Name: KEY Id#

ISE 307, Term 153

ENGINEERING ECONOMIC ANALYSIS

Quiz# 5

 Date: Sunday, August 28, 2016

#

# **Q1.** Peabody Corporation has the following base-case estimates for its new small engine assembly project:

• Price per unit= $400 increasing at a rate of 10%

• Variable costs = $150 per unit increasing at a rate of 8%

• Fixed costs = $1 million increasing by 100,000 each year

• Demand = 10,000 units per year increasing at a 5% rate

• Capital investment = $5 million at year 0

• Product life = 5 years

• Salvage value = $1,000,000

• Depreciation method: Seven-year MACRS

• Tax rate= 35%

• MARR = l5%

1. Calculation the depreciation for each year over the product life, the book value at the end of year 5 and the Tax Gains or Losses.

D1 = 5,000,000\*.1429= 714,500; D2 = 5,000,000\*.2449= 1,224,500

D3 = 5,000,000\*.1749= 874,500; D4 = 5,000,000\*.1249= 624,500

D5 = 5,000,000\*.0893/2= 223,250

B5 = 5,000,000-(714,500+1,224,500+874,500+624,500+223,250)=$1,338,750.

Tax Gains (losses) = 0.35\*(1,000,000-1,338,750)= -$118,563

Thus, there will be tax gain or credit of $118,563

1. Develop the project’s cash flows over its project life.
2. Determine the net present worth (NPW) of the project at the company’s MARR of 15%.

 Is this project acceptable?

MACRS Depreciation Schedule with Half Year Convention for 7-Year MACRS property

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
| **14.29** | **24.49** | **17.49** | **12.49** | **8.93** | **8.92** | **8.93** | **4.46** |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Income Statement** |   |   |   |   |   |   |
|  | **0** | **1** | **2** | **3** | **4** | **5** |
| **Revenues** |  |  |  |  |  |  |
| **Unit Price** |  | **$400**  | **$440**  | **$484**  | **$532**  | **$586**  |
| **Demand(Units)** |  | **10,000** | **10,500** | **11,025** | **11,576** | **12,155** |
| **Sales Revenue** |  | **$4,000,000**  | **$4,620,000**  | **$5,336,100**  | **$6,163,196**  | **$7,118,491**  |
| **Expenses** |  |  |  |  |  |  |
| **Unit Variable Cost** |  | **$150**  | **$162**  | **$175**  | **$189**  | **$204**  |
| **Variable Cost** |  | **$1,500,000**  | **$1,701,000**  | **$1,928,934**  | **$2,187,411**  | **$2,480,524**  |
| **Fixed Cost** |  | **$1,000,000**  | **$1,100,000**  | **$1,200,000**  | **$1,300,000**  | **$1,400,000**  |
| **Depreciation** |  | **$714,500**  | **$1,224,500**  | **$874,500**  | **$624,500**  | **$223,250**  |
|  |  |  |  |  |  |  |
| **Taxable Income** |  | **$785,500**  | **$594,500**  | **$1,332,666**  | **$2,051,284**  | **$3,014,717**  |
| **Income Taxes (35%)** |  | **$274,925**  | **$208,075**  | **$466,433**  | **$717,950**  | **$1,055,151**  |
|  |  |  |  |  |  |  |
| **Net Income** |  | **$510,575**  | **$386,425**  | **$866,233**  | **$1,333,335**  | **$1,959,566**  |
|  |  |  |  |  |  |  |
| **Cash Flow Statement** |  |  |  |  |  |  |
| **Operating Activities** |  |  |  |  |  |  |
| **Net Income** |  | **$510,575**  | **$386,425**  | **$866,233**  | **$1,333,335**  | **$1,959,566**  |
| **Depreciation** |  | **714500** | **1224500** | **874500** | **624500** | **223250** |
| **Investment Activities** |  |  |  |  |  |  |
| **Investment** | **($5,000,000)** |  |  |  |  |  |
| **Salvage** |  |  |  |  |  | **$1,000,000**  |
| **Gains Tax** |  |  |  |  |  | **$118,562.50**  |
|  |  |  |  |  |  |  |
| **Net Cash Flow** | **($5,000,000)** | **$1,225,075**  | **$1,610,925**  | **$1,740,733**  | **$1,957,835**  | **$3,301,378**  |
| **PW(15%)** | **$1,188,700**  |  |  |  |  |  |

# **Since PW(15%)=$1,188,700 >0, the project is acceptable.**