FIRM VALUATION: COST OF CAPITAL AND APV APPROACHES

Question 1
A. False. It can be equal to the FCFE if the firm has no debt.
B. True.
C. False. It is pre-debt, but after-tax.
D. False. It is after-tax, but pre-debt.
E. False. The free cash flow to firm can be estimated directly from the earnings before interest and taxes.

Question 2
A. FCFF in 1993 = Net Income + Depreciation - Capital Expenditures - ∆ Working Capital + Interest Expenses (1 - tax rate)
   = $770 + $960 - $1200 - 0 + $320 (1 - 0.36) = $734.80 million

B. EBIT = Net Income/(1 - tax rate) + Interest Expenses
   = 770/0.64 + 320 = $1523.125 million

Return on Capital = EBIT (1-t)/ (BV of Debt + BV of Equity)
   = 974.80/9000 = 10.83%

Expected Growth Rate in FCFF = Retention Ratio * ROC
   = 0.6 * 10.83% = 6.50%

Cost of Equity = 7% + 1.05 * 5.5% = 12.775%

Cost of Capital = 8% (1 - 0.36) (4000/(4000 + 12000)) + 12.775%
   (12000/(4000 + 12000)) = 10.86%

Value of the Firm = 734.80/(.1086 - .065) = $16,853 millions

C. Value of Equity = Value of Firm - Market Value of Debt
   = $16,853 - $4,000 = $12,853 millions

Value Per Share = $12,853/200 = $64.27

Question 3
A.

<table>
<thead>
<tr>
<th>Yr</th>
<th>EBITDA</th>
<th>Deprec’n</th>
<th>EBIT</th>
<th>Exp.</th>
<th>FCFF Term Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$1,290</td>
<td>$400</td>
<td>$890</td>
<td>$534</td>
<td>$450 $82 $402</td>
</tr>
<tr>
<td>1</td>
<td>$1,413</td>
<td>$438</td>
<td>$975</td>
<td>$585</td>
<td>$493 $90 $440</td>
</tr>
</tbody>
</table>
Price/Earnings Multiples

|   |   |   |   |   |  
|---|---|---|---|---|---|
| 2 | $1,547 | $480 | $1,067 | $640 | $540 |
| 3 | $1,694 | $525 | $1,169 | $701 | $591 |
| 4 | $1,855 | $575 | $1,280 | $768 | $647 |
| 5 | $2,031 | $630 | $1,401 | $841 | $708 |

Cost of Equity = 13.05% 13.89%
AT Cost of Debt = 4.80% 4.50%
Cost of Capital = 9.37% 9.45%

Terminal Value

= \{EBIT (1-t)(1+g) - (Rev1998 - Rev1997) \times WC as \% of Rev \}/(WACC-g)

= (841 \times 1.04) - (13500 \times 1.0955 \times 1.04 - 13500 \times 1.0955) 
* 0.07 / (.0945-.04) = $14,941

Value of the Firm

= 440/1.0937 + 482/1.0937^2 + 528/1.0937^3 + 578/1.0937^4 + (633 + 14941)/1.0937^5

= $11,566

B. Value of Equity in the Firm = ($11566 - Market Value of Debt) = 11566 - 3200 = 8366

Value Per Share = $8366/62 = $134.94

Question 4

A. Beta for the Health Division = 1.15

Cost of Equity = 7% + 1.15 * 5.5% = 13.33%

Cost of Capital = 13.33% \times 0.80 + (7.5% \times 0.6) \times 0.2 = 11.56%

B.

<table>
<thead>
<tr>
<th>Year</th>
<th>Deprec’n</th>
<th>EBIT</th>
<th>EBIT(1-t)</th>
<th>Cap Ex</th>
<th>FCFF</th>
<th>Term Val</th>
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<tbody>
<tr>
<td>0</td>
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<td>$560</td>
<td>$336</td>
<td>$420</td>
<td>$266</td>
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</tr>
<tr>
<td>1</td>
<td>$364</td>
<td>$594</td>
<td>$356</td>
<td>$437</td>
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<td>2</td>
<td>$379</td>
<td>$629</td>
<td>$378</td>
<td>$454</td>
<td>$302</td>
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<tr>
<td>3</td>
<td>$394</td>
<td>$667</td>
<td>$400</td>
<td>$472</td>
<td>$321</td>
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<tr>
<td>4</td>
<td>$409</td>
<td>$707</td>
<td>$424</td>
<td>$491</td>
<td>$342</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$426</td>
<td>$749</td>
<td>$450</td>
<td>$511</td>
<td>$364</td>
<td></td>
</tr>
</tbody>
</table>

Now After 5 years

Cost of Equity = 13.33% 13.33%

Cost of Debt = 4.50% 4.50%
Cost of Capital 11.56% 11.56%

Value of the Division = 283/1.1156 + 302/1.1156^2 + 321/1.1156^3 + 342/1.1156^4 + (364 + 501)/1.1156^5 = $4,062 millions

C. There might be potential for synergy, with an acquirer with related businesses. The health division at Kodak might also be mismanaged, creating the potential for additional value from better management.

Question 5

Value = FCFF/(WACC-g)

750 = 30/(WACC-.05)

Solving for WACC,

WACC = .09

Given the cost of equity of 12% and the after-tax cost of debt of 6%,

Book Value weight for Equity = 0.50

The correct weights will be as follows:

Market Value Weight of Equity = (3*50)/(3*50+50) = 0.75

Correct Cost of Capital = 12% (.75) + 6% (.25) = 10.5%

Correct Value of Firm = 30/(.105-.05) = $545.45

Question 6

A. Cost of Equity = 7% + 1.25 * 5.5% = 13.88%

Current Debt Ratio = 1340/(1340 + 18.25 * 183.1) = 28.63%

After-tax Cost of Debt = 7.43% (1 - 0.4) = 4.46%

Cost of Capital = 13.88% (0.7137) + 4.46% (0.2863) = 11.18%

B. & C. See table below.

<table>
<thead>
<tr>
<th>D/(D+E)</th>
<th>Cost of Debt</th>
<th>Beta</th>
<th>Cost of Equity</th>
<th>Cost of AT Debt</th>
<th>Cost of AT Capital</th>
<th>Cost of AT Value</th>
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</thead>
<tbody>
<tr>
<td>0%</td>
<td>6.23%</td>
<td>1.01</td>
<td>12.54%</td>
<td>3.74%</td>
<td>12.54%</td>
<td>$2,604</td>
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<tr>
<td>10%</td>
<td>6.23%</td>
<td>1.07</td>
<td>12.91%</td>
<td>3.74%</td>
<td>11.99%</td>
<td>$2,763</td>
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<tr>
<td>20%</td>
<td>6.93%</td>
<td>1.16</td>
<td>13.37%</td>
<td>4.16%</td>
<td>11.53%</td>
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</table>
Price/Earnings Multiples

<table>
<thead>
<tr>
<th>Price/Earnings Multiples</th>
<th>30%</th>
<th>40%</th>
<th>50%</th>
<th>60%</th>
<th>70%</th>
<th>80%</th>
<th>90%</th>
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</thead>
<tbody>
<tr>
<td>7.43%</td>
<td>1.27</td>
<td>13.97%</td>
<td>4.46%</td>
<td>11.11%</td>
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<tr>
<td>8.43%</td>
<td>1.41</td>
<td>14.76%</td>
<td>5.06%</td>
<td>10.88%</td>
<td>$3,153</td>
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</tr>
<tr>
<td>8.93%</td>
<td>1.61</td>
<td>15.87%</td>
<td>5.36%</td>
<td>10.61%</td>
<td>$3,265</td>
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</tr>
<tr>
<td>10.93%</td>
<td>1.91</td>
<td>17.53%</td>
<td>6.56%</td>
<td>10.95%</td>
<td>$3,125</td>
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</tr>
<tr>
<td>11.93%</td>
<td>2.42</td>
<td>20.30%</td>
<td>7.16%</td>
<td>11.10%</td>
<td>$3,067</td>
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<tr>
<td>11.93%</td>
<td>3.43</td>
<td>25.84%</td>
<td>7.16%</td>
<td>10.89%</td>
<td>$3,149</td>
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</tr>
<tr>
<td>13.43%</td>
<td>6.45</td>
<td>42.47%</td>
<td>8.06%</td>
<td>11.50%</td>
<td>$2,923</td>
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<td></td>
</tr>
</tbody>
</table>

Unlevered Beta = 1.25/(1 + 0.6 * (1340/(183.1 * 18.25)) = 1.01
Levered Beta at 10% D/(D+E) = 1.01 * (1 + 0.6 * (10/90)) = 1.07
FCFF to Firm Next Year = (637 - 235) * (1 - 0.4) * 1.03 = $248.43 million

Value of the Firm = 255.67 * 1.03/(WACC-.03)

Problem 7

a. Cost of capital approach
   Return on capital = 200 (1 - .4)/ 1200 = 10%
   Reinvestment rate = g/ ROC = 4%/10% = 40%
   Cost of equity = 5% + 1.2 (5.5%) = 11.6%
   Cost of capital = 11.6% (1000/1500) + 6% (1-.4)(500/1500) = 8.93%
   Value of firm
     = EBIT (1-t) (1- Reinvestment rate ) (1+g)/ (Cost of capital – g)
     = 200 (1-.4) (1-.4)(1.04)/ (.0893 - .04) = $1,519 million

b. Unlevered beta = 1.20/ (1 + (1-.4)(500/1000)) = 0.9231
   Unlevered cost of equity = 5% + 0.9231 (5.5%) = 10.08%
   Unlevered firm value = = 200 (1-.4) (1-.4)(1.04)/ (.1008 - .04) = $1,232 million
   + PV of tax benefits from debt = Tax rate * Debt
      = 0.40 * 500 = $ 200 million
   - Expected bankruptcy costs = Probability of bankruptcy * Unlevered firm value * Cost of bankruptcy = 0.10 * 1232 * .25 = $30.8 million
   APV value of firm = $ 1232 + 200 – 30.8 = $ 1401.2 million

c. The APV approach considers only the tax benefits from existing debt, whereas the cost of capital approach assumes that debt will increase over time (to keep the debt ratio stable as the firm grows) and considers the potential tax benefits from future debt issues.