1. Novellus Inc. is a publicly traded company that operates in three businesses with the following characteristics:

<table>
<thead>
<tr>
<th></th>
<th>Revenues (in millions)</th>
<th>Estimated Enterprise Value (in millions)</th>
<th>Unlevered Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Device</td>
<td>$600.00</td>
<td>$400.00</td>
<td>0.9</td>
</tr>
<tr>
<td>Electronics</td>
<td>$500.00</td>
<td>$600.00</td>
<td>1.2</td>
</tr>
<tr>
<td>Social Media</td>
<td>$400.00</td>
<td>$800.00</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The firm has 100 million shares trading at $12/share, has no cash balance and raises the rest of its funding from debt. The marginal tax rate is 40%.

a. Estimate the current levered beta for the firm. (2 points)
b. Assume that Novellus is planning to sell its storage device business for the estimated value and invest half the proceeds in its social media business and use the other half to retire debt. Estimate the new beta for the firm. 

(2 points)

c. How would you answer to (b) change, if you used the proceeds entirely to buy back shares in the company? (2 points)
2. You own a retail business and generated $40 million in EBITDA on revenues of $200 million in the most recent year. You are considering spending $20 million in a new computerized inventory system; the investment is depreciable straight line over 5 years to a salvage value of zero. If you install the system, you expect to see two primary benefits:
   - Your revenues which had been expected to be flat ($200 million each year) for the next 5 years will grow 5% each year for the next 5 years with the new system in place ($210 million next year, $220.5 million in year 2 etc…)
   - Your EBITDA margin (as a percent of revenues) will remain unchanged at current levels for the next 5 years but you do expect your non-cash working capital which is currently 10% of revenues to drop to 5% of revenues immediately and remain at that percent level each year for the next 5 years.

At the end of year 5, you expect to scrap the new inventory system and get no salvage value for the system. The working capital is expected to revert back to 10% of revenues at the point in time. Your marginal tax rate is 40% and your cost of capital is 10%.

   a. Estimate the NPV of the investment.   (3 points)
b. If you can expense the computerized inventory system rather than depreciate it, estimate the NPV of the investment. (1 point)

c. Now assume that you are offered the alternative of using a service to manage your inventory. Assuming that the benefits that the service delivers are equivalent to those stated in part (a), i.e., higher growth in revenues and lower working capital requirements, how much would you be willing to pay as an annual fee for this service for the next 5 years? (2 points)
3. You are looking at Lizma Steel, a mature steel company that generated $120 million in operating income (EBIT) last year on revenues of $5 billion. The firm has 40 million shares trading at $20/share and $200 million (book & market) in debt. The current beta (levered) is 1.15 and the pre-tax cost of debt is 4%. The marginal tax rate is 40%, the riskfree rate is 3% and the equity risk premium is 6%.
   a. Estimate the current cost of capital for Lizma Steel. (1 point)

   b. Now assume that you are considering doing an LBO (leveraged buyout) of Lizma Steel and are looking to move to a mix of 90% debt and 10% equity. If the pre-tax cost of the debt in the LBO will be 7.5%, estimate the cost of capital at a 90% debt ratio. (2 points)
c. How much would you need to borrow (in dollar terms) to get to a 90% debt ratio of the new firm value? (If necessary, you can assume that any savings you get from a change in cost of capital will be perpetual and have no growth) (2 points)

d. How (if at all) would your answer to part (b) change if you were told that Lizma Steel has only $60 million in operating income? (1 point)
4. You have been provided with forecasts of operating items for Zune Inc. for the next 5 years (in millions):

<table>
<thead>
<tr>
<th></th>
<th>Most recent year (just ended)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>$1,000</td>
<td>$1,100</td>
<td>$1,200</td>
<td>$1,300</td>
<td>$1,400</td>
<td>$1,500</td>
</tr>
<tr>
<td>EBITDA</td>
<td>$250</td>
<td>$275</td>
<td>$300</td>
<td>$325</td>
<td>$350</td>
<td>$375</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$60</td>
<td>$66</td>
<td>$72</td>
<td>$78</td>
<td>$84</td>
<td>$90</td>
</tr>
<tr>
<td>Net Income</td>
<td>$80</td>
<td>$88</td>
<td>$96</td>
<td>$104</td>
<td>$112</td>
<td>$120</td>
</tr>
<tr>
<td>Non-cash Working Capital</td>
<td>$75</td>
<td>$70</td>
<td>$65</td>
<td>$60</td>
<td>$50</td>
<td>$40</td>
</tr>
<tr>
<td>Total Debt outstanding</td>
<td>150</td>
<td>145</td>
<td>140</td>
<td>135</td>
<td>130</td>
<td>125</td>
</tr>
</tbody>
</table>

a. The firm currently has a cash balance of $150 million and expects this cash balance to drop to $50 million by the end of year 5. If the company plans to pay out 60% of its earnings as dividends for the next 5 years, how much capital expenditure does it have planned cumulatively for the five-year period? (3 years)
b. If the company would like to keep its cash balance unchanged over the next 5 years, i.e., it wants its cash balance to be $150 million at the end of year 5, and pay off all of its debt over the 5 years, what dividend payout ratio should the firm maintain, on average, over the next 5 years? (2 points)

c. Which of the following would you consider the most defensible reason for a company that has never paid dividends before, to initiate dividends? (1 point)
   i. The company wants to attract pension fund investors who are restricted from buying stocks that don’t pay dividends
   ii. The company had a windfall gain from a lawsuit that increases income and cash flows this year.
   iii. The company expects earnings growth and reinvestment needs to be much higher in the future
   iv. The company expects its earnings growth and reinvestment needs to decrease in the future
   v. All the other companies in the sector pay dividends
5. You are trying to value Kappa Inc., a small, publicly traded entertainment company. The firm generated $10 million in after-tax operating income in the most recent year on revenues of $80 million; the invested capital (book value) at the start of the year was $100 million. The firm is expected to maintain its existing return on capital in perpetuity. Capital expenditures in the most recent year amounted to $12 million, depreciation was $5 million and non-cash working capital increased from $6 million to $8 million during the course of the year. The firm is expected to have a 12% cost of capital for the next 5 years and 8% thereafter.

a. Assuming that Kappa maintains the reinvestment rate that it posted in its most recent year for the next 5 years, estimate the expected free cash flows to the firm each year for the next 5 years. (3 points)
b. At the end of year 5, Kappa Inc. is expected to be a stable growth firm, growing 3% a year in perpetuity. Estimate the terminal value (the value at the end of year 5). (2 points)

c. Finally, assume that Kappa Inc. has a cash balance of $15 million, debt outstanding (in book and market terms) of 40 million and 8 million shares outstanding, estimate the value per share. (1 point)