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18/SCI01/099

CSC 314

Data : $\lambda = 30$ units, $C_1 = 0.05$ / unit, $C_3 = \text{R} \$.100$ / per ^{order} unit

$$\text{Economic lot size} = q_0 = \sqrt{(2C_3\lambda) \div C_1}$$

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

$$= \sqrt{6000} \div 0.05$$

$$= 77.459 \div 0.05$$

$$= 1549.18 \text{ units per order}$$

$$\text{Associated total cost} = C_0 = \sqrt{(2C_1C_3\lambda)}$$

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

$$= \sqrt{300}$$

$$= 17.3205$$

Length of time between orders $t_0 = q_0 / \lambda$

$$= 1549.18 / 30$$

$$= 51.6393$$

Data = $\lambda = 30$, $C_1 = 0.05$, $C_3 = 80$

$$\text{Economic lot size} = q_0 = \sqrt{(2C_3\lambda) \div C_1}$$

$$= \sqrt{(2 \times 80 \times 30) \div 0.05}$$

$$= \sqrt{9600} \div 0.05$$

$$= 54.7723 \div 0.05$$

$$= 1095.44 \text{ units per order}$$

$$\begin{aligned} \text{Associated total costs} &= C_0 = \sqrt{2C_1C_3\lambda} \\ &= \sqrt{2 \times 0.05 \times 50 \times 30} \\ &= \sqrt{1500} \\ 5\sqrt{6} &\approx 12.2475 \end{aligned}$$

$$\begin{aligned} \text{Length of time between orders } t_0 &= q_0/\lambda \\ &= 1095.4/30 \\ &= 36.5133 \end{aligned}$$

c) Data: $\lambda = 100$ units, $C_1 = 0.01$, $C_3 = \text{Rs. } 100$

$$\begin{aligned} \text{Economic lot size } q_0 &= \sqrt{(2C_3\lambda)} \div C_1 \\ &= \sqrt{(2 \times 100 \times 100)} \div 0.01 \\ &= \sqrt{8000} \div 0.01 \\ &= 89.4427 \div 0.01 \\ &= 8944.27 \end{aligned}$$

$$\begin{aligned} \text{Associated total cost} &= C_0 = \sqrt{(2C_1C_3\lambda)} \\ &= \sqrt{(2 \times 0.01 \times 100 \times 100)} \\ &= \sqrt{80} \\ &= 8.94427 \end{aligned}$$

$$\begin{aligned} \text{Length of time between orders } t_0 &= q_0/\lambda \\ &= 8944.27/100 \\ &= 223.6067 \approx 223.61 \end{aligned}$$

d) Data: $\lambda = 20$ units, $C_1 = 0.04$, $C_3 = \text{Rs. } 100$

$$\begin{aligned} \text{Economic lot size } q_0 &= \sqrt{(2C_3\lambda)} \div C_1 \\ &= \sqrt{(2 \times 100 \times 20)} \div 0.04 \\ &= \sqrt{4000} \div 0.04 \\ &= 63.2455 \div 0.04 \\ &= 1581.14 \end{aligned}$$

$$\begin{aligned}
 \text{Associated total cost} &= C_0 = \sqrt{(2C_1C_3\lambda)} \\
 &= \sqrt{(2 \times 0.04 \times 100 \times 20)} \\
 &= \sqrt{160} \\
 &= \text{Rs. } 12.6491
 \end{aligned}$$

$$\begin{aligned}
 \text{Total cost including material cost} \\
 &= 20 \times 1 + 12.7 \\
 &= 32.7 / \text{year}
 \end{aligned}$$

$$\begin{aligned}
 \text{length of time between orders } t_0 &= Q_0 / \lambda \\
 &= 1581.1 \div 20 \\
 &= 79.1
 \end{aligned}$$

2) $\lambda = 10,000$ units per annum, $C_3 = \text{Rs. } 36$, $P = \text{Rs. } 2$
 $C_3 = \text{Rs. } 36$ ~~per unit~~

a) Economic order quantity: $Q_0 = \sqrt{(2C_3\lambda)} \div iP$

$$\begin{aligned}
 &= \sqrt{(2 \times 36 \times 10,000)} \div (2 \times 0.18) \\
 &= \sqrt{720,000} \div 0.36 \\
 &= 848.528 \div 0.36 \\
 &= 2357.0222
 \end{aligned}$$

b) number of orders = $\lambda \div Q_0$

$$\begin{aligned}
 &= 10,000 \div 2357.02 \\
 &= 4.24
 \end{aligned}$$

Order period = Q_0 / λ

$$\begin{aligned}
 &= 2357.02 / 10,000 \\
 &= 0.24 \\
 &= 365 \times 0.24 \\
 &= 87.6 \text{ days}
 \end{aligned}$$