Q1

Fleming Accessories produces paper slicers used in offices and in art stores. The mini slicer has been one of its most popular items: Annual demand is 6,750 units and is constant throughout the year. Kristen Fleming, the owner of the firm, produces the mini slicers in batches. On average, Kristen can manufacture 125 mini slicers per day. Demand for these slicers during the production process is 30 per day. The setup cost for the equipment necessary to produce the mini slicers is $150. Carrying costs are $1 per-mini slicer per year. How many mini slicers should Kristen manufacture in each batch?

Solution:

D = 6,750 units

C_s = $150

C_h = $1

d = 30 units

p = 125 units

a)

$$Q^* = \sqrt{\frac{2DC_s}{C_h\,(1-d/p)}}$$

$$= \sqrt{\frac{2(6{,}750)(150)}{1(1-30/125)}} = 1{,}632$$

b) Production Cycle = t = Q/P = 1,632/125 = 13.0 days

Q2

Consider a product with a daily demand of 400 units, a setup cost per production run of $100, a monthly holding cost per unit of $2.00, and an annual production rate of 292,000 units. This company can manufacture 800 units per day The firm operates, and experiences demand 365 days per year. How many units should this company produce in each batch?

Solution

d = 400 units → D= 400*365 = 146,000 units

C_s = $100

P = 800 per day

a) The inventory holding cost per year = 2*12 = $24

b)

$$Q^* = \sqrt{\frac{2DC_s}{C_h\,(1-d/p)}}$$

$$= \sqrt{\frac{2*164{,}000*100}{24(1-400/800)}} = 1{,}560 \text{ units}$$

c) Production time = t = Q/P = 1,560/800 = 1.95 ≈ 2 days

Q3

A toy manufacturer uses 48000 rubber wheels per year for its popular dump truck series. The firm makes its own wheels, which it can produce at a rate of 800 per day. The toy trucks are assembled uniformly over the entire year. The carrying cost is $1 per wheel a year. The setup cost for a production run of wheels is $45. the firm operates 240 days per year

Solution

D = 48,000 units → d= 48,000/240 = 200 units per day

P = 800 per day

C_h = $1

C_s = $45

a) What is the optimal size of a production run?

$$Q^* = \sqrt{\frac{2DC_s}{C_h\,(1-d/p)}}$$

$$Q^* = \sqrt{\frac{2*48000*45}{1(1-200/800)}} = 2400 \text{ units}$$

b) What is the length of each production run?

T = Q/P = 2400 / 800 = 3 days