Activation energy, Standard free energy and Degree of dissociation and Vapour density

1. The vapour density of completely dissociated NH_4Cl would be
(a) Slight less than half that of NH_4Cl
(b) Half that of NH_4Cl
(c) Double that of NH_4Cl
(d) Determined by the amount of solid NH_4Cl in the experiment

2. In an equilibrium reaction for which $\Delta G^0 = 0$, the equilibrium constant $K =$
(a) 0 (b) 1
(c) 2 (d) 10

3. For a system in equilibrium $\Delta G = 0$ under conditions of constant
(a) Temperature and pressure
(b) Temperature and volume
(c) Energy and volume
(d) Pressure and volume

4. A reaction attains equilibrium when the free energy change accompanying it is
(a) Positive and large
(b) Zero
(c) Negative and large
(d) Negative and small

5. $\Delta G^0(HI, g) \cong +1.7kJ$. What is the equilibrium constant at 25^oC for $2HI(g) \leftrightarrows H_2(g) + I_2(g)$
(a) 24.0 (b) 3.9
(c) 2.0 (d) 0.5

6. The standard state gibbs free energy change for the given isomerization reaction *cis*-2-pentene $\rightleftharpoons$ trans –2 -pentene is $-3.67kJ/mol$ at $400K$. If more trans-2-pentene is added to the reaction vessel, then
(a) More *cis* –2–pentene is formed
(b) Equilibrium is shifted in the forward direction
(c) Equilibrium remains unaffected
(d) Additional *trans*–2–pentene is formed

7. In a reversible reaction, the catalyst
(a) Increases the activation energy of the backward reaction
(b) Increases the activation energy of the forward reaction
(c) Decreases the activation energy of both, forward and backward reaction
(d) Decreases the activation energy of forward reaction

8. For the reaction $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$, the equilibrium constant changes with

(a) Total pressure

(b) Catalyst

(c) The amounts of H_2 and I_2 taken

(d) Temperature

9. Calculate $\Delta G°$ for conversion of oxygen to ozone $3/2\ O_2(g) \rightarrow O_3(g)$ at 298 *K*, if K_p for this conversion is 2.47×10^{-29}

(a) $163\ kJ\ mol^{-1}$

(b) $2.4 \times 10^2\ kJ\ mol^{-1}$

(c) $1.63\ kJ\ mol^{-1}$

(d) $2.38 \times 10^6\ kJ\ mol^{-1}$