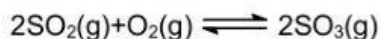


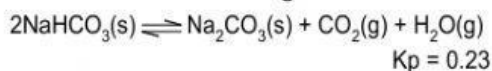
16. A mixture of gases is allowed to reach equilibrium at  $700^{\circ}\text{C}$  in a 12.0L flask. At equilibrium, the mixture contains 0.208M  $\text{SO}_2$ ,  $1.12 \times 10^{-6}$  M  $\text{O}_2$  and 0.725 M  $\text{SO}_3$ .



What is equilibrium constant,  $K_c$ ?

- A.  $9.22 \times 10^{-8}$       C.  $1.08 \times 10^7$   
B.  $3.11 \times 10^6$       D.  $4.56 \times 10^8$

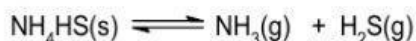
17. Consider the following reaction



A sample of  $\text{NaHCO}_3$  is placed in an evacuated flask and is allowed to achieve equilibrium at 373K. What is the total gas pressure at equilibrium?

- A. 0.12 atm      C. 0.48 atm  
B. 0.24 atm      D. 0.96 atm

18. Some inert gas is added at constant volume to the following reaction at equilibrium.



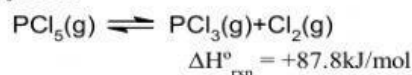
Predict the effect of adding inert gas:

- A. The equilibrium position shift in the forward direction
- B. The equilibrium position shift in the backward direction
- C. The equilibrium remains unaffected
- D. The value of  $K_p$  is increased

19. In which reaction, low pressure and temperature favour the formation of products?

- A.  $2\text{O}_3(\text{g}) \rightleftharpoons 3\text{O}_2(\text{g}) \quad \Delta H = -284 \text{ kJ}$   
 B.  $2\text{HI}(\text{g}) \rightleftharpoons \text{H}_2(\text{g}) + \text{I}_2(\text{g}) \quad \Delta H = +10.5 \text{ kJ}$   
 C.  $2\text{NH}_3(\text{g}) \rightleftharpoons 2\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \quad \Delta H = +92.4 \text{ kJ}$   
 D.  $2\text{C}_2\text{H}_2(\text{g}) + 5\text{O}_2(\text{g}) \rightleftharpoons 4\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{g})$   
 $\Delta H = -284 \text{ kJ}$

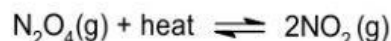
20. Consider this gas phase equilibrium system



Which of the following statements is **FALSE**?

- A. Increasing the system volume shifts the equilibrium to the right.
- B. Increasing the temperature shifts the equilibrium to the right.
- C. A catalyst speeds up the approach to equilibrium and shifts the position of equilibrium to the right.
- D. Increasing the temperature causes the equilibrium constant to increase

21. For the equilibrium system:



Which of the following factors would cause the value of the equilibrium constant to decrease?

- A. Decreasing the temperature.  
B. Removing some  $\text{NO}_2$ .  
C. Adding a catalyst.  
D. Adding some He gas at constant volume.

22. For the reaction



What conditions of pressure and temperature would be optimum for the synthesis?

- A. Low  $T$  and low  $P$   
B. Low  $T$  and high  $P$   
C. High  $T$  and low  $P$   
D. High  $T$  and high  $P$

23. In a reversible chemical reaction having two reactants in equilibrium, if the concentration of the reactants doubled then the equilibrium constant will