OCTOBER 29, 2015

HOMEWORK 8

PRODUCTION PLANNING & SCHEDULING

NICK MORRIS

Section 5.4 - 5.5

Problem 14

Table 1 below includes the optimal order size, re-order point, and safety stock required for Weiss's Optimal (Q,R) inventory system given a unit penalty cost for stock-outs.

Table 1: Optimal (Q,R) Inventory System for Weiss's Paint Store

Metric	Value	Units
Q*	81	[item/order]
R*	124	[items]
S*	26	[items]

Problem 15

Table 2 below includes the optimal order size, re-order point, and comparative Type 2 service level (beta) required for Weiss's Type 1 Optimal (Q,R) inventory system.

Table 2: Type 1 Optimal (Q,R) Inventory System for Weiss's Paint Store

Metric	Value	Units
EOQ	75	[item/order]
R*|alpha=0.9	117	[item]
beta|alpha=.9	0.9905	NA

Additional Problems

Problem 28

Table 3 below suggests the preferred inventory models that should be used at an artist's supply shop for each situation they're dealing with. The Simple EOQ model is chosen for Situation A because the product has a restrictive lifetime of 3 months, an equivalent lead time of 3 months, and various demand levels. This requires a newsvendor model with a desired service level (Simple EOQ) to determine how much demand should be satisfied during the products life time.

The Finite Production Rate model is chosen for Situation B because the demand is predictable, there is no given lifetime of the product, and there is a purchasing cost given for the product. This suggest a (Q,R) model with a penalty cost proportional to the lost profits and goodwill (Finite Production Rate) that can accurately satisfy demand given the regular demand levels.

The Resource-Constrained EOQ is chosen for Situation C because the demand is variable and the given lifetime isn't a significant factor. This suggests a (Q,R) model with a Type 2 service level (Resource-Constrained EOQ) that will minimize stock-outs by the unit, month-to-month. The focus of this model is meeting each unit, because the demand is variable when making sales.

The EOQ with Quantity Discounts is chosen for Situation D because product selling price varies by volume of sale, quantity discounts. This suggests a (Q,R) model with Type 1 service level (EOQ with Quantity Discounts) that will minimize stock-outs by the order. The focus of this model is meeting the order, because order size matters in the sale.

Table 3: Suggested Inventory Models for an Artist's Supply Shop across Situations

Situation	Model
A	Simple EOQ
B	Finite Production Rate
C	Resource-Constrained EOQ
D	EOQ with Quantity Discounts

Problem 29

Table 4 below includes the optimal order size, re-order point, and safety stock, in the last three rows, required for the campus store's (Q,R) inventory system of pencils given a unit penalty cost for stock-outs. The first two rows of Table 4 give a (Q,R) model based on the simple EOQ calculation, in which the order size is 45 units less than optimal and the re-order point is 1 unit more than the optimal. Given that the simple EOQ based (Q,R) model varies from the optimal, the average annual holding, set-up, and stock-out costs will cumulatively be larger than the optimal (Q,R) model which is designed to minimize these total costs.

Table 4: Optimal (Q,R) Inventory System for Campus Store Pencils

Metric	Value	Units
EOQ	1741	[item/order]
R|EOQ	319	[item]
Q*|p	1786	[item/order]
R*|p	318	[item]
S	151	[item]

Problem 30

Table 5 below includes an optimal type 1 service level (Q,R) model for the campus store's pencils in the first two rows, type 2 service level (Q,R) model in the first and third row, and the optimal type 2 service level (Q,R) model in the last two rows.

Table 5: Type 1 and Type 2 Service Level Optimal (Q,R) Inventory Systems for Campus Store Pencils

Metric	Value	Units
EOQ	1741	[item/order]
R*|alpha	334	[item]
R|Beta	94	[item]
Q*|Beta	1863	[item/order]
R*|Beta	86	[item]

Problem 31

Table 6 below includes the TRUE or FALSE response for each given statement.

Table 6: TRUE/FALSE Statements

Statement	Logical
A	FALSE
B	TRUE
C	TRUE
E	FALSE