THE OXFORD COLLEGE OF ENGINEERING
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A PROJECT REPORT ON

"DETERMINATION OF RATE CONSTANT OF PSEUDO FIRST ORDER REACTION IN A BATCH REACTOR AS A FUNCTION OF TEMPERATURE"

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CHAPTER 1
INTRODUCTION

Chemical kinetics, also known as reaction kinetics, is the study of rates of chemical processes. Chemical kinetics includes investigations of how different experimental conditions can influence the speed of a chemical reaction and yield information about the reaction's mechanism and transition states, as well as the construction of mathematical models that can describe the characteristics of a chemical reaction. In 1864, Peter Waage and Cato Guldberg pioneered the development of chemical kinetics by formulating the law of mass action, which states that the speed of a chemical reaction is proportional to the quantity of the reacting substances.

As all chemical and biochemical processes involve many reactions in the due course, it is most important to study the nature of the reactions involved and suitably design the reactors to handle those processes. Reactor design is purely based on the analysis of the reaction data and therefore the reaction that takes place has to be carefully examined to determine the conversion and the product distribution which also plays a key role in deciding the economics of the process.

This project work is taken up as a study project to examine pseudo first order reactions and to analyze reaction rate as a function of temperature. The aim of the project work is:

i) To carry out pseudo first order reactions at different temperatures

ii) To determine the conversion rates at these respective temperatures

iii) To design mixed flow reactor and plug flow reactor

iv) To determine suitable residence time for these reactors