

NAME: SHOSAN HADIJAT ABIMBOLA

MATRIC NO: 17/SCI01/076

1a.

NAME: SHOSAN HADIJAT ABIMBOLA
MATRIC No. 17/SCI01/076

1a) Data: $\lambda = 30$ units per year
 $C_1 = 0.05$ /per unit
 $C_3 = \text{Rs. } 100$ /per order

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

$$= \sqrt{(2 \times 100 \times 30) / 0.05}$$
$$= \sqrt{6000} / 0.05$$
$$= 77.459 / 0.05$$
$$= 1549.18 \text{ units per order}$$

Associated total costs $= C_0 = \sqrt{(2C_3\lambda)}$

$$= \sqrt{(2 \times 100 \times 30)}$$
$$= \sqrt{6000}$$
$$= 77.32$$

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

$$= 1549.18 / 30$$
$$= 51.639$$

b) Data: $\lambda = 30$ units per year
 $C_1 = 0.05$ per unit
 $C_3 = 50$ per order

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

$$\begin{aligned} &= \sqrt{(2 \times 50 \times 30) / 0.05} \\ &= \sqrt{3000} / 0.05 \\ &= 54.77 / 0.05 \\ &= 1095.4 \text{ units per order} \end{aligned}$$

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

$$\begin{aligned} &= \sqrt{2 \times 0.05 \times 50 \times 30} \\ &= \sqrt{1500} \\ &= ~~38.729~~ 12.247 \end{aligned}$$

$$\begin{aligned} \text{Length of time between orders} &= t_0 = q_0 / \lambda \\ &= 1095.4 / 30 \\ &= 36.513 \end{aligned}$$

1b.

d) Data: $\lambda = 40$ units per year
 $C_1 = 0.01$ per unit
 $C_3 = \text{Rs. } 100$ per order

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

$$\begin{aligned} &= \sqrt{(2 \times 100 \times 40) / 0.01} \\ &= \sqrt{8000} / 0.01 \\ &= 89.4427 / 0.01 \\ &= 8944.27 \end{aligned}$$

$$\begin{aligned} \text{Associated total cost } = C_0 &= \sqrt{(2C_1C_3\lambda)} \\ &= \sqrt{(2 \times 0.01 \times 100 \times 40)} \\ &= \sqrt{80} \\ &= 8.94427 \end{aligned}$$

$$\begin{aligned} \text{Length of time between orders} = t_0 &= q_0 / \lambda \\ &= 8944.27 / 40 \\ &= 223.61 \end{aligned}$$

1c.

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

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

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

$$= \sqrt{4000} / 0.04$$

$$= 63.2455 / 0.04$$

$$= 1581.14$$

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

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

$$= \sqrt{160}$$

$$= 12.649$$

1d.

2 $C_0 = 36; C = 2; D = 10,000$ $C_h = 18\%$ of $2 = \frac{18 \times 2}{100} = \frac{36}{25}$

a) $Q^* = \sqrt{\frac{2 \times 10000 \times 36 \times 25}{9}} = \sqrt{2000000} = 1414 \text{ units}$

b) $\frac{D}{Q^*} = \frac{10000}{1414} = 7.072$

Optimum no of days = $\frac{365}{7} = 52 \text{ days}$

2.