**Solution Chapter 12 exercises**

**(12.13,12.17,12.20,12.25)**

**(12.27,12.32,12.33,12.34,12.35)**

**12.13**(a) 

(b) 



(c) 



(d) 

(e) 

(f) ROP  *dL*  10(2)  20 units (where 10  daily demand)



**12.17**Production Order Quantity, noninstantaneous delivery.

(a) *D* 12,000/yr

*H* $.10/light-yr

*S* $50/setup

*P* $1.00/light

*p* 100/day





 4,472 lights per run

(b) 

(c)

(d) Total cost (including cost of goods)

 PD  $134.16  $134.16

 ($1 × 12,000)  $134.16  $134.16

 $12,268.32/year

**12.20***D* (Annual demand) = 400 × 12 = 4,800, *P* (Purchase price/Unit) = $350/unit, *H* (Holding cost /Unit) = $35/unit/year,   
*S* (Ordering cost/Order) = $120/order. So,



(a)



However, if Bell Computers orders 200 units, which is optional with the discount model, then



Bell Computers should order 200 units for a minimum total cost of $1,446,380.



(b)

181 units *would not* be bought at $350. 196 units cannot be bought at $300, hence that isn’t possible either. So, *EOQ* = 188 units.



The minimum order quantity is 200 units yet again because the overall cost of $1,445,880 is less than ordering 188 units, which has an overall cost of $1,566,119.

**12.25** *S* 10, *H* 3.33, *D* 2,400

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EOQ  120 with slight rounding | | | | | | | | |
|  |  | Costs | | | | | |  |
| Qty | Price |  | Holding | Ordering | Purchase | Total |  |  |
| 120 | $33.55 | $199.80 | | $200.00 | $80,520.00 | $80,919.80 | | Vendor A |
| 150 | $32.35 | $249.75 | | $160.00 | $77,640.00 | $78,049.75 | |  |
| 300 | $31.15 | $499.50 | | $80.00 | $74,760.00 | $75,339.50 | |  |
| 500 | $30.75 | $832.50 | | $48.00 | $73,800.00 | $74,680.50 | |  |
| 120 | $34.00 | $199.80 | | $200.00 | $81,600.00 | $81,999.80 | | Vendor B |
| 150 | $32.80 | $249.75 | | $160.00 | $78,720.00 | $79,129.75 | |  |
| 300 | $31.60 | $499.50 | | $80.00 | $75,840.00 | $76,419.50 | |  |
| 500 | $30.50 | $832.50 | | $48.00 | $73,200.00 | $74,080.50 | | BEST |
| 120 | $33.75 | $199.80 | | $200.00 | $81,000.00 | $81,399.80 | | Vendor C |
| 200 | $32.50 | $333.00 | | $120.00 | $78,000.00 | $78,453.00 | |  |
| 400 | $31.10 | $666.00 | | $60.00 | $74,640.00 | $75,366.00 | |  |
| 120 | $34.25 | $199.80 | | $200.00 | $82,200.00 | $82,599.80 | | Vendor D |
| 200 | $33.00 | $333.00 | | $120.00 | $79,200.00 | $79,653.00 | |  |
| 400 | $31.00 | $666.00 | | $60.00 | $74,400.00 | $75,126.00 | |  |

**12.27**(a) μ  60; σ7

Safety stock for 90% service level  σZ(at 0.90)

 7 × 1.28  8.96 ≈ 9

(b) ROP  60  9  69 BX-5 bandages.

**12.32**Onlydemand is variable in this problem so Equation   
(12-15) applies

(a) ROP = (Average daily demand × Lead time in days)   
+ *Z*σdLT





= 2,000 + 291 = 2,291 towels

(b) Safety stock = 291 towels

**12.33**Onlylead time is variable in this problem, so Equation   
(12-16) is used.

*Ζ* = 1.88 for 97% service level

ROP = (Daily demand × Average lead time in days)   
+ *Ζ* × Daily demand × *σ*LT

ROP = (12,500 × 4) + (1.88)(12,500)(1)

= 50,000 + 23,500 = 73,500 pages

**12.34**Bothlead time and demand are variables, so Equation   
(12-17) applies, in weeks. *Ζ* = 1.28 for 90% service.

ROP = (200 × 6) + 1.28 *σ*dLT

where *σ*dLT 





So ROP = 1,200 + (1.28)(405)  1,200 + 518 = 1,718 cigars

**12.35**Fixed-period model.

*Q*  Target – On hand – Orders not received

 40 – 5 – 18  17 poles.