Le-Chaterlier principle and It's application

1. When in any system at equilibrium state pressure, temperature and concentration is changed then the equilibria shifted to such a direction which neutralize the effect of change. This is known as
   (a) First law of thermodynamics
   (b) Le-chatelier's principle
   (c) Ostwald's rule
   (d) Hess's law of constant heat summation

2. $N_2 + O_2 \rightleftharpoons 2NO - Qcals$
   In the above reaction which is the essential condition for the higher production of NO
   (a) High temperature
   (b) High pressure
   (c) Low temperature
   (d) Low pressure

3. A reversible reaction is in equilibrium. If a factor is changed which affect it, then
   (a) The speed of forward and backward reaction increases
   (b) The speed of forward and backward reaction decreases
   (c) Only the speed of that reaction increases which nullifies the factor causing increase of speed
   (d) No difference

4. Which of the following reactions proceed at low pressure
   (a) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
   (b) $H_2 + I_2 \rightleftharpoons 2HI$
   (c) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
   (d) $N_2 + O_2 \rightleftharpoons 2NO$

5. Le-chatelier principle is applicable
   (a) Both for physical and chemical equilibrium
   (b) Only for chemical equilibrium
   (c) Only for physical equilibrium
   (d) Neither for (b) nor for (c)

6. In the following reversible reaction
   $2SO_2 + O_2 \rightleftharpoons 2SO_3 + QCal$
   Most suitable condition for the higher production of SO_3 is
   (a) High temperature and high pressure
   (b) High temperature and low pressure
   (c) Low temperature and high pressure

(d) Low temperature and low pressure

7. When the pressure is applied over system *ice* ⇌ *water* what will happen ?
(a) More water will form
(b) More ice will form
(c) There will be no effect over equilibrium
(d) Water will decompose in H_2 and O_2

8. The reaction $A + B \rightleftharpoons C + D$ +*heat* has reached equilibrium. The reaction may be made to proceed forward by
(a) Adding more C
(b) Adding more D
(c) Decreasing the temperature
(d) Increasing the temperature

9. On the velocity in a reversible reaction, the correct explanation of the effect of catalyst is
(a) It provides a new reaction path of low activation energy
(b) It increases the kinetic energy of reacting molecules
(c) It displaces the equilibrium state on right side
(d) It decreases the velocity of backward reaction

10. Select the correct statement from the following
(a) Equilibrium constant changes with addition of catalyst
(b) Catalyst increases the rate of forward reaction
(c) The ratio of mixture at equilibrium is not changed by catalyst
(d) Catalyst are active only in solution

11. According to Le-chatelier principle, if heat is given to solid-liquid system, then
(a) Quantity of solid will reduce
(b) Quantity of liquid will reduce
(c) Increase in temperature
(d) Decrease in temperature

12. In the reaction $A(g) + 2B(g) \rightleftharpoons C(g) + QkJ$, greater product will be obtained **or** the forward reaction is favoured by
(a) At high temperature and high pressure
(b) At high temperature and low pressure
(c) At low temperature and high pressure

(d) At low temperature and low pressure

13. Following gaseous reaction is undergoing in a vessel $C_2H_4 + H_2 \rightleftharpoons C_2H_6$; $\Delta H = -32.7Kcal$

Which will increase the equilibrium concentration of C_2H_6

(a) Increase of temperature

(b) By reducing temperature

(c) By removing some hydrogen

(d) By adding some C_2H_6

14. The effect of increasing the pressure on the equilibrium $2A + 3B \rightleftharpoons 3A + 2B$ is

(a) Forward reaction is favoured

(b) Backward reaction is favoured

(c) No effect

(d) None of the above

15. For the equilibrium $2NO_2(g) \rightleftharpoons N_2O_4(g) + 14.6kcal$ the increase in temperature would

(a) Favour the formation of N_2O_4

(b) Favour the decomposition of N_2O_4

(c) Not alter the equilibrium

(d) Stop the reaction

16. Which of the following factors will favour the reverse reaction in a chemical equilibrium

(a) Increase in the concentration of one of the reactants

(b) Removal of at least one of the product at regular time intervals

(c) Increase in the concentration of one or more products

(d) None of these

17. In the formation of SO_3 by contact process, the conditions used are

(a) Catalyst, optimum temperature and higher concentration of reactants

(b) Catalyst, optimum temperature and lower concentration of reactants

(c) Catalyst, high temperature and higher concentration of reactants

(d) Catalyst, low temperature and lower concentration of reactants

18. Given reaction is $2X_{(gas)} + Y_{(gas)} \rightleftharpoons 2Z_{(gas)} + 80kcal$

Which combination of pressure and temperature gives the highest yield of Z at equilibrium

(a) 1000 atm and 500^oC

(b) 500 atm and 500^oC

(c) 1000 atm and 100^oC

(d) 500 atm and 100^oC

19. Consider the reaction $HCN_{(aq)} \rightleftharpoons H^+_{(aq)} + CN^-_{(aq)}$. At equilibrium, the addition of $CN^-_{(aq)}$ would

(a) Reduce $HCN_{(aq)}$ concentration
(b) Decrease the $H^{+}_{(aq)}$ ion concentration
(c) Increase the equilibrium constant
(d) Decrease the equilibrium constant

20. In the gaseous equilibrium $H_2X_2 +$ heat $\rightleftharpoons$ $2HX$, the formation of HX will be favoured by
(a) High pressure and low temperature
(b) High temperature and low pressure
(c) Low temperature and low pressure
(d) High temperature and high pressure