ABSTRACT

There are many branches in operations research, in which inventory control or management is an important branch. Keeping a stock or goods, new materials, manpower etc is necessary to meet the fluctuating demand for the same. But the optimal stock size is very important because it is cost effective. There are many real life situations in which the inventory is necessary. Hence depending upon the problems that arise in real life, suitable mathematical models are developed in stochastic process. This thesis is devoted to the development of some inventory models.

The first Chapter contains two sections. In the first section, a brief introduction about operations research, in particular the scope of inventory control or management and their usages to real world problems are given. In the second section, a detailed review of research work related to our topic done in the past is furnished.

The second Chapter deals with the study of stochastic model for optimal reserve inventory between machines in series and parallel. The generalized equation is obtained for both the models.

A multi period inventory model of stochastic demand with random arrival of shipments are considered in the third Chapter. Numerical example is given to study the sensitivity analysis.

Different inventory models with Weibull distribution deterioration using various demand rates such as stock dependent, time dependent, price dependent and power dependent are discussed in the fourth Chapter. This chapter contains five sections:

In the first section, an EOQ model with power demand pattern permitting partial backlogging is developed. Optimal equation is obtained and verified by a numerical example. In the second section, we discuss an EOQ model with power demand pattern without backorders. In the third section, an attempt has been made
for obtaining a deterministic inventory model for stock dependent demand rate without shortages. The optimality is verified. In the fourth section, an inventory model is derived considering time dependent demand rate allowing shortages with complete backlogging. The last section deals with the inventory model with price dependent demand rate with partial and complete backlogging.

In the fifth Chapter, we discuss the replenishment policy for inventory model considering the effect of money inflation and time value money. Solution procedure is given and explained with example. Optimal solution is analyzed by carrying out sensitivity analysis.

In the sixth Chapter, we derive an EOQ model with stock dependent demand rate permitting delay in payments and credit discount. A numerical example is used to illustrate the behaviour of the model using sensitivity analysis.