Induction period:

$$A \xrightarrow{k_1} X \xrightarrow{k_2} Z$$

Z is formed from A, not directly but via an intermediate X, there will be a time lag between the start of disappearance of A and the start of formation of Z. This time is called induction time.

If the intermediate X is very unstable the induction time will be short.

On the other hand, if X is sufficiently stable, then the induction time will be long.

In an elementary or single step reaction (Z is formed directly from A), there is no induction time.