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## AN EOQ MODEL FOR INTEGRATED INVENTORY WITH FIXED LIFE TIME AND RANDOM INPUT

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**Abstract.** The manufacturer and retailer collaborates a long term production-purchasing agreement before any action is taken, and then work together towards maximizing their individual and joint profits. This implies that the optimal order quantity and number of shipments must be determined at the outset of contract based on their integrated joint profit function. This paper analyses an integrated inventory policy for manufacturer-retailer with fix life time products. The paper is an attempt to analyse time varying deteriorating inventory with random input and stock dependent demand. The proposed model is illustrated by a numerical example, its sensitivity analysis, and graphical representations are also carried out. Analysis and observations of the paper is useful to managers involve in supply chain of Drugs, Cosmetics, FMCGs, etc.

**Keywords.** Integrated inventory, Stock dependent demand, Variable deterioration, Fix life time, Random input.

AMS (MOS) subject classification: 90B05.

## 1 Introduction

Globalization of the business forced the business players to device win-win strategy to survive in this competitive world. Supply chain (SC) is a network comprise of raw material supplier, manufacturer, distributor, retailer, buyer and other business players. The main purpose of SCM is to optimize the whole system cost by maintaining effective collaboration and coordination among different players. Goyal [32] formulated a single vendor single-buyer integrated inventory model. Banerjee [1] extended above model when vendor follows lot-for-lot production policy. Rau *et al.* [16] derived for deteriorating items in multi-echelon supply chain environment. Crdenas-Barrn *et al.* [21] solved system with arithmeticgeometric inequality. Crdenas-Barrn and Sana [22] explained production-inventory model for a two-echelon supply chain with sales teams initiatives dependent demand. Sarkar [7] formulated model with variable backorder, inspections, and discount policy for fixed lifetime products.

Due to variety of reasons, viz, machines breakdown, workers strike, electricity failure, shortage of raw materials etc., it is found that received quantity