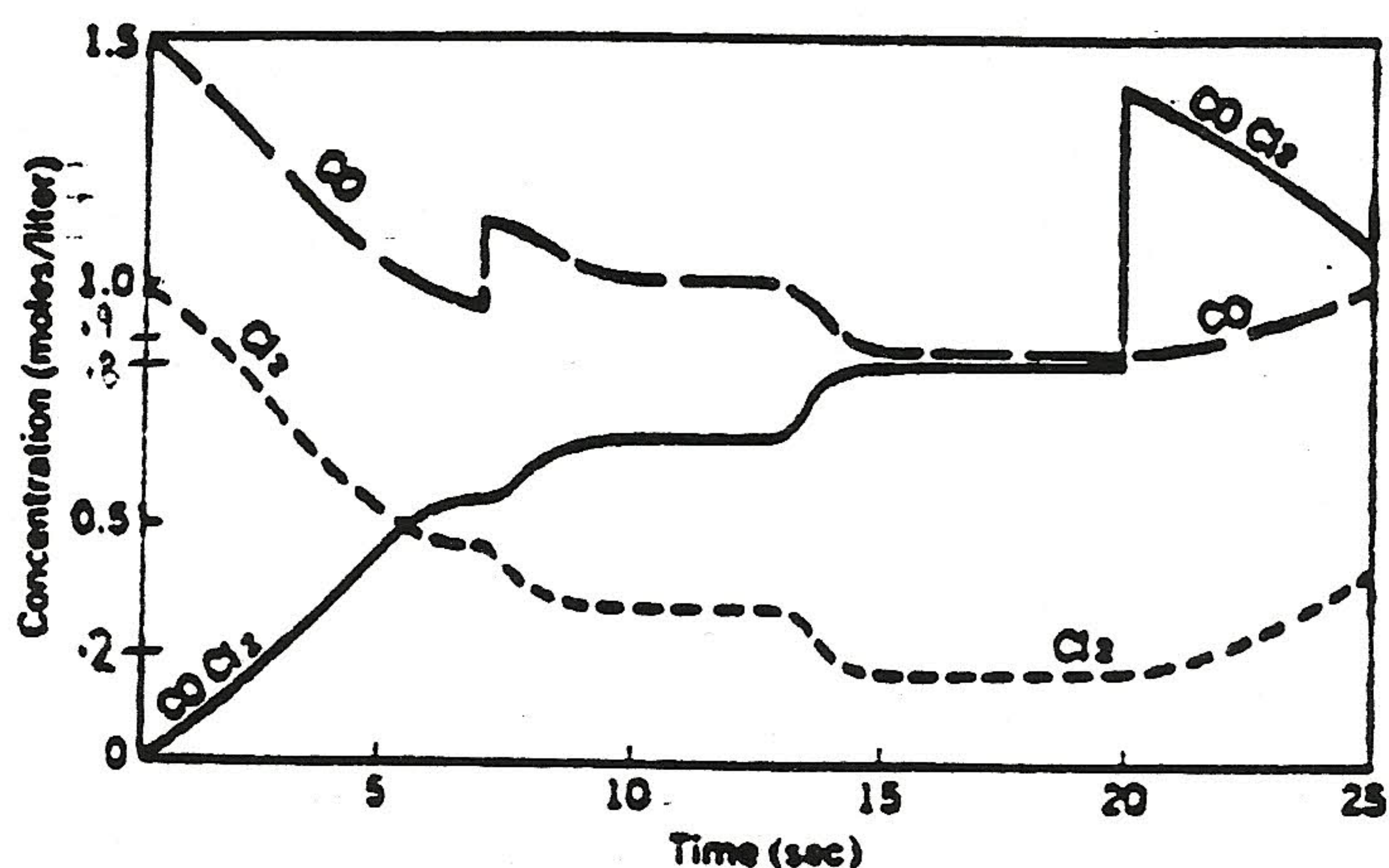


## Le Chatelier Question

1. Consider the following equilibrium system  $\text{CO}_{(g)} + \text{Cl}_{2(g)} \rightleftharpoons \text{COCl}_{2(g)}$ .

The graph below shows concentrations of all three species of the equilibrium system are plotted against time under a given set of conditions.



- How long did it take for the system to reach its first equilibrium position?
- Calculate the value of  $K$  at time = 17 seconds.
- Explain the change (stress) in conditions 6 seconds after the initiation of the reaction. Explain.
- What change (stress) in conditions might have been imposed on the system 13 seconds after the initiation of the reaction? Explain.
- Are there any changes imposed on the system between the interval of 15 to 20 seconds? Explain.
- What change (stress) may have taken place at 20 seconds? Explain.
- What differences would you have noted if a catalyst had been present during the entire course of this reaction?
- List the changes (stresses) you might impose on the system if you wanted to produce the maximum amount of  $\text{COCl}_2$ ?
- How could you account for the differences in the value of  $K$  at different points on the graph?