

17/sci01/067

CSC 314

Assignment

1) a) $C_3 = \text{Rs } 100$ - per order, $C_1 = \text{Rs } 0.05$ per order and $d = 30$ units per year.

Solution

Economic Lot size

$$q_0 = \sqrt{(2 C_3 \times \lambda) / C_1}$$

$$q_0 = \sqrt{(2 \times 100 \times 30) / 0.05}$$

$$= 1549.2 \text{ units}$$

The associated total costs

$$C_0 = \sqrt{2 \times C_3 \times C_1 \times \lambda}$$

$$= \sqrt{2 \times 100 \times 0.05 \times 30}$$

$$= \text{Rs } 17.3$$

Total cost including material cost

$$= 30 \times 1 + 17.3 = 47.3$$

$$= \text{Rs } 47.3 \text{ / per year}$$

Length of line between orders

$$t_0 = q_0 / \lambda$$

$$= 1549.2 / 30$$

$$= 51.64 \text{ years between orders}$$

b) $C_3 = \text{Rs } 50$ - per order, $C_1 = \text{Rs } 0.05$ per unit and $\lambda = 30$ units per year.

Solution

$$i) q_0 = \sqrt{(2 C_3 \times \lambda) / C_1}$$

$$q_0 = \sqrt{(2 \times 50 \times 30) / 0.05}$$

$$= 1095.4 \text{ units}$$

$$ii) C_0 = \sqrt{2 \times C_3 \times C_1 \times \lambda}$$

$$= \sqrt{2 \times 50 \times 0.05 \times 30}$$

$$= \text{Rs } 12.2$$

$$30 \times 1 + 12.2 = 42.2$$

$$= \text{Rs } 42.2 \text{ / per year}$$

$$\text{iii) } t_0 = q_0 / \lambda$$

$$= 1095.4 / 30$$

$$= \underline{\underline{36.5}}$$

c) $C_3 = \text{Rs. } 100$ / per order, $C_1 = 0.01$ / per unit and $\lambda = 40$ units per year.

$$\Rightarrow \text{i) } q_0 = \sqrt{2(C_3 \times \lambda) / C_1}$$

$$= \sqrt{2 \times 100 \times 40 / 0.01}$$

$$= 8944.3 \text{ units}$$

$$\text{ii) } C_0 = \sqrt{2 C_3 C_1 \lambda}$$

$$= \sqrt{2 \times 100 \times 0.01 \times 40}$$

$$= \text{Rs } 8.9$$

Total cost including material cost

$$= 40 \times 1 + 8.9$$

$$= \text{Rs } 48.9 \text{ / per year}$$

$$\text{iii) } t_0 = q_0 / \lambda$$

$$= 8944.3 / 40$$

$$= \underline{\underline{223.6}} \text{ years between orders}$$

d) $C_3 = \text{Rs. } 100$ / per order, $C_1 = \text{Rs } 0.04$ / per unit and $\lambda = 20$ units per year.

$$\Rightarrow \text{i) } q_0 = \sqrt{2(C_3 \times \lambda) / C_1}$$

$$= \sqrt{2 \times 100 \times 20 / 0.04}$$

$$= 1581.1 \text{ units}$$

$$\text{ii) } C_0 = \sqrt{2 C_3 C_1 \lambda}$$

$$= \sqrt{2 \times 100 \times 0.04 \times 20}$$

$$= \text{Rs } 12.7$$

Total cost including material cost

$$= 20 \times 1 + 12.7$$

$$= \text{Rs } 32.7 \text{ / per year}$$

$$\begin{aligned}
 \text{iii) } E_0 &= q_0 / \lambda \\
 &= 1581.1 / 20 \\
 &= \underline{79.1 \text{ years between orders}}
 \end{aligned}$$

$$\begin{aligned}
 2) \quad \lambda &= 10,000 \text{ units per annum} \quad C_3 = \text{Rs } -36 \\
 P &= \text{Rs } 21. \quad C_1 = 1890
 \end{aligned}$$

$$\begin{aligned}
 a) \quad q_0 &= \sqrt{(2 \times 36 \times 10,000) / (2 \times 0.18)} \\
 &= \sqrt{720,000 / 0.36} \\
 &= 2357.02 //
 \end{aligned}$$

$$\begin{aligned}
 b) \quad \text{number of orders} &= \lambda / q_0 \\
 &= 10,000 / 2357.02 \\
 &= 4.24
 \end{aligned}$$

$$\begin{aligned}
 \text{order period} &= q_0 / \lambda \\
 &= 2357.02 / 10,000 \\
 &= 0.24 \text{ of years} \\
 &= 365 \times 0.24 \\
 &= \underline{\underline{87.6 \text{ days}}}
 \end{aligned}$$