**Karan Arora**  **R.L. Institute M: 9416974837**

**Max Time : 1 hr** **EQUILIBRIUM TEST-1 Max Marks : 20**

**Class = 11th Chemistry CODE : A**

1. Answer the following Multiple Choice Question (s) : [1.5 x 10 = 15]
2. If pressure is increased on the equilibrium N2 + O2 2 NO , the equilibrium will

|  |  |
| --- | --- |
| a) shift in the forward direction | b) shift in the backward direction |
| c) remain undisturbed | d) may shift in the forward or backward direction |

1. For the reaction ; PCl3 (g) + Cl2 (g) PCl5 (g) the value of KC at 250˚C is 26. The value of KP at this temperature will be

|  |  |  |  |
| --- | --- | --- | --- |
| a) 0.61 | b) 0.57 | c) 0.83 | d) 0.46 |

1. In a reversible reaction, two substances are in equilibrium. If the concentration of each one is doubled, the equilibrium constant will be

|  |  |
| --- | --- |
| a) Reduced to half its original value | b) Reduced to ¼ th of its original value |
| c) Doubled | d) Constant |

1. The reaction , SO2 + Cl2 SO2Cl2 is exothermic and reversible. A mixture of SO2 (g) , Cl2 (g) and SO2Cl2 (g) is at equilibrium in a closed container. Now a certain quantity of extra SO2 is introduce into the container, the volume remaining the same. Which of the following is/are true ?

|  |  |
| --- | --- |
| a) The pressure inside the container will not change | b) The temperature will not change |
| c) The temperature will increase | d) The temperature will decrease |

1. In a reaction, A + 2 B 2 C , 2 mole of ‘A’ , 3 mol of ‘B’ and 2 mole of ‘C’ are placed in a 2 litre flask and the equilibrium concentration of ‘C’ is 0.5 mol/L. The equilibrium constant (K) for the reaction is

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| --- | --- | --- | --- |
| a) 0.073 | b) 0.147 | c) 0.05 | d) 0.026 |

1. NH4COONH2 (s) 2 NH3 (g) + CO2 (g) , If equilibrium pressure is 3 atm for the above reaction, KP for the reaction is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 4 | b) 27 | c) 4/27 | d) 1/27 |

1. For the reaction , H2 (g) + CO2 (g) CO (g) + H2O (g) , If the initial pressure of [H2] = [CO2] and x moles/Litre of hydrogen is consumed at equilibrium , the correct expression of Kp is

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) | c) | d) |

1. N2O4 is 10 % dissociated at a total pressure P1 and 20 % dissociated at a total pressure P2. Then ratio P1/P2 is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1/2 | b) 2/1 | c) 1/4 | d) 4/1 |

1. When hydrogen molecules decompose into its atoms, which condition give maximum yield of hydrogen atoms?

|  |  |
| --- | --- |
| a) high temperature and low pressure | b) low temperature and high pressure |
| c) high temperature and high pressure | d) low temperature and low pressure |

1. For the reaction : H2 + I2 2 HI , K = 47.6 . If the initial number of moles of each reactant and product is 1 mole, then at equilibrium

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| a) [I2] = [H2] , [I2] > [HI] | b) [I2] < [H2] , [I2] = [HI] | c) [I2] = [H2] , [I2] < [HI] | d) [I2] > [H2] , [I2] = [HI] |

1. At 450 K , KP = 2 x 1010/bar for the given reaction at equilibrium [ 2 ]

2 SO­2 (g) + O2 (g) 2 SO3 (g) , What is KC at this temperature ?

1. A sample of pure PCl5 was introduced into a evacuated vessel at 473 K. After equilibrium was reached , the concentration of PCl5 was found to be 0.5 x 10 – 1 mol/L. If KC is 8.3 x 10 – 3 what are the concentrations of PCl3 and Cl2 at equilibrium ? [ 3 ]

**Karan Arora**  **R.L. Institute M: 9416974837**

**Max Time : 1 hr** **EQUILIBRIUM TEST-1 Max Marks : 30**

**Class = 11th Chemistry CODE : B**

1. Answer the following Multiple Choice Question (s) : [1.5 x 10 = 15]
2. When hydrogen molecules decompose into its atoms, which condition give maximum yield of hydrogen atoms ?

|  |  |
| --- | --- |
| a) high temperature and low pressure | b) low temperature and high pressure |
| c) high temperature and high pressure | d) low temperature and low pressure |

1. The reaction , SO2 + Cl2 SO2Cl2 is exothermic and reversible. A mixture of SO2 (g) , Cl2 (g) and SO2Cl2 (g) is at equilibrium in a closed container. Now a certain quantity of extra SO2 is introduce into the container, the volume remaining the same. Which of the following is/are true ?

a) The pressure inside the container will not change

b) The temperature will not change

c) The temperature will increase

d) The temperature will decrease.

1. For the reaction , H2 (g) + CO2 (g) CO (g) + H2O (g) , If the initial pressure of [H2] = [CO2] and x moles/Litre of hydrogen is consumed at equilibrium , the correct expression of Kp is

|  |  |  |  |
| --- | --- | --- | --- |
| a) | b) | c) | d) |

1. For the reaction : H2 + I2 2 HI , K = 47.6 . If the initial number of moles of each reactant and product is 1 mole, then at equilibrium

|  |  |  |  |
| --- | --- | --- | --- |
| a) [I2] = [H2] , [I2] > [HI] | b) [I2] < [H2] , [I2] = [HI] | c) [I2] = [H2] , [I2] < [HI] | d) [I2] > [H2] , [I2] = [HI] |

1. In a reversible reaction, two substances are in equilibrium. If the concentration of each one is doubled, the equilibrium constant will be

|  |  |
| --- | --- |
| a) Reduced to half its original value | b) Reduced to ¼ th of its original value |
| c) Doubled | d) Constant |

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| a) 0.073 | b) 0.147 | c) 0.05 | d) 0.026 |

1. If pressure is increased on the equilibrium N2 + O2 2 NO , the equilibrium will

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| a) shift in the forward direction | b) shift in the backward direction |
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| --- | --- | --- | --- |
| a) 0.61 | b) 0.57 | c) 0.83 | d) 0.46 |

1. NH4COONH2 (s) 2 NH3 (g) + CO2 (g) , If equilibrium pressure is 3 atm for the above reaction, KP for the reaction is

|  |  |  |  |
| --- | --- | --- | --- |
| a) 4 | b) 27 | c) 4/27 | d) 1/27 |

1. N2O4 is 10 % dissociated at a total pressure P1 and 20 % dissociated at a total pressure P2. Then ratio P1/P2 is

|  |  |  |  |
| --- | --- | --- | --- |
| a) ½ | b) 2/1 | c) 1/4 | d) 4/1 |

1. A sample of pure PCl5 was introduced into a evacuated vessel at 473 K. After equilibrium was reached , the concentration of PCl5 was found to be 0.5 x 10 – 1 mol/L. If KC is 8.3 x 10 – 3 what are the concentrations of PCl3 and Cl2 at equilibrium ? [3]
2. At 450 K , KP = 2 x 1010/bar for the given reaction at equilibrium [3]

2 SO­2 (g) + O2 (g) 2 SO3 (g) , What is KC at this temperature ?

1. The equilibrium constant for the reaction, H­2 (g) + Br2 (g) 2 HBr (g) at 1024 K is 1.6 x 105. Find the equilibrium pressure of all gases if 10 bar of HBr is introduced into a sealed container at 1024 K. [3]
2. Calculate (a) G0 and (b) the equilibrium constant for the formation of NO2 from NO and O2 at 298 K .

NO (g) + O2 (g) → NO2 (g) ,

where G0 (NO2) = 52 KJ/mol , G0 (NO) = 87 KJ/mol , G0 (O2) = 0 KJ/mol [3]

1. Which of the following reactions will get affected by increasing the pressure ? Also mention whether change will cause the reaction to go into forward or backward direction ? [3]

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| --- | --- |
| a) COCl2 (g) CO (g) + Cl2 (g) | b) CH4 (g) + 2 S2 (g) CS2 (g) + 2 H2S (g) |
| c) C (s) + CO2 (g) 2 CO (g) | d) 2 H2 (g) + CO (g) CH3OH (g) |
| e) CaCO3 (g) CaO (s) + CO2 (g) | f) 4 NH3 (g) + 5 O2 (g) 4 NO (g) + 6 H2O (g) |

**Answers**

**EQUILIBRIUM Test-1 [CLASS = 11th ]**

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| --- | --- |
| **CODE : A** | **CODE : B** |
| Q.1 1. c | Q.1 1. a |
| 2. a | 2. c |
| 3. d | 3. a |
| 4. c | 4. c |
| 5. c | 5. d |
| 6. a | 6. c |
| 7. a | 7. c |
| 8. d | 8. a |
| 9. a | 9. a |
| 10. c | 10. d |
| Q.2 7.48 x 1011 L/mol | Q.2 0.02 M |
| Q.3 0.02 M | Q.3 7.48 x 1011 L/mol |
| Q.4 a) – 35 KJ/mol  b) 1.361 x 106 | Q.4 10 bar |
| Q.5 10 bar | Q.5 a) – 35 KJ/mol  b) 1.361 x 106 |

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| --- |
| Q.6 a) Reaction will go in the backward direction. |
| b) Reaction will not be affected by pressure. |
| c) Reaction will go in the backward direction. |
| d) Reaction will go in the forward direction. |
| e) Reaction will go in the backward direction. |
| f) Reaction will go in the backward direction. |