**Ogbeide, Kingsley**

**ECO 550 Week4.**

**Check Your Understanding Week 4**

**Chapter 7: Problems 1, 6, 8, and 9**

1. Deep Creek Mining Company:  
Complete the table.  
a.  

|  |  |  |  |
| --- | --- | --- | --- |
| L | TPX (=Q) | MPX = ΔQ/ΔX | APX = Q/X |
| 0 | 0 | - | - |
| 1 | 3 | 3 | 3.00 |
| 2 | 6 | 3 | 3.00 |
| 3 | 16 | 10 | 5.33 |
| 4 | 29 | 13 | 7.25 |
| 5 | 43 | 14 | 8.60 |
| 6 | 55 | 12 | 9.17 |
| 7 | 58 | 3 | 8.29 |
| 8 | 60 | 2 | 7.50 |
| 9 | 59 | -1 | 6.56 |
| 10 | 56 | -3 | 5.60 |

b. See table  
c.

Stage I:     0 − 6       APX   increasing  
Stage II:     6+ − 8+   MPX ≥ 0  
Stage III:   8+ − ∞     MPX < 0  
  
**6. a.**

Q = 10L − 0.5L2  
MPL = 10 − 1.0L  
MRQ = Price = $10  
MRPL = (10 − 1.0L)($10) = $100 − $10L  
  
b. MFCL = $20  
  
c. The optimal level of the variable input occurs where:   MRPL = MFCL  
100 − 10L = 20, so L\* = 8  
  
  
**9. a.**

(i). EL = β1 = 0.45;

(ii). EF = β2 = 0.20;

(iii). EB = β3 = 0.30.

b. EL = %ΔQ/%ΔL = 0.45.   If %ΔL = 0 .02, %ΔQ = 0.45(0.02) = 0.009, or .9%.  
  
c. EB = %ΔQ/%ΔB = 0.30.   If %ΔB = −0.03,   %ΔQ = .30(−.03) = -0.009 or -.9%.   
  
d. β1 + β2 + β3 = 0.45 +0 .20 + 0.30 = 0.95, this is Decreasing Returns to Scale, because the sum of the exponents is less than 1.  
  
e. Technical progress causes the production process to change over time.   For example, wider roads and improved traffic control systems may result in increased output (i.e., bus miles) even though the number of buses (i.e., capital input) and drivers (i.e., labor input) remains constant.   Likewise, the replacement of older buses with new models may increase output since the new buses may be faster and more maneuverable.   Finally, as the experience level of the bus drivers increases over time, output may increase even though the number of drivers remains constant  
  
  
**Chapter 8: Problems 2(a), 4, and 6(a)**  
2. Howard Bowen’s cotton farm analysis appears below.  
a. Accounting profits:  
Revenues $5,000,000  
Less:   Variable operating costs 4,500,000  
Less:   Depreciation 40,000  
Less:   Wages 50,000  
Equals:   Operating Income $410,000  
Less:   Interest expense 400,000  
Accounting income before tax +$10,000

**4. Complete the table.   Bold figures reflect the given values. Total cost = Total fixed cost +Total variable cost.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Q | TC | FC | VC | ATC | AFC | AVC | MC |
| 0 | 125 | 125 | 0 | - | - | - | - |
| 10 | 175 | 125 | 50 | 17.50 | 12.50 | 5.00 | 5.00 |
| 20 | 210 | 125 | 85 | 10.50 | 6.25 | 4.25 | 3.50 |
| 30 | 235 | 125 | 110 | 7.83 | 4.17 | 3.67 | 2.50 |
| 40 | 255 | 125 | 130 | 6.38 | 3.13 | 3.25 | 2.00 |
| 50 | 275 | 125 | 150 | 5.50 | 2.50 | 3.00 | 2.00 |
| 60 | 305 | 125 | 180 | 5.08 | 2.08 | 3.00 | 3.00 |
| 70 | 350 | 125 | 225 | 5.00 | 1.79 | 3.21 | 4.50 |
| 80 | 420 | 125 | 295 | 5.25 | 1.65 | 3.95 | 7.00 |

6. The Blair Company has multiple plant locations.  
  
a. One centralized plant in Missouri:  
TC = $900,000 + (6,000 + 4,500 + 3,000) $250 = $4,275,000  
Three subassembly plants:  
TC = ($475,000 + $425,000 + $400,000) + (6000 + 4500 + 3000) $225 = $4,337,500  
One centralized plant would be cheaper.