Operations research is the scientific study of large samples with a view to the different problem areas and also to provide the decision makers as well as the designers with a quantitative basis for their decisions which will enhance the effectiveness of the system in achieving the specified objectives. Among different techniques that are most commonly used in this area, the optimisation methods play a very significant and vital role for their applications.

The techniques of inventory management are also very essential tools for any business organisation, however large or small it may be. The decisions made about the variables in the system can greatly influence for business planning and forecasting.

This research study deals with certain inventory models with aggregation problem for several commodities and also specifically the models for restrictions. Here the inventory systems are influenced by the market conditions and considering the relevant cost structure as well as the mark-up and discounting, the decision variables are determined considering the profit maximisation approach for the system.

The entire study is split-up into EIGHT chapters. A brief summary of the same is presented as under.
Chapter I begins with some preliminary remarks about this study. It also contains the conceptual introduction of the subject along with some basic definitions. Thus, the purpose of this chapter is to present, in a very precise form, the entire framework of the study.

Chapter II contains an aggregate inventory model for continuous units under given market situation. The model is developed for the profit maximisation approach using linear and hyperbolic quantity discount policies for the bulk purchases of the items. The derived model is also illustrated by means of its sensitivity analysis.

Chapter III discusses the lot-size inventory model under finite production rate suitable for multi-product items, where the lot size units are discrete in nature and appropriate types of discounting policies are considered under given mark-up phenomena. The results developed are illustrated by a numerical example along with its sensitivity analysis.

Chapter IV considers EOQ model under given variable but known linear demand law with quantity discount cases. The results are illustrated by a numerical example along with its sensitivity analysis.

Chapter V contains inventory models for several items under the restrictions pertaining to the limited floor space area as well as the total capital investment in inventory which can be available at the warehouse. The inventory models for such
situations are derived with an objective of maximising the net return on investment subject to the desired mark-up of prices as well as the appropriate types of discounting policies. The model developed is also illustrated by its sensitivity analysis.

**Chapter VI** discusses ELS model for several items corresponding to the restrictions imposed upon the commoditywise given number of orders as well as for the aggregate number of orders for all the commodities as a whole. The model is developed for maximising the net revenue (profit) of the supplier under given marketing situations. The derived model is suitably illustrated with its sensitivity analysis.

**Chapter VII** considers the inventory model for multi-product items under varying but known linear demand function and the commoditywise constraints for the given fixed number of orders that can be placed. The derived model is illustrated by a suitable numerical example with its sensitivity analysis pertaining to the problems of maximising the net ROI.

**Chapter VIII** contains aggregate inventory control model under the given restrictions, taken commoditywise with a view for fixing up only a limited number of orders that can be placed. The demand law has an exponent and the profit maximisation approach is considered pertaining to such demand situation under different discounting policies. The model is illustrated by means of a numerical solution along with its sensitivity.