Answer on Question #79188 - Economics - Other

A manufacturing company needs 2500 units of a particular component every year. The company buys it at the rate of Sh. 30 per unit. The order processing cost for this part is estimated at Sh. 15 and the cost of carrying a part in stock comes to about Sh.4 per year. The company can manufacture this part internally. In that case, it saves 20% of the price of the product. However, it estimates a set-up cost of Sh. 250 per production run. The annual production rate would be 4800 units. However, the inventory holding costs remain unchanged.

i. Determine the EOQ and the optimal number of orders placed in a year. (3 marks)

ii. Determine the optimum production lot size and the average duration of the production run. (4 marks)

iii. Should the company manufacture the component internally or continue to purchase it from the supplier?

Answer

i) EOQ is determined by the formula (*D=2500 units, A = R_s 15 / order, h = R_s 4 / unit / year):*

$$EOQ = \sqrt{\frac{2AD}{h}} = \sqrt{\frac{2 \times 15 \times 2500}{4}} \cong 137\ units$$

Optimal number of orders is determined by the formula:

$$= \frac{D}{EOQ} = \frac{2500}{137} \cong 18$$

ii) ELS is determined by the formula (*D=2500 units, S = R_s 250 / set up, h = R_s 4 / unit / year, p = 4800 units. d = 2500 units):*

$$ELS = \sqrt{\frac{2DS}{h}}\sqrt{\frac{p}{p-d}} = \sqrt{\frac{2 \times 2500 \times 250}{4}}\sqrt{\frac{4800}{4800-2500}} \cong 800\ units$$

$$\text{Average duration of the production run} = \frac{800}{2500} = 0.32\ year$$

iii) Total costs if the item is purchased from outside:

$$Total\ Cost = Dc + \frac{D}{EOQ} \times A + \frac{EOQ}{2} \times h = 2500 \times 30 + \frac{2500}{137} \times 15 + \frac{137}{2} \times 4$$

$$= R_s\ 75{,}548$$

Total costs if the item is produced internally:

Cost per unit = 80% of R_s 30 = R_s 24

Set up cost, S = R_s 250 per set up

$$Total\ Cost = Dc + \frac{D}{ELS} \times S + \frac{ELS}{2} \times \frac{p-d}{p} \times h = 2500 \times 24 + \frac{2500}{808} \times \frac{2300}{4800} \times 4$$

= R_s 61,548

Based on the data received, the company must produce the product internally.