaction vessel at $250^\circ C$ in order to obtain a concentration of 0.1 mole of Cl_2 , K_c for $PCl_5 \rightleftharpoons PCl_3 + Cl_2$ is $0.0414 \text{ mol dm}^{-3}$ at $250^\circ C$.



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13. At 540, the equilibrium constant K_p for PCl_5 dissociation equilibrium at 1.0 atm 1.77 atm. Calculate equilibrium constant in molar

concentration (K_c) at same temperature and pressure.



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