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COURSE TITLE: OPERATIONS RESEARCH

ASSIGNMENT

1 In each of the following cases, stock is replenished instantaneously and no shortages are allowed. Find the economic lot size, the associated total costs and length of time between orders and give your comments.

1. C3 = Rs. 100/- per order, C1 = Re. 0.05 per unit and λ = 30 units per year.

(b) C3 = Rs. 50/0 /- per order, C1 = Re. 0.05 per unit and λ = 30 units per year.

(c) C3 = Rs. 100/- per order, C1 = 0.01 per unit and λ = 40 units per year.

(d) C3 = Rs. 100/- per order, C1 = Rs. 0.04 per unit and λ = 20 units per year.

2. The XYZ manufacturing company has determined from an analysis of its accounting and production data for part number 625, that its cost to purchase is Rs.36 per order and Rs. 2/per part. Its inventory carrying charge is 18% of the average inventory cost. The demand for this part is 10,000 units per annum. Find (a) What is the economic order quantity; (b) What is the optimal number of days supply per optimum order.

3. A manufacturer receives an order for 6890 items to be delivered over a period of a year as follows: At the end of the first week = 5 items. At the end of the second week = 10 items. At the end of the third week = 15 items. etc. The cost of carrying inventory is Rs. 2.60 per item per year and the cost of set up is Rs. 450/ - per production run. Compute the costs of following policies:

(a) Make all 6890 at start of the year.

(b) Make 3445 now and 3445 in 6 months,

(c) Make 1/12 th the order each month.

(d) Make 1/52 th order every week.

**Soln**

1.

(a)C3 = Rs. 100/- per order, C1 = Re. 0.05 per unit and λ = 30 units per year.

(b) C3 = Rs. 50 /- per order, C1 = Re. 0.05 per unit and λ = 30 units per year.

(c) C3 = Rs. 100/- per order, C1 = 0.01 per unit and λ = 40 units per year.

(d) C3 = Rs. 100/- per order, C1 = Rs. 0.04 per unit and λ = 20 units per year.

A) 

Total cost =(√2\*C3\*C1\*λ)=√2\*100\*0.05\*30 =Rs.17.3205 per Year

Time between orders = t0 = q0 / λ = 1549.193/30 = 51.63977 ≈ 52days per year

B)

Economic Lot Size = (√2\*C3\*λ)/C1 = (√2\*50\*30)/0.05 = 1095.445 ≈ 1096units per procurement

Total cost =(√2\*C3\*C1\*λ)=√2\*50\*0.05\*30 =Rs.12.2474487 per Year

Time between orders = t0 = q0 / λ = 1095.445/30 = 36.5148 ≈ 37days per year

C)

Economic Lot Size = (√2\*C3\*λ)/C1 = (√2\*100\*40)/0.01 = 8944.2719 ≈ 8944units per procurement

Total cost =(√2\*C3\*C1\*λ)=√2\*100\*0.01\*40 =Rs.8.9442 per Year

Time between orders = t0 = q0 / λ = 8944.2719/40 = 223.60679 ≈ 224days per year

D)

Economic Lot Size = (√2\*C3\*λ)/C1 = (√2\*100\*20)/0.04 = 1581.1388 ≈ 1581units per procurement

Total cost =(√2\*C3\*C1\*λ)=√2\*100\*0.04\*20 =Rs.12.6491 per Year

Time between orders = t0 = q0 / λ = 1581.1388/20 = 79.05694 ≈ 79days per year

2.

Data: C3 = Rs.36 per order, p = Rs.2, i = 0.18, λ = 10,000

q0 = (√2\*C3\*λ)/ip = (√2\*10000\*36)/(0.18\*2) = (√720000)/0.36 = 2357.02

Number of orders = λ/q0 = 10000/2357.02 = 4.24

Order Period = q0 / λ = 2357.02/10000 = 0.2357 of a year

2b.) 365\*0.2357 = 87.6 days

3.

Data: C3 = Rs.450 per production,C1 = Rs.2.60 per year, λ = 6890

1. All at beginning of year

(√2\*C3\*C1\*λ) = √2\*6890\*2.6\*450 =Rs.4015.29576 per year

B)half in the first half of the year and half in the other half; therefore C1 = Rs.1.3

(√2\*C3\*C1\*λ) = √2\*6890\*1.3\*450 =Rs.2839.242857 per 6 months so Rs.5678.486 per year

C)Make 1/12 th the order each month.therefore C1 = Rs.0.22

(√2\*C3\*C1\*λ) = √2\*6890\*0.22\*450 =Rs.1167.998 per month so Rs.14015.98 per year

D)Make 1/52 th order every week. .therefore C1 = Rs.0.05

(√2\*C3\*C1\*λ) = √2\*6890\*0.05\*450 =Rs.556.821 per week so Rs.28954.71 per year