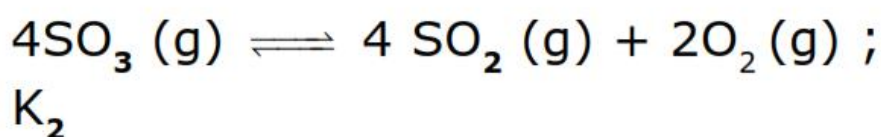
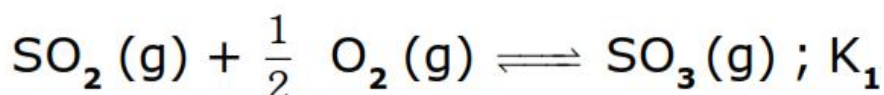


**Chemistry [ DPP ]**  
**Chemical Equilibrium**

1. Consider the two gaseous equilibrium involving  $\text{SO}_2$  and the corresponding equilibrium constants at 299 K



The value of the equilibrium constant are related by :-

(A)  $K_2 = \frac{1}{(K_1)^4}$       (B)  $K_2 = K_1^4$

(C)  $K_2 = \left(\frac{1}{K_1}\right)^{\frac{1}{4}}$       (D)  $K_2 = \frac{1}{K_1}$

- 
- 2.** For the reactions :-  $A \rightleftharpoons B$  ;  $K_c = 2$ ,  
 $B \rightleftharpoons C$  ;  $K_c = 4$ ,  $C \rightleftharpoons D$  ;  $K_c = 6$   
 $K_c$  for the reaction  $A \rightleftharpoons D$  :-  
(A) 12 (B)  $4/3$   
(C) 24 (D) 48
- 3.** If  $A \rightleftharpoons B$  ( $K_c = 3$ ),  $B \rightleftharpoons C$  ( $K_c = 5$ ),  
 $C \rightleftharpoons D$  ( $K_c = 2$ )  
The value of equilibrium constant for the above reaction are given, the value of equilibrium constant for  $D \rightleftharpoons A$  will be:-  
(A) 15 (B) 0.3  
(C) 30 (D) 0.03

4. Effect of increasing temperature on equilibrium constant is given by  $\log$

$$K_2 - \log K_1 = \frac{-\Delta H}{2.303R} \left[ \frac{1}{T_2} - \frac{1}{T_1} \right]. \text{ Then for}$$

an endothermic reaction the false statement is:-

(A)  $\left[ \frac{1}{T_2} - \frac{1}{T_1} \right] = \text{positive}$

(B)  $\log K_2 > \log K_1$

(C)  $\Delta H = \text{positive}$

(D)  $K_2 > K_1$

5. The equilibrium constant for the reaction

$\text{Br}_2 \rightleftharpoons 2\text{Br}$  at 500 K and 700 K are  $1 \times 10^{-10}$  and  $1 \times 10^{-5}$  respectively.

The reaction is:-

(A) Endothermic (B) Exothermic

(C) Fast (D) Slow

- 
- 6.** The equilibrium constant in a reversible reaction at a given temperature:-
- (A) Depends on initial concentration of the reactants.
  - (B) Depends on the concentration of the products at equilibrium.
  - (C) Does not depend on the initial concentrations.
  - (D) It is not characteristic of the reaction.
- 7.** For a reaction  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ , the value of  $K_c$  does not depends upon :-
- (a) Initial concentration of the reactants
  - (b) Pressure
  - (c) Temperature
  - (d) Catalyst
- |             |                |
|-------------|----------------|
| (A) Only c  | (B) a, b, c    |
| (C) a, b, d | (D) a, b, c, d |
-

8. For any reversible reaction if concentration of reactants increases then effect on equilibrium constant:-  
(A) Depends on amount of concentration  
(B) Unchange  
(C) Decrease  
(D) Increase
9. In an experiment the equilibrium constant for the reaction  $A + B \rightleftharpoons C + D$  is  $K$  when the initial concentration of A and B each is  $0.1 \text{ mol L}^{-1}$ . Under the similar conditions in an another experiment if the initial concentration of A and B are taken 2 and  $3 \text{ mol L}^{-1}$  respectively then the value of equilibrium constant will be:-  
(A)  $\frac{K}{2}$  (B)  $K$   
(C)  $K^2$  (D)  $\frac{1}{K}$

**10. List X**

**List Y**

- |   |  |
|---|--|
| (A) Active mass   | (i) $\Delta n = 0$                       |
| (B) Dynamic nature  | (ii) Molar concentration                 |
| (C) $A + \text{heat} \rightleftharpoons B$  | (iii) Vant hoff's equation               |
| (D) $\log (K_{p2}/K_{p1}) = \frac{\Delta H}{2.303R} \left[ \frac{1}{T_1} - \frac{1}{T_2} \right]$ | (iv) adaptation if temperature increases |
| (E) $2A(g) + B(g) \rightleftharpoons 3C(g)$   | (v) Chemical equilibrium                 |

Correct match list X and Y

- (A) A - (V), B - (II), C - (III), D - (I), E - (IV)
- (B) A - (V), B - (IV), C - (III), D - (II), E - (I)
- (C) A - (II), B - (V), C - (IV), D - (III), E - (I)
- (D) None of these

- 
- 11.** For the reaction,  $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$  equilibrium constant,  $K_p$  changes with :-
- (A) Temperature
  - (B) Total pressure
  - (C) Catalyst
  - (D) Amount of  $\text{H}_2$  and  $\text{I}_2$  present
- 12.** 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 does not changed by catalyst
  - (D) Catalyst are active only in solution.

**13.** The equilibrium constant ( $K_p$ ) for the reaction  $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$  is 16. If the volume of the container is reduced to one-half its original volume, the value of  $K_p$  for the reaction at the same temperature will be :-

- (A) 32                      (B) 64  
(C) 16                      (D) 4

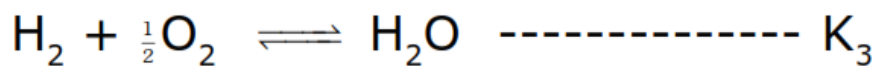
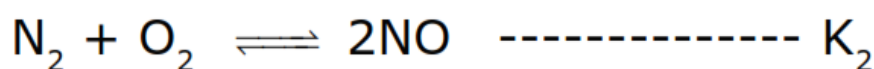
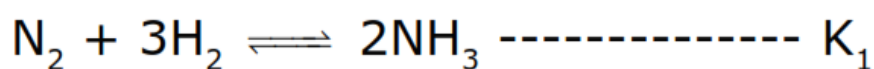
**14.** The equilibrium constant for the reaction :

$\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$  at 2000 K is  $4 \times 10^4$ . In presence of catalyst the equilibrium is established ten times faster at the same temperature. What is the value of equilibrium constant in presence of catalyst :-

- (A)  $40 \times 10^{-4}$               (B)  $4 \times 10^{-4}$   
(C)  $4 \times 10^4$                 (D) None

- 15.** The equilibrium constant of the reaction  $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$  is 64. If the volume of the container is reduced to one fourth of its original volume, the value of the equilibrium constant will be
- (A) 16                      (B) 32  
(C) 64                      (D) 128
- 16.** If some He gas is introduced into the equilibrium  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$  at constant pressure and temperature then equilibrium constant of reaction:
- (A) Increase  
(B) Decrease  
(C) Unchange  
(D) Nothing can be said

**17.** The following equilibrium are given



The equilibrium constant of the reaction

$2\text{NH}_3 + \frac{5}{2}\text{O}_2 \rightleftharpoons 2\text{NO} + 3\text{H}_2\text{O}$ , in terms of  $K_1$ ,  $K_2$  and  $K_3$  is :

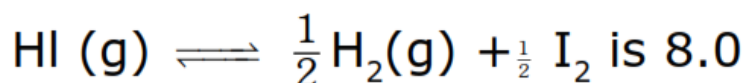
(A)  $\frac{K_1 K_2}{K_3}$

(B)  $\frac{K_1 K_3^2}{K_2}$

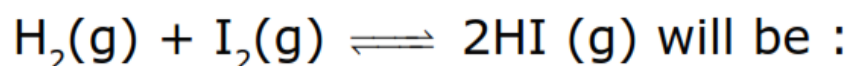
(C)  $\frac{K_2 K_3^3}{K_1}$

(D)  $K_1 K_2 K_3$

- 18.** The value of equilibrium constant of the reaction

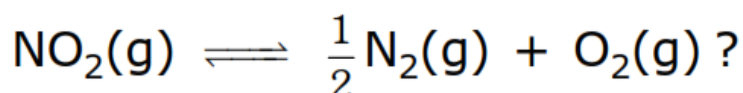


The equilibrium constant of the reaction



- (A)  $\frac{1}{64}$  (B) 16  
(C)  $\frac{1}{8}$  (D)  $\frac{1}{16}$

- 19.** For the reaction  $\text{N}_2\text{(g)} + \text{O}_2\text{(g)} \rightleftharpoons 2\text{NO(g)}$ , the equilibrium constant is  $K_1$ . The equilibrium constant is  $K_2$  for the reaction  $2\text{NO(g)} + \text{O}_2\text{(g)} \rightleftharpoons 2\text{NO}_2\text{(g)}$ . What is  $K$  for the reaction



- (A)  $1/(2K_1K_2)$  (B)  $1/(4K_1K_2)$   
(C)  $[1/K_1K_2]^{1/2}$  (D)  $1/(K_1K_2)$

---

**20.** For the reaction  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$ ,  $K_c$  is 100 then  $K_c$  for reaction.

$2\text{NO} \rightleftharpoons \text{N}_2 + \text{O}_2$  will be :-

- |          |         |
|----------|---------|
| (A) 0.01 | (B) 0.1 |
| (C) 10   | (D) 100 |

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## **ANSWER KEY**

- |            |   |            |   |            |   |
|------------|---|------------|---|------------|---|
| <b>1.</b>  | A | <b>2.</b>  | D | <b>3.</b>  | D |
| <b>4.</b>  | A | <b>5.</b>  | A | <b>6.</b>  | C |
| <b>7.</b>  | C | <b>8.</b>  | B | <b>9.</b>  | B |
| <b>10.</b> | C | <b>11.</b> | A | <b>12.</b> | C |
| <b>13.</b> | C | <b>14.</b> | C | <b>15.</b> | C |
| <b>16.</b> | C | <b>17.</b> | C | <b>18.</b> | A |
| <b>19.</b> | C | <b>20.</b> | A |            |   |