Solution Outline for Problem 10.1

Some advantages and disadvantages of ratio analysis are below. You probably will think of others!

Advantages:

- Ratios summarize the financial statements and so provide information in a more concise way, more accessible to decision makers than wading through all the detailed numbers.
- Ratios are scale-free measures so they can be used to compare enterprises of different sizes, or the same enterprise over periods of time in which its size changes.
- Ratios can be aggregated into industry and other groupings, facilitating comparisons of the enterprise to others.
- Because they have both numerators and denominators, ratios can be usefully sensitive to changes in the underlying figures.
- As summarized information, ratios may be easier for nonaccountants in general to understand than are the detailed financial statements.
- Because they are ratios, the ratios can be related to the “relative return” goal that is presumed to lie behind investors’ and creditors’ decision making.

Disadvantages and ways around them:

- Because they are summarizations, ratios are only as good as the underlying data (mitigated by: establish that the financial statements are audited, with a “presents fairly” unqualified opinion by the auditors).
- If managers or others know that people will rely on certain ratios, they may strive to produce satisfactory ratios, such as by reducing maintenance expenses or not acquiring new assets, rather than focusing on the fundamental underlying business issues (mitigated by: use ratios with care and find out what managerial actions lie behind them).
- Ratios are just numbers and have no meaning in themselves apart from the phenomena they summarize; for example, there is nothing magic about a working capital ratio of 2 (mitigated by: become very knowledgeable about the enterprise and its competitors so that meaningful comparisons may be made).
- There are many different ratios and alternative ways of calculating most of them, so that comparing ratios as calculated by others can be frustrating and not very informative (mitigated by: know how to calculate the ratios that are important to you and use those calculations instead of others’ versions if there are problems with those versions).

Solution Outline for Problem 10.2

Some thoughts about the manager's complaint:

1. The manager has a point:
   - accounting financial analyses are based on past information;
   - the stock market does react quickly to information and is likely to have incorporated any “news” included in the financial statements by the time they can be analyzed;
   - thoughtless mechanical calculation of ratios isn't much good to anyone.
2. But there are some advantages to such analyses:
   • even if the stock market has reacted to the information, just observing the stock market prices tells
     you little about the company;
   • financial analysis is a useful way to develop a good understanding of the company, its financial and
     operating strategy and other such factors, both absolutely and in comparison to other years or
     companies;
   • stock market responses are not perfect and do not necessarily reflect your preferences as to returns
     and risks, so understanding the company's performance helps you assess your own position with
     respect to the company;
   • financial analysis does indeed reveal many business management factors that are important to the
     company's success (is the manager nervous about having management's performance analyzed and
     revealed?);
   • financial analysis can be useful to management too, in identifying strengths and weaknesses and
     planning strategies;
   • a retrospective review of performance is useful to verify that management has done the things it
     said would be done and generally has discharged its stewardship role.

Solution Outline for Problem 10.3

1. Such a concept of performance relates the return to the investment required to earn it, thereby enabling
   the relative return to be calculated. This is important because returns do require investment, people
   usually don’t make investments without expecting a return, and the sizes of each have to be related to
   each other in order to evaluate the quality of the result. A $1,000 return would be great if the
   investment required was $2,000 (a ratio of 50%) but not so great if the investment was $200,000 (only
   0.5%).

2. a. The interest earned could be compared to the $1,200 required to earn it.
   b. The consulting earnings could be compared to the $15,000 invested to earn them.
   c. This is more difficult because the returns are probably nonfinancial, such as the fun of driving a
      sports car, and would not be readily comparable to the car’s cost – however, this sort of ratio is
      implicit in many buying decisions, in which we ask ourselves if the benefits we will obtain are
      worth the costs and we may well choose a cheaper car if the feeling of wind in our hair isn’t all
      that important to what we have to pay for a convertible.
   d. The returns on her investment could be compared to the $300,000 invested to earn them. She
      could compare the return to those of similar funds in other companies or other funds within the
      same company or in other companies, or to the performance of the stock market to which the
      fund is indexed.

Solution Outline for Problem 10.4

Various user types might be suggested, including owners, lenders, management, employees, or regulators. Here are ideas for two types:

1. Shareholder/owner
   Balance Sheet:
   Possible analysis – performance ratios, common size balance sheet, activity ratios, financing ratios,
   liquidity ratios.
   How it will help them – to assess resources and their deployment used to generate a return; assess
   capital structure; and assess risk due to financing strategies.
Income Statement:
Possible analysis – performance ratios, common size income statement, EPS and price earnings ratios.
How it will help them – to compare economic performance to other companies and periods and to assess whether performance of company’s shares on the market can be predicted/understood from the income statement.

Cash Flow Statement:
Possible analysis – analysis of cash flow statement, cash flow to total assets.
How it will help them – to assess investment and financing strategies; and assess risk due to ability to generate cash flow.

2. Banker/creditor
Balance Sheet:
Possible analysis – debt/equity and working capital ratios.
How it will help them – to assess security for loans and risk and deployment of resources to earn future cash flows.

Income Statement:
Possible analysis – performance ratios and common size income statement.
How it will help them – to compare economic performance, efficiency and financial performance to other companies or periods.

Cash Flow Statement:
Possible analysis – analysis of cash flow statement and cash flow to total assets.
How it will help them – to assess whether enough cash is being generated to repay debt and assess investment and financing strategy.

Solution Outline for Problem 10.5

These are rough notes! The specific contents of the speech would vary from person to person; perhaps the notes below will prompt further ideas.

Analysis and Use of Financial Accounting Information
1. Important to understand the nature of the information, e.g.:
   • historical transaction basis of accounting
   • accrual accounting's approximation of economic performance
   • generally accepted accounting principles
   • role of the audit
   • standard set of financial statements

2. Essential to shape the analysis to its purpose, e.g.:
   • evaluation of managerial performance
   • assessment of liquidity, solvency, risk
   • estimation of future income and/or cash flow
   • short vs. long term decision/investment horizon
   • valuation of company shares and valuation of the whole company
3. Nature of “ratio” analysis and associated techniques, e.g.:
   - Ratios are just “boiled down” accounting figures, so have the strengths and weaknesses of the original figures.
   - Little meaning on own: meaning comes from comparisons with other companies or other years for the same company.
   - If the original figures are not fully comparable, adjustments may be needed to make the ratios meaningful.
   - Many ratios (e.g., return on assets, return on equity) are “scale free” in that they arithmetically remove the effects of the size of the company and so allow different sized companies to be compared.

4. Essential to know the company well, e.g.:
   - What is the nature of the business.
   - What are management's strategies and plans.
   - What is the financial and legal structure of the company (such as shares, subsidiaries, borrowings).
   - What are the company's prospects.

5. Some applications of financial analysis, e.g.:
   - Separating operating return from financial return (leverage).
   - Relating company performance to stock market returns.
   - Showing the time trend of earnings and other important measures.
   - Relating income levels to cash flows.
   - Evaluating the investment advice available from brokers and other advisors.
   - Planning an investment strategy.

Solution Outline for Problem 10.6

1. The president is correct as far as what was specifically said. Working capital has increased from $400,000 to $450,000, and operating expenses have decreased from $400,000 to $350,000. But that is only part of the story, and perhaps a misleading part. As to working capital, the increase is actually a danger signal because it includes a 75% decline in cash, a 150% increase in accounts receivable and a 25% increase in inventories. None of these is a positive development, especially when sales have decreased since 2005. Two ratios that suggest trouble:

   Day’s sales in ending accounts receivable (collection ratio):
   - 2005: $100,000/($1,500,000/365) = 24.3 days
   - 2006: $250,000/($1,200,000/365) = 76.0 days

   Inventory turnover (based on ending inventory):
   - 2005: $900,000/$400,000 = 2.25 times
   - 2006: $780,000/$500,000 = 1.56 times
Therefore the company appears to be having significantly greater difficulty collecting from its customers and its inventories are piling up. As sales are down, these are worrisome indicators.

As to sales and the rest of the income statement we see first a 20% decline in sales from 2005 to 2006 and a decline in net income. Common size income statements show (rounded):

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Cost of goods sold</td>
<td>65%</td>
<td>60%</td>
</tr>
<tr>
<td>Gross profit</td>
<td>35%</td>
<td>40%</td>
</tr>
<tr>
<td>Operating expenses</td>
<td>29%</td>
<td>27%</td>
</tr>
<tr>
<td>Income taxes</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>Net income</td>
<td>5%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Therefore sales return has dropped dramatically, percentage gross profit has declined, and operating expenses, which the president described as falling, have actually increased as a percentage of sales.

All this indicates that, contrary to what the president implied, the company had a poor year in 2006 and appears to be in some trouble.

2. Some other information that might be requested:
   • cash flow statement to indicate the full reasons for the decline in cash: mostly the poor 2006 results and the rise in receivables and inventories, but there may have been more going on;
   • complete balance sheet to reveal the rest of the assets and liabilities;
   • details on receivables and inventories to indicate what the quality of those assets is and why they have increased so much;
   • explanation for the decline in sales revenue;
   • explanation for the decline in gross profit percentage and increase in operating expense percentage;
   • auditor’s report indicating that the financial statement figures are reliable and fair;
   • business plan or management’s discussion and analysis showing how the company intends to work itself out of its difficulties.

**Solution Outline for Problem 10.7**

This is a challenging question: some detective work is needed to assemble useful figures.

Inna’s calculation is odd. It's $2,400/$10,000 = 24% for Alpha and $1,600/$10,000 = 16% for Omega. Two odd things: the calculations are based on the beginning figures, and they are not return on equity but rather some sort of return on total equities (including debt) or total assets. Let's see if we can do some more useful calculations.

This problem is a bit of a puzzle because the available figures are for the beginning of the year. With the information given, the year-end figures may be determined as follows:

Alpha: Assets $10,000 + $2,400 income - $900 dividends = $11,500
Long-term debt (assuming none was repaid) = $1,000
Shareholders' equity $9,000 + $2,400 - $900 = 10,500
Total = $11,500

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Omega: Assets $10,000 + $1,600 income - $100 dividends = $11,500
Long-term debt (assuming none was repaid) = $ 9,000
Shareholders’ equity $1,000 + $1,600 - $100 = 2,500
Total = $11,500

The two companies' incomes differ by $800, which is proportional to the $8,000 difference in their debt, so their incomes before interest expense are likely to be about equal. $800/$8,000 = 10%, so if the interest rate on the debt is 10%, their incomes before interest would be:
Alpha: $2,400 + 10% ($1,000) = $2,500
Omega: $1,600 + 10% ($9,000) = $2,500

From this the following Scott formula amounts may be calculated based on the year-end figures:

<table>
<thead>
<tr>
<th></th>
<th>Alpha</th>
<th>Omega</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ROE</td>
<td>$2,400/$10,500</td>
<td>.229</td>
</tr>
<tr>
<td></td>
<td>$1,600/$2,500</td>
<td>.640</td>
</tr>
<tr>
<td>2. ROA</td>
<td>$2,500/$11,500</td>
<td>.217</td>
</tr>
<tr>
<td></td>
<td>$2,500/$11,500</td>
<td>.217</td>
</tr>
<tr>
<td>3. D/E</td>
<td>$1,000/$10,500</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td>$9,000/2,500</td>
<td>3.600</td>
</tr>
<tr>
<td>4. Int. rate(IN)</td>
<td>.10 (above)</td>
<td>.10 (above)</td>
</tr>
<tr>
<td>5. ROA-IN</td>
<td>.117</td>
<td>.117</td>
</tr>
<tr>
<td>6. (ROA-IN)(D/E)</td>
<td>.011</td>
<td>.421</td>
</tr>
<tr>
<td>7. Scott formula*</td>
<td>.229 = .217 + .011</td>
<td>.640 = .217 + .421</td>
</tr>
</tbody>
</table>

*Not exact due to rounding.

All this is a roundabout way of supporting several comments:

a. Inna’s careless analysis obscured and reversed the relative performances of the two companies.
b. The two companies are operated equally well, as shown by their equal returns on assets (.217).
c. The difference in their incomes is due to their debt difference: Alpha has less debt, so less interest expense, so more income.
d. But the higher debt, while it reduces Omega's income, also means it has lower equity and therefore higher return on equity. Omega is benefitting from leverage because return on assets exceeds the interest rate and Omega has a lower equity (high debt/equity ratio of 3.6).
e. The earnings per share of Alpha equals $2.67($2,400/900) while that of Omega equals $16.00($1,600/100). So for a given number of shares purchased, Omega returns much more.
f. However, Omega's higher debt does mean it is more risky. This is the “negative” side of leverage.
g. So if Inna wants to maximize return and thinks that the return on assets will continue to exceed the interest rate, Omega is the better choice. If she does not think this or is worried about risk, Alpha is the better choice.
h. In spite of these comments, Inna should learn a lot more about the two companies, their histories, their management, their strategies, their markets, etc. before making an investment. Giving definitive investment advice based on the scanty data in this problem would be irresponsible.
Solution Outline for Problem 10.8

Several issues are illustrated in the information provided. Just to provide some analysis relative to the president's concern about cash, a start might be to estimate what the company's ability to generate cash has been. You could also start with other ratio analyses illustrated later in this outline. The 2004 and 2003 cash flow statements follow (2002 cannot be done without the 2001 balance sheet).

Cash Flow Statement

<table>
<thead>
<tr>
<th>Operations:</th>
<th>2004</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net income</td>
<td>$116</td>
<td>$117</td>
</tr>
<tr>
<td></td>
<td>$191</td>
<td>$201</td>
</tr>
</tbody>
</table>

Changes in other working capital accounts:
- Receivables                        | (124) | (163) |
- Inventory                           | (330) | (142) |
- Accounts payable                    | 85    | 71    |
- Other liabilities                   | 2     | 5     |
- Income tax payable                  | (4)   | 2     |

Cash from operations                  | $(180) | $(26) |

Investing:
- Acquisition of land, buildings and equipment | 0     | (500) |

Financing:
- Bank loan                           | 255   | 570   |
- Dividends paid                       | (80)  | (70)  |

Cash from financing                    | $175  | $500  |

Net decrease in cash for year          | $(5)  | $(26) |
Cash - beginning                       | 61    | 87    |
Cash - end                             | $56   | $61   |

The above cash flow statements indicate several problems:

a. Receivables have been increasing faster than income. Further analysis of this situation shows:

<table>
<thead>
<tr>
<th>2004</th>
<th>2003</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.3%</td>
<td>19.7%</td>
<td></td>
</tr>
<tr>
<td>29.5%</td>
<td>63.4%</td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>55</td>
<td>40</td>
</tr>
</tbody>
</table>

Because receivables have grown so much, the cash flow that would have been expected from the sales and income has not happened.

b. Similarly, problems exist in the management of inventories:

<table>
<thead>
<tr>
<th>2004</th>
<th>2003</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.9%</td>
<td>23.2%</td>
<td>23.1%</td>
</tr>
<tr>
<td>14.3%</td>
<td>19.7%</td>
<td></td>
</tr>
<tr>
<td>65.6%</td>
<td>39.3%</td>
<td></td>
</tr>
<tr>
<td>3.74</td>
<td>4.98</td>
<td></td>
</tr>
</tbody>
</table>
Inventory is growing dramatically and gross profit percentage is slipping. The company is piling up inventory and selling prices have been squeezed: to reduce the inventory, now more than twice what it was two years ago, would probably produce even more pressure on selling prices and reduce income. The company seems to have gotten itself into serious difficulty.

c. The increased receivables and inventories, payment of dividends, and $500,000 of capital assets in 2003, have been financed partly out of cash generated from income but largely from short-term borrowing. The increase in accounts payable is moderate, but the company's reliance on its bank loan is enormous: $825,000 over the two years 2003 and 2004.

d. The situation is also revealed by examining the company's working capital:

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2003</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current assets</td>
<td>$1,433</td>
<td>$984</td>
<td>$705</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>1,255</td>
<td>917</td>
<td>269</td>
</tr>
<tr>
<td>Working capital</td>
<td>$.178</td>
<td>$.67</td>
<td>$436</td>
</tr>
<tr>
<td>&quot;Quick&quot; assets</td>
<td>$600</td>
<td>$481</td>
<td>$344</td>
</tr>
<tr>
<td>Current ratio</td>
<td>1.14</td>
<td>1.07</td>
<td>2.62</td>
</tr>
<tr>
<td>Quick ratio</td>
<td>.48</td>
<td>.52</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Clearly the company is not in a strong current position. The president knows this, but may not realize the risk to the company of its lack of liquidity. The quick (acid test) ratio shows that the company's ability to meet current debts is strained and declining, but even that ratio may underestimate the problem because the quick assets include receivables and the company's collections are not very quick!

This analysis can be extended by using the Scott formula to examine the company's returns and use of debt:

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2003</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets (&quot;A&quot;)</td>
<td>$2,486</td>
<td>$2,112</td>
<td>$1,417</td>
</tr>
<tr>
<td>Owners' equity (&quot;E&quot;)</td>
<td>1,231</td>
<td>1,195</td>
<td>1,148</td>
</tr>
<tr>
<td>Total liabilities (&quot;L&quot;)</td>
<td>1,255</td>
<td>917</td>
<td>269</td>
</tr>
<tr>
<td>Income (&quot;NI&quot;)</td>
<td>116</td>
<td>117</td>
<td>112</td>
</tr>
<tr>
<td>Income tax rate:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004 ($95/($116 + $95)</td>
<td>.450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 ($102/($117 + $102)</td>
<td>.466</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2002 ($97/($112 + $97)</td>
<td>.464</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest expense:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before tax shield</td>
<td>89</td>
<td>61</td>
<td>0</td>
</tr>
<tr>
<td>After shield (&quot;ATI&quot;)</td>
<td>49</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Revenue (&quot;REV&quot;)</td>
<td>3,200</td>
<td>2,800</td>
<td>2,340</td>
</tr>
<tr>
<td>Formula's terms:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE (NI/E)</td>
<td>.094</td>
<td>.098</td>
<td>.098</td>
</tr>
<tr>
<td>ROA ((NI + ATI)/A)</td>
<td>.066</td>
<td>.071</td>
<td>.079</td>
</tr>
<tr>
<td>IN (ATI/L)</td>
<td>.039</td>
<td>.036</td>
<td>0</td>
</tr>
<tr>
<td>Rate difference (ROA-IN)</td>
<td>.027</td>
<td>.035</td>
<td>.079</td>
</tr>
<tr>
<td>SR ((NI + ATI)/REV)</td>
<td>.052</td>
<td>.054</td>
<td>.048</td>
</tr>
<tr>
<td>AT (REV/A)</td>
<td>1.287</td>
<td>1.326</td>
<td>1.651</td>
</tr>
<tr>
<td>Debt/equity (L/E)</td>
<td>1.019</td>
<td>.767</td>
<td>.234</td>
</tr>
<tr>
<td>Leverage (ROA-IN)(L/E)</td>
<td>.028</td>
<td>.027</td>
<td>.018</td>
</tr>
</tbody>
</table>
Scott formulas:
2004: 0.094 = 0.066 + 0.028
2003: 0.098 = 0.071 + 0.027
2002: 0.092 = 0.079 + 0.018

The Scott formula figures indicate:

- The company is benefiting from leverage, so the borrowing has helped maintain return on equity.
- But return on equity has been slipping, largely because return on assets is falling. The company's ability to generate an operating return consistent with its size is declining.
- Sales return has held up at about 5%, so the expenses other than interest are being kept under control.
- The difference between average interest rate and return on assets is small and decreasing. This indicates borrowing is risky as the difference could become negative with a moderate decline in return on assets.
- If it is assumed that the bank loan is the only interest-bearing debt, its average after-tax rate is 7.0% in 2004 ($49/(average of $825 and $570)) and 11.6% in 2003 ($33/(average of $570 and $0)). Both these figures exceed return on assets, so if the company obtains more such financing, returns will be reduced because the company is not generating income sufficient to cover the added interest.

Some suggestions for the president from the above about getting cash:
1. Reduce production or purchasing until inventory is substantially reduced.
2. Increase collection efforts or change credit terms to get receivables down.
3. Increase share capital or obtain long-term financing to reduce the reliance on short-term borrowing (though these would reduce returns to present owners and might not be popular with the shareholders).
4. Raise selling prices a little to protect returns from the effects of any further borrowing (may not work if price competition is strong, of course).

**Solution Outline for Problem 10.9**

1. Financial leverage is the use of borrowed money to earn money. The leverage is positive if the money earned is greater than the cost of borrowing (e.g., if $10,000 borrowed at 8% is used to earn a 12% return), and it is negative if the money costs more to borrow than the borrower can earn using it.
2. Such leverage is risky for two main reasons. First, the return earned might not be what is hoped, and, if it is less than the cost of borrowing, then the borrowing ends up making the borrower worse off than without borrowing at all. Second, the money obtained must be repaid, and the lender may take strong action, such as going to court or taking over management or taking assets, if the loan gets into difficulty. So borrowing may result in the loss of more than the money borrowed.
3. The Scott formula incorporates leverage by separating its effect on return on equity from the effect of the operating return (the day-to-day relative return without borrowing: return on assets). Leverage is computed by first of all calculating the difference between the return on assets and the cost of borrowing (in the example above, 12% minus 8%) and then multiplying that by the degree of borrowing relative to equity. If leverage is positive, the more borrowed, the better the effect on return on equity; if it is negative, the more borrowed, the worse the effect on return on equity.
4. The first company’s leverage return is 4%; the second’s is 1%. The two aspects of risk noted above are present in this comparison. The second company is more in danger of having leverage go negative, but the first company has borrowed relatively more. So the second company is at greater risk of leverage hurting, but the hurt will not be great because not as much is borrowed, whereas the first company has more to repay and so could get into more difficulty if problems do arise.

**Solution Outline for Problem 10.10**

1. Return on equity = \(\frac{10,000}{65,000} = .154\)

2. Calculations (using Scott formula terms):
   - ROE = .154 as above
   - ATI = \(3,000 \times (1-.333) = 2,000\)
   - ROA(ATI) = \(\frac{10,000 + 2,000}{115,000} = .104\)
   - IN(ATI) = \(\frac{2,000}{50,000} = .040\)
   - L/E = \(\frac{50,000}{65,000} = .769\)
   - Leverage potential = \((\text{ROA(ATI)} - \text{IN(ATI)}) = .104 - .040 = .064\)
   - Leverage = \(.064(.769) = .049\)

So, managerial performance (ROA(ATI)) shows a 10.4% return and leverage show a 4.9% return, only one-half of the ROA. Two-thirds of ROE are operating return and one-third is leverage return.

3. The assets financed would earn 10.4%, according to the above calculations. The cost of the money borrowed is 8%. Therefore, leverage is positive (2.4%) and the company should go ahead. This will, however, increase the company’s risk because the interest has to be paid and return on assets could decline below that rate.

4. (a. and b.) Some possible additional information and ratios (more can be imagined, so this is an outline only):
   - Terms and security of present debts
   - Quality of management (especially Mr. A)
   - Industry and competition prospects
   - Personal guarantees Mr. A might offer
   - Interest coverage ratio
   - Receivables collection and inventory turnover
   - Sales return
   - Income tax information

**Solution Outline for Problem 10.11**

This problem raises the role of leverage in helping (or hurting) return on equity. It can be addressed via the Scott formula:

\[
\text{ROE} = \frac{54,300}{(142,050+106,700)} = .218
\]

\[
\text{ROA} = \frac{(54,300 + (1 - .43)(8,270))}{410,090} = .144
\]

Before going further, the leverage effect can be deduced. ROE exceeds ROA, so leverage is working positively for the company. Leverage return is \(.074(.218-.144)\), or a third of the return on equity.
(To check this, calculate (ROA-IN)(D/E).
Above, ROA=.144;IN=(1-.43)($8,270)/$161,304=.029;D/E=$161,340/($142,050 $106,700)=.649
Result = (.144-.029)(.649)=.115(.649)=.074

Therefore, the return to the owners of this business is being helped by its borrowing. A third of the return comes from its debt leverage. As the interest rate is very low (2.9% average), liabilities are far less than equity, long-term debt is less than half of total liabilities, and there is a 11.5% difference between the interest rate and return on assets generated by operating activities, there is not much risk in the situation. The neighbour should not worry about this company, though her aversion to debt may apply for many other companies that are more heavily in debt.

As a footnote, the problem's data indicate a possible complication in the above rosy assessment. Income pre-tax and unusual item is $58,850, while net income is $54,300. As the latter figure is after 43% income tax, the before-tax income can be calculated as $54,300/(1-.43), or $95,263. Subtracting $58,850 from that leaves $36,413 as the unusual income. Should that income be left out of the analysis as being not part of the normal earning power?

If the analysis were re-done without the unusual income, the net income would be $33,545 ($58,850 minus 43% tax). Retained earnings would be lower by $20,755 ($54,300-$33,545), as would total assets. The revised Scott Formula figures would be:

\[
\text{ROE} = \frac{$33,545}{($142,050 + 106,700 - 20,755)} = .147
\]

\[
\text{ROA} = \frac{($33,545 + (1 -.43)($8,270))}{(410,090 - 20,755)} = .098
\]

So ROE is 7.1% down from the earlier figure and ROA is 4.6% down. Leverage is still positive at 4.9% (.147 -.098) and is still about a third of ROE. (The earlier conclusions about leverage are not substantially affected by removing the unusual item.)

\section*{Solution Outline for Problem 10.12}

1. Scott formula for the year ended September 30, 2006:

\[
\text{ROE} = \frac{$405,000}{$4,500,000} = .09
\]

\[
\text{SR} = \frac{($405,000 + 300,000 x (1 -.40))}{$2,700,000} = .217
\]

\[
\text{AT} = \frac{$2,700,000}{$7,500,000} = .36
\]

\[
\text{ROA} = \frac{($405,000 + 300,000 x (1 -.40))}{$7,500,000} = .078
\]

\[
\text{IN} = \frac{($300,000 x (1 -.40))}{$3,000,000} = .06
\]

\[
\text{D/E} = \frac{$3,000,000}{$4,500,000} = .667
\]

\[
.09 = .217 x .36 + (.078 -.06) x .667
\]

\[
.09 = .078 + .012
\]

2. This indicates that most of the company's 2006 return on owners' investment was produced by operating activity (return on sales and sales volume relative to the company's size) and relatively little from leverage (borrowing to increase owners' return).

Regarding operations, the company has quite a large return on sales (21.7%) but a relatively low asset turnover (only .36 per year, so sales revenue was about a third of assets).

Regarding leverage, the company has little debt relative to equity, so not much potential for leverage. Its return on assets was just a little above the average interest rate, so not much leverage was achieved either.
3. Some limitations of the Scott formula:
   • based on book values, not on current values such as share prices or market values of assets, which values may be of more interest in many cases than book values;
   • a mechanical formula that requires no real understanding of the company and its business strategies;
   • composed of ratios and so only as good as the accounting information on which the ratios are based;
   • makes the assumption that returns can be divided up into the components in the formula, though they are undoubtedly highly interrelated.

4. Comparison of Scott formulas:
   \[
   \begin{align*}
   2005 & \quad 0.094 = (0.164)(0.486) + (0.080 - 0.025)(0.240) \\
   & \quad = 0.080 + 0.013 \\
   2006 & \quad 0.090 = (0.217)(0.360) + (0.078 - 0.060)(0.667) \\
   & \quad = 0.078 + 0.012
   \end{align*}
   \]

Return on equity declined only slightly, but several performance factors changed:
   • return on sales went up
   • asset turnover went down
   • because of those opposite changes, return on assets declined only slightly
   • average interest rate rose dramatically
   • borrowing rose significantly also

So the company's operating policies appear to have changed but the net effect on operating return was minor. The company greatly increased its borrowing but at much higher rates, just about eliminating leverage. If the new borrowing had been at similar rates to those from 2003, return on equity would have been boosted in 2004; as it is, ROE declined slightly.

**Solution Outline for Problem 10.13**

1. Raising selling prices would produce a return on equity more than double the present .095 ROE:
   \[
   \begin{align*}
   \text{ROE} & = 0.06 \times 2.10 + (\text{ROA} - 0.07) \times 1.5 \\
   & = 0.126 + (0.126 - 0.07) \times 1.5 \\
   & = 0.126 + 0.084 \\
   & = 0.21
   \end{align*}
   \]

2. Refinancing the debt would increase ROE a little from .095:
   \[
   \begin{align*}
   \text{ROE} & = 0.04 \times 2.00 + (0.08 - 0.06) \times 1.5 \\
   & = 0.08 + 0.03 \\
   & = 0.11
   \end{align*}
   \]

3. Reducing operating costs would increase ROE more substantially from .095:
   \[
   \begin{align*}
   \text{ROE} & = 0.05 \times 2.00 + (\text{ROA} - 0.07) \times 1.5 \\
   & = 0.10 + (0.10 - 0.07) \times 1.5 \\
   & = 0.10 + 0.045 \\
   & = 0.145
   \end{align*}
   \]

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4. Increasing long-term borrowing and reducing equity would have little effect on the present ROE:

\[
\text{ROE} = 0.04 \times 2.00 + (0.08 - 0.07) \times 1.8 \\
= 0.08 + 0.018 \\
= 0.098
\]

**Solution Outline for Problem 10.15**

1. The concept of “time value of money” is that people wish to be rewarded for waiting to receive funds (cash, usually). This reward is called interest and is calculated as a function of the amount of money and the passage of time. Because of this concept, it can be said that an amount of money received after a period of time is “worth” less than if it were received now, because if it had been received earlier it would have earned interest by the later time. Therefore the “present value” of an amount of money changing hands later is less than that amount, because of the implied interest included in the later amount. You might say that the future amount minus the implied interest equals the present value.

Business people are sensitive to this because money changes hands at all sorts of different times, for example money is borrowed now and paid back later. Therefore, the interest charged, or implied, must be taken into account when comparing cash flows that occur at different times. To ignore this would misstate the value of future flows in comparison to present ones.

2. a. \( PV = \frac{1,000}{1 + 0.10} = 909.09 \).

b. \( PV = \frac{1,000}{1 + 0.12} + \frac{1,000}{(1 + 0.12)^2} + \frac{1,000}{(1 + 0.12)^3} \)

\[ = 893 + 797 + 712 = 2,402. \]

OR \[ = \frac{1,000}{0.12} \left( 1 - \frac{1}{(1.12)^3} \right) = 2,402 \]

The present value is higher than in part b, though the rate is lower, because the implied interest included in the total $3,000 cash flow is lower and therefore when it is removed, the resulting present value is higher. This illustrates an important rule: the higher the interest (“discount”) rate, the lower the present value because more interest is presumed to be included in the future cash flow(s) and when it is removed, the remaining present value is lower.
**Solution Outline for Problem 10.16**

a. Present value will go up – the faster future the cash flows are realized, the lower the present value
b. Present value will go down – the higher the interest rate used to discount future cash flows, the lower the present value.
c. Present value will go down – delaying cash flows reduces the present value.
d. Present value will go down because the required rates on all or some projects will increase (so, opposite of b.)

**Solution Outline for Problem 10.17**

1. The amount needed at retirement is the present value of an annuity of $100,000 per year for 35 years:

\[ PV = \left( \frac{100,000}{.08} \right) \times \left(1 - \frac{1}{(1.08)^{35}}\right) \]
\[ = \frac{1250000}{1.08} \times 1 - 0.0676 \]
\[ = 1,165,500 \]

The amount needed is also the future value of the annual savings (AS):

\[ FV = AS \times \left(1 + .08\right)^{30} - 1)/.08 \]
\[ = 1,165,500 = AS \times 113.283 \]
\[ AS = 10,228 \]

2. The future value of 30 annual deposits of $10,228 at 10%:

\[ FV = 10,228 \times \left(1 + .10\right)^{30} - 1)/.10 \]
\[ = 10,228 \times 164.494 \]
\[ = 1,692,314 \]

This amount would provide an annuity for 35 years of:

\[ PV = \left(\text{annual amount}/.10\right) \times \left(1 - \frac{1}{(1 + .10)^{35}}\right) \]

Annual amount = $1,692,314/9.644 = $175,478

3. The amount needed at retirement is the present value of an annuity of $100,000 per year for 35 years:

\[ PV = \left(\frac{100,000}{.05}\right) \times \left(1 - \frac{1}{(1 + .05)^{35}}\right) \]
\[ = 2,000,000 \times .8187 \]
\[ = 1,637,400 \]

The amount needed is also the future value of the annual savings (AS):

\[ FV = AS \times \left(1 + .05\right)^{30} - 1)/.05 \]
\[ = 1,637,400 = AS \times 66.4388 \]
\[ AS = 24,645 \]
Solution Outline for Problem 10.19

Present value = P.V. of annual flow + P.V. of share sale:

\[
\frac{8,000}{.08} \left( 1 - \frac{1}{(1.08)^4} \right) + \frac{200,000}{1.08^4} = $26,497 + $147,006 = $173,503
\]

As this P.V. is less than the $175,000 investment, the return is less than the 8% the company requires. Therefore it should not make the investment.

Solution Outline for Problem 10.20

1. Net present value of lease option.

\[
\frac{30,000}{.08} \left( 1 - \frac{1}{(1.08)^5} \right) = $119,781
\]

Net present value of buy option = $140,000 (cash price)

Therefore, lease the truck.

2. Net present value of lease option remains the same: $119,781.

Net present value of buy option:

<table>
<thead>
<tr>
<th>Initial payment</th>
<th>$140,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling price at end of five years</td>
<td></td>
</tr>
<tr>
<td>( 25,000/(1.08)^5 )</td>
<td>( (17,015) )</td>
</tr>
<tr>
<td>( 122.95 )</td>
<td></td>
</tr>
</tbody>
</table>

Answer would not change: Speedy Trucking should still lease the truck.

3. Important assumptions:
   - That the appropriate interest rate is used. If the appropriate interest rate is lower, the net present value of the lease option will be higher.
   - That the truck can be sold at the end of five years for $25,000. If the selling price of the truck is lower or higher at the end of five years this will affect the analysis.
Solution Outline for Problem 10.21

Present value:

$$\frac{4,500}{.08} \left(1 - \frac{1}{(1.08)^7}\right) + \frac{6,500}{(1.08)^4} = 14,095 + 4,778 = 18,873$$

Present value is less than the $20,000 cost. It does not appear to be a good idea, especially given that the future cash flows are uncertain. Harriett may want to re-examine her estimates, though, to be sure they are accurate and not too pessimistic.

Solution Outline for Problem 10.22

1. $15,000 \left(1 - \frac{1}{(1.05)^{10}}\right) = 115,826.02$

   $$[(1.05)^{10} = 1.628894627]$$

2. Interest = $115,826.02 x .05 = $5,791.30

   Check: PV a year from now

   $$= \frac{15,000}{.05} \left(1 - \frac{1}{(1.05)^9}\right) = 106,617.33$$

   So principal goes down $115,826.02 - 106,617.33 = $9,208.69

   Total payment = principal + interest
   = $5,791.30 + 9,208.69
   = 14,999.99
   (rounding error)

3. PV at the end of the 6th year (4 years to go)

   $$= \frac{15,000}{.05} \left(1 - \frac{1}{(1.05)^4}\right) = 53,189.26$$

4. Current portion (from check in part 2) = 9,208.69
   Noncurrent portion (also from check in part 2) = 106,617.33
   115,826.02
Solution Outline for Problem 10.23

First offer: PV = $750,000

Second offer:

\[ PV = 250,000 + 75,000 \times \frac{1 - \frac{1}{(1.05)^5}}{.05} + 75,000 \times \frac{1 - \frac{1}{(1.06)^5}}{.06} \times (1.05)^5 \]

\[ = 250,000 + 324,710.75 + 315,927.28/1.2762815 \]

\[ = 324,710.75 + 247,537.31 \]

\[ = $822,248.06 \]

(Note: The last part of the above formula is to bring those 5 years’ payments back to the present.)

\[ [(1.05)^5 = 1.2762815; (1.06)^5 = 1.3382255] \]

Third offer:

\[ PV = 75,000 \times \frac{1 - \frac{1}{(1.05)^5}}{.05} + 125,000 \times \frac{1 - \frac{1}{(1.06)^5}}{.06} \times (1.05)^5 \]

\[ = 324,710.75 + 526,545.47/1.2762815 \]

\[ = 324,710.75 + 412,562.18 \]

\[ = 737,279.93 \]

Conclusion:
The second offer is best, the first offer is second best, and the third offer is the worst.

Solution Outline for Problem 10.24

1. a. If 8% bonds were priced to yield 8%, they’d sell for $100.
   b. If 8% bonds were priced to yield 7%:
      \[ PV = \frac{8}{.07} \times \left(1 - \frac{1}{1.07^{10}}\right) + \frac{100}{1.07^{10}} \]
      \[ 1.07^{10} = 1.9671511 \]
      \[ PV = \frac{8}{.07} \times \left(1 - \frac{1}{1.9671511}\right) + \frac{100}{1.9671511} \]
      \[ = $56.19 + $50.83 = $107.02 \]
   c. If 8% bonds were priced to yield 9%:
      \[ PV = \frac{8}{.09} \times \left(1 - \frac{1}{1.09^{10}}\right) + \frac{100}{1.09^{10}} \]
      \[ 1.09^{10} = 2.3673634 \]
      \[ PV = \frac{8}{.09} \times \left(1 - \frac{1}{2.3673634}\right) + \frac{100}{2.3673634} \]
      \[ PV = $51.34 + $42.24 = $93.58 \]
2. It would make more because the funding would cost only 7%, leaving a greater spread between cost and the 10% return anticipated. (This would be modified by whatever return the company earned on the extra $700,000 raised.)

Solution Outline for Problem 10.25

Share price of $30 after 5 years:

\[
P_V = \frac{1.00}{0.05} \left( \frac{1}{1.05} \right)^5 + \frac{12}{1.05^5} = 4.62 + 9.40 = 14.02
\]

Share price of $50 after 5 years:

\[
P_V = \frac{1.00}{0.05} \left( \frac{1}{1.05} \right)^5 + \frac{20}{1.05^5} = 4.62 + 15.67 = 20.29
\]

So, it makes a big difference whether the price will be $12 or $20. At $12, the present value is less than the investment cost of $15, so it is not an attractive investment. However at $20, present value exceeds cost and it is attractive.

Solution Outline for Problem 10.26

1. Present value = P.V. of annual flow + P.V. of principal repayment:

\[
= \frac{8.00}{0.09} \left( \frac{1}{1.09} \right)^4 + \frac{100}{(1.09)^4}
\]

\[
= 25.92 + 70.84
\]

\[
= 96.76
\]

If 9% is required, the bond is worth only $96.76 (because it pays only 8% and so if the effective return is to be higher, 9%, the investment cost must be lower than $100).

2. To answer this, some assumption must be made about the value of the gold mining company's shares at the end of 4 years. To be conservative, let's assume they will not be worth anything. Then the present value of the cash flow is:

\[
= \frac{32.00}{0.09} \left( \frac{1}{1.09} \right)^4 = 103.68
\]

So an investment of $103.68 per share would be as valuable as an investment of $96.76 per bond. If you have say $20,000 to invest, you'd be indifferent between 193 shares and 207 bonds.

3. Some other factors:
   • if the mining shares are worth anything at all at the end of 4 years, their value would increase according to the present value of that amount;
   • maybe the uncle's mining company is riskier than Big Conglomerate.
Solution Outline for Problem 10.27

1. Changes in accounting methods usually affect the timing of the recognition of revenue or the timing of the recognition of expense. Since this does not alter the timing of when cash is received or disbursed, there will be no effect on cash flow.

2. The effect on net income will be offset by the balance sheet effect when changes in the balance sheet are accounted for in the cash flow statement. Thus there will be no overall effect on cash flow as reported in the cash flow statement.

3. If the change in accounting method affects the amount of income tax actually paid out this period, cash flow as reported on the cash flow statement will change. For example, Canada Revenue Agency allows the use of both FIFO and average cost for tax purposes. A change from one inventory accounting method to another may well result in a change in income for tax purposes, thus possibly resulting in a change in tax currently paid as well as payable in the future. A change in accounting method that results in redefining what is included in cash and cash equivalents will also affect cash flow as reported in the cash flow statement.

4. Under GAAP it is necessary to match expenses of the period with revenues of the period. If a “what if” effects analysis results in a change in income before tax, the tax expense of the period will also be affected. If income tax is not taken into account, income tax expense will not be properly matched to the income of the period.

5. No. For example, if the change in revenue recognition policy has the effect of increasing the beginning receivable balance more than the ending receivable balance, revenue and net income will be lower in the current year.

Solution Outline for Problem 10.28

a. Total current assets are unaffected (the cash came in and went out in one day).

b. Total assets increase by $50,000,000 (the additional equipment).

c. Total current liabilities decrease by $25,000,000 (reduced short-term bank loans).

d. The working capital ratio would be improved because the denominator, current liabilities, would decrease without there being any effect on the numerator, current assets.

e. No change in shareholders’ equity (see f. however).

f. No direct effect on earnings, but there will be increased interest and amortization expenses in the future. So, unless the additional equipment generates more revenue than that, earnings and shareholders’ equity will be reduced in the future.

g. No effect on cash and cash equivalents (no effect on cash, as noted in a. and short-term bank loans are not likely part of cash and cash equivalents). Cash generated by operations, as shown on the cash flow statement, would decrease by $25,000,000 due to the reduction in short-term bank loans.

h. Cash used for investments would increase by $50,000,000 (the additional equipment).
i. Cash provided from financing would increase by $50,000,000 (the new borrowing of $75 million, less the $25 million short-term bank loans repaid).

j. Effect on return on equity could be predicted by estimating the increased income to be earned from new equipment and any interest charges on short-term bank loans that will be saved, and deducting the interest costs of the new borrowing. All calculations should be done on an after-tax basis, because return on equity uses net income as its numerator.

k. The leverage return estimate would be done in a similar way. The effect on return on assets that is expected would be compared to the interest rate on the borrowing to determine if the leverage will be positive (presumably it is expected to be positive, otherwise the company would not have borrowed the money).

Solution Outline for Problem 10.29

a. Assets would increase by $15,000,000.
b. Liabilities would decrease by $30,000,000
c. Total shareholders’ equity would increase by $45,000,000
d. The debt-equity ratio would decrease since the numerator, debt, has been decreased by $30,000,000 and the denominator, equity has been increased by $45,000,000
e. Cash from financing activities would increase by $15,000,000 as the net effect is an inflow of cash. ($45,000,000 in – $30,000,000 out).
f. Cash from investing activities would decrease by $15,000,000 since net properties are being increased in value
g. Total cash on hand would be unchanged since the changes to cash from financing and investing cancel out.

Solution Outline for Problem 10.30

• Effect on net income = $8,649,000 (0.05 – 0.02) × (1 – 0.30) = $181,629 reduction
• Revised net income = $223,650 – $181,629 = $42,021
• So the change would reduce net income by over 80% but would not reduce it to zero.
• There would be no effect on cash flow (this is an accrual accounting change: cash flow effects come from the company’s actual success in collections).
• Appropriate accounting should be chosen even if the managers are not pleased with the result.

Solution Outline for Problem 10.31

Data:
- The amount of advertising capitalized was $100,000 this year.
- The capitalized amount is being amortized at 20% per year.

Present method:
- Amortization expense is $20,000 this year (20% of $100,000);
- Deferred asset is $100,000 - $20,000 = $80,000 at the end of this year.
Effects if advertising were not capitalized:

- This year’s income would be lower by 65% of ($100,000 - $20,000) = $52,000;
- Income tax liability would go down by $28,000 (the other 35%);
- Retained earnings this year would be lower by $52,000;
- Assets would be lower by the removal of the $80,000 deferred asset;
- Balance sheet proof: ($80,000) = $(28,000) + $(52,000);
- No effect on net cash flow, cash balance or working capital.

Solution Outline for Problem 10.32

Effect on net income: ($2,650,000 - $265,000) x .70 = $1,669,500 higher

Effect on cash flow from operations:

- Increase in net income $1,669,500
- Increase in amortization add-back 265,000
- Increase in income tax payable
  \((2,350,000 - 235,000) \times 25\%\)
  \(715,500\)
  \$2,650,000 higher

(There would also be a $2,650,000 decrease in cash from investing so the net effect on cash flow is nil.)

Solution Outline for Problem 10.33

1. **Large Corporation**

   May 1, 2006 Balance Sheet Categories Affected (in millions $)

<table>
<thead>
<tr>
<th>Category</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEA</td>
<td>$ -2.2</td>
</tr>
<tr>
<td>OCA</td>
<td></td>
</tr>
<tr>
<td>NCA</td>
<td>+ 5.8</td>
</tr>
<tr>
<td>CAP</td>
<td>+2.0</td>
</tr>
<tr>
<td>RET</td>
<td></td>
</tr>
<tr>
<td>CEL</td>
<td></td>
</tr>
<tr>
<td>OCL</td>
<td></td>
</tr>
<tr>
<td>NCL</td>
<td>$+1.6</td>
</tr>
<tr>
<td>RET</td>
<td>+3.6</td>
</tr>
</tbody>
</table>

2. Financing activity section will show two more items. First, cash raised from issue of shares is $2.0 million, and second, cash raised from bank loan is $1.6 million.

3. Income statement will show higher amortization charge because trucks are purchased and capitalized. Also, there will be increased interest expense because of the loan. Taxes will be reduced due to a higher tax capital cost allowance claim and also a higher interest expense.

4. On the balance sheet, this will affect the working capital ratio (down), the debt-equity ratio (we don’t know whether up or down), and the debt to assets ratio (probably down). On the income statement, sales return and gross margin may be affected; it depends on whether the new fleet brings in more revenue than the increased expenses. Presumably that is the intention, or the trucks would not have been bought (unless competitive pressure forced the purchase, in which case no new revenue might be generated). If net income is affected, then ROE and ROA will be affected through their numerators; their denominators are already affected by the balance sheet changes.

5. **DR Equipment** $5,800,000  
   **CR Share capital** $2,000,000  
   **CR Cash** 2,200,000  
   **CR Long-term bank loan** 1,600,000

**Solution Outline for Problem 10.34**

1. **Strapped Ltd.**  
   - Working capital will increase by $50,000 (extra cash increases current assets) to $260,000.  
   - The working capital ratio goes up from 1.17 ($210,000/$180,000) to 1.44 ($260,000/$180,000).  
   - No immediate effect, but it could be helped as the money is put to work and hurt as interest is paid.

2. **Slipshod Inc.**  
   - Net income will go down by $145,000 x (1 – 0.40), or $87,000.  
   - Retained earnings will go down by $210,000 x (1 – 0.40), or $126,000, which is $87,000 for the current year plus $65,000 x (1 – 0.40) for the prior years.  
   - There is no net effect on cash from operations:
     - Decrease in net income $(87,000)  
     - Non-cash warranty expense increase 145,000  
     - Decrease in income tax payable (58,000)  
     - $ 0  
   - No effect on working capital ratio because no current assets or liabilities are involved (the warranty liability is noncurrent in this case).

**Solution Outline for Problem 10.35**

1. **Income before tax, unadjusted** $75,000  
   - New revenue policy* (2,000)  
   - Monthly accrual of bonuses* (4,000)  
   - Postpone repayment of loan*** 0  
   - Capitalize trademark**** 0  
   **Income before tax, adjusted** $69,000  
   **Tax (at 30%)** 20,700  
   **Net income, adjusted** $48,300

* Current year’s revenue reduced because prior year’s A/R increased more than this year’s A/R (28,000 – 26,000).

** Bonus expense for current year is the difference between prior year’s liability and this year’s liability (11,000 – 7,000).

*** This change affects the balance sheet but not the income statement.

**** Since the expenses were from the preceding year, a prior period adjustment would be made to opening retained earnings and would not affect this year’s income. If we knew the rate of amortization for such intangible assets we could calculate the effect on the current year’s expense.
The economic reasons favouring each change would involve better matching of the revenue and expense recognitions to the economic events that indicate success or failure for such a company. The revenue should better approximate what has been earned from an economic perspective, as should bonuses and the lower trademark expenses better approximate what has been incurred. Fairness is the ultimate criterion. However, since none of these changes actually increase the current year’s income (there is actually a decrease) the company may not wish to make these changes.

2. Zero (as usual with accrual accounting changes, none of the changes affect the cash account).

3. Some expenses not paid in cash are now recognized (bonuses), and some expenses already paid are set up as assets (trademark) and accounts receivable increase because revenue is increased. None of these changes immediately involve cash.

Solution Outline for Problem 10.36

<table>
<thead>
<tr>
<th>Combined impact:</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. On net income:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development expense</td>
<td>down $10,000</td>
<td>down $9,000</td>
</tr>
<tr>
<td>Amortization expense</td>
<td>up 15,000</td>
<td>down 10,000</td>
</tr>
<tr>
<td>Net expense change</td>
<td>up $5,000</td>
<td>down $19,000</td>
</tr>
<tr>
<td>Tax effect (30%)</td>
<td>down 1,500</td>
<td>up 5,700</td>
</tr>
<tr>
<td>Net income effect</td>
<td>down $3,500</td>
<td>up $13,300</td>
</tr>
<tr>
<td><strong>b. On year-end working capital</strong></td>
<td>no effect</td>
<td>no effect</td>
</tr>
<tr>
<td><strong>c. On year-end total assets</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(opposite of net expense change)</td>
<td>down $5,000</td>
<td>up $19,000</td>
</tr>
<tr>
<td><strong>d. On year-end debt-equity ratio:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator effect (tax)</td>
<td>down $1,500</td>
<td>up $4,200 *</td>
</tr>
<tr>
<td>Denominator effect (equity)</td>
<td>down 3,500</td>
<td>up 9,800 **</td>
</tr>
<tr>
<td>Probable effect on ratio:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unclear (num. and den. both smaller)</td>
<td>unclear</td>
<td></td>
</tr>
<tr>
<td>Unclear (num. and den. both larger)</td>
<td>unclear</td>
<td></td>
</tr>
<tr>
<td>* $1,500 - $5,700 = $4,200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>** $3,500 - $13,300 = $9,800</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>e. On return on year-end equity:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator effect</td>
<td>down $3,500</td>
<td>up $13,300</td>
</tr>
<tr>
<td>Denominator effect</td>
<td>same</td>
<td>up 9,800</td>
</tr>
<tr>
<td>Probable effect on ratio:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worsened (due to numerator)</td>
<td>worsened</td>
<td></td>
</tr>
<tr>
<td>Unclear (num. and den. both larger)</td>
<td>unclear</td>
<td></td>
</tr>
<tr>
<td><strong>f. On total asset turnover:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numerator effect</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Denominator</td>
<td>down $5,000</td>
<td>up $9,000</td>
</tr>
<tr>
<td>Effect on ratio</td>
<td>improved</td>
<td>worsened</td>
</tr>
</tbody>
</table>
Solution Outline for Problem 10.37

<table>
<thead>
<tr>
<th>Balance Sheet</th>
<th>Income Statement</th>
<th>Balance Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>End Last Year</td>
<td>This Year</td>
<td>End This Year</td>
</tr>
<tr>
<td>Assets</td>
<td>Revenue</td>
<td>Assets</td>
</tr>
<tr>
<td>Rec. up $8,000</td>
<td>Up $10,000</td>
<td>Rec. up $18,000</td>
</tr>
<tr>
<td>Liabilities</td>
<td>Expenses</td>
<td>Liabilities</td>
</tr>
<tr>
<td>Other than tax</td>
<td>Other than tax</td>
<td>Other than tax</td>
</tr>
<tr>
<td>Pay. up $3,000</td>
<td>Exp. up $4,000</td>
<td>Pay. up $7,000</td>
</tr>
<tr>
<td>Income tax</td>
<td>Income tax</td>
<td>Income tax</td>
</tr>
<tr>
<td>$1,750</td>
<td>$2,100</td>
<td>$2,100</td>
</tr>
<tr>
<td>Equity</td>
<td>Equity</td>
<td>Equity</td>
</tr>
<tr>
<td>Retained earn.</td>
<td>Net income</td>
<td>Retained earn.</td>
</tr>
<tr>
<td>Up $3,250</td>
<td>Up $3,900</td>
<td>Up $7,150</td>
</tr>
</tbody>
</table>

Note that this question could alternatively have been phrased something like this: “Receivables will increase $18,000 at the end of the current year and $8,000 at the end of the previous year; payables will increase $7,000 at the end of the current year and $3,000 at the end of the previous year.” In that case, the current year’s net income figures would be deduced from the balance sheet effects, whereas above, the current year’s balance sheet effects were deduced from the income figures and the previous balance sheet. In this alternative wording, sometimes people think that the current balance sheet effects will be added to the prior ones (for example, the receivables increase would be calculated as $26,000). This would be incorrect, because the current balance sheet effects already include all prior effects: each balance sheet is the aggregation of everything recorded prior to that.

There is no effect on cash, but the cash flow statement’s internal numbers will change:
- Net income will go up (positive apparent effect) $3,900
- Change in accts. rec’ble will go up (negative apparent effect) (10,000)
- Change in accts. payable will go up (positive apparent effect) 4,000
- Change in tax payable will go up (positive apparent effect) 2,100
- Net effect on cash from operations $0

Solution Outline for Problem 10.38

<table>
<thead>
<tr>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending accounts receivable*</td>
<td>$120,000</td>
<td>$170,000</td>
</tr>
<tr>
<td>Worthless (potential write-offs)</td>
<td>5,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Doubtful during year</td>
<td>10,000</td>
<td>25,000</td>
</tr>
</tbody>
</table>

Method (a):
- Effect on income none none none
- Effect on working capital none none none

Method (b):
- Effect on income (5,000) +40,000 (20,000)
- Effect on working capital +5,000 +40,000 +20,000

Method (c):
- Effect on income (15,000) (65,000) 70,000
- Effect on working capital +15,000 65,000 +70,000
Ending accounts receivable = Beginning + Credit sales - Cash collected from credit sales (not cash sales):

2003: $0 +$500,000 - ($420,000 - $40,000) = $120,000
2005: $120,000 + $700,000 - ($740,000 - $90,000) = $170,000
2006: $170,000 + $1,100,000 - ($1,050,000 - $100,000) = $320,000

Solution Outline for Problem 10.39

1. Retained earnings at the end of last year.
   Increase by $104,055  (148,650 x (1 - .30))
2. Income tax liability at the end of last year.
   Increase by $44,595  (148,650 x .30)
3. Supplies expense for this year.
   Increase by $24,790  (148,650 - 123,860)
4. Net income for this year.
   Decrease by $17,353  (24,790 x (1 - .30))
5. Current assets at the end of this year.
   Increase by $123,860
6. Income tax liability at the end of this year.
   Increase by $37,158  (123,860 x .30)
7. Retained earnings at the end of this year.
   Increase by $86,702  (123,860 x (1 - .30))
8. Cash flow for this year.
   No change.
   No change.

Using the analytical framework:

<table>
<thead>
<tr>
<th>Last Balance Sheet</th>
<th>Income Statement</th>
<th>This Balance Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Assets</td>
<td>Expense</td>
<td>Current Assets</td>
</tr>
<tr>
<td>+$148,650</td>
<td>+$24,790</td>
<td>+$123,860</td>
</tr>
<tr>
<td>(148,650 - 123,860)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax Liability</td>
<td>Tax Expense</td>
<td>Tax Liability</td>
</tr>
<tr>
<td>+$44,595</td>
<td>-$7,437</td>
<td>+$37,158</td>
</tr>
<tr>
<td>(148,650 x .30)</td>
<td>(24,790 x .30)</td>
<td>(123,860 x .30)</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>Net Income</td>
<td>Retained Earnings</td>
</tr>
<tr>
<td>+$104,055</td>
<td>-$17,353</td>
<td>+$86,702</td>
</tr>
<tr>
<td>(148,650 x .70)</td>
<td>(24,790 x .70)</td>
<td>(123,860 x .70)</td>
</tr>
</tbody>
</table>
### Solution Outline for Problem 10.40

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance expense</td>
<td>$43,860</td>
<td>$64,940</td>
<td>$73,355</td>
<td>$95,440</td>
</tr>
<tr>
<td></td>
<td>x .20</td>
<td>x .20</td>
<td>x .20</td>
<td>x .20</td>
</tr>
<tr>
<td></td>
<td>$ 8,772</td>
<td>$12,988</td>
<td>$14,671</td>
<td>$19,088</td>
</tr>
<tr>
<td>Previous years'</td>
<td>0</td>
<td>8,772</td>
<td>21,760</td>
<td>36,431</td>
</tr>
<tr>
<td>increases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative increase</td>
<td>$8,772</td>
<td>$21,760</td>
<td>$36,431</td>
<td>$55,519</td>
</tr>
<tr>
<td>in cost of plant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amortization expense</td>
<td>$ 877</td>
<td>$ 2,176</td>
<td>$ 3,643</td>
<td>$ 5,552</td>
</tr>
<tr>
<td>Previous years'</td>
<td>0</td>
<td>877</td>
<td>3,053</td>
<td>6,696</td>
</tr>
<tr>
<td>increases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative increase</td>
<td>$877</td>
<td>$ 3,053</td>
<td>$ 6,696</td>
<td>$12,248</td>
</tr>
<tr>
<td>in accum. amort</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in</td>
<td>$ (8,772)</td>
<td>$(12,988)</td>
<td>$(14,671)</td>
<td>$(19,088)</td>
</tr>
<tr>
<td>maintenance expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in amortization expense</td>
<td>877</td>
<td>2,176</td>
<td>3,643</td>
<td>5,552</td>
</tr>
<tr>
<td>Net decrease in</td>
<td>$(7,895)</td>
<td>$(10,812)</td>
<td>$(11,028)</td>
<td>$(13,536)</td>
</tr>
<tr>
<td>expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in FIT</td>
<td>$ 3,158</td>
<td>$ 4,325</td>
<td>$ 4,411</td>
<td>$ 5,414</td>
</tr>
<tr>
<td>expense at 40%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous years'</td>
<td>0</td>
<td>3,158</td>
<td>7,483</td>
<td>11,894</td>
</tr>
<tr>
<td>increases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative increase</td>
<td>$3,158</td>
<td>$ 7,483</td>
<td>$11,894</td>
<td>$17,308</td>
</tr>
<tr>
<td>in balance sheet FIT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net decrease in</td>
<td>$(7,895)</td>
<td>$(10,812)</td>
<td>$(11,028)</td>
<td>$(13,536)</td>
</tr>
<tr>
<td>non-tax expenses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in FIT</td>
<td>3,158</td>
<td>4,325</td>
<td>4,411</td>
<td>5,414</td>
</tr>
<tr>
<td>expense</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase in net</td>
<td>$ 4,737</td>
<td>$ 6,487</td>
<td>$ 6,617</td>
<td>$ 8,122</td>
</tr>
<tr>
<td>income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative increase</td>
<td>0</td>
<td>4,737</td>
<td>11,224</td>
<td>17,841</td>
</tr>
<tr>
<td>in net income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cumulative increase</td>
<td>$ 4,737</td>
<td>$ 1,224</td>
<td>$17,841</td>
<td>$25,963</td>
</tr>
<tr>
<td>in Retained Earnings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Year 4 summary:**

**Effect on income statement**

- Net income increase 
  
  $ 8,122

**Effect on cash flow statement**

- Net income increase 
  
  $8,122

- Add back future income tax increase 
  
  5,414

- Add back amortization expense increase 
  
  5,552

- Less increase in cost of capital assets 
  
  (19,088)

  $0

**Effect on balance sheet**

- Increase in assets (55,519 – 12,248) 
  
  $43,271

- Increase in liabilities 
  
  17,308

- Increase in equity 
  
  25,963

  $43,271
**Solution Outline for Problem 10.41**

The key to this question is to remember that only the **timing** of the record-keeping is improper. (This is an error situation but the idea is the same as if a decision to advance or delay recognition of an event were made in creating an accrual accounting policy, such as changing the revenue recognition or an expense recognition policy.) Because it is a timing issue, an effect on 2004 is exactly offset by the same effect in 2005, and vice versa.

Profit Company uses the periodic inventory method, therefore half the $1,000 of merchandise was included in the “ending inventory” value to which the accounts were adjusted. Ending inventory should have been $500 higher. None of the merchandise was recorded as purchased in 2004 and payable at the end of 2004, so 2004 Purchases and Accounts Payable at Dec. 31, 2004 were both too low by $1,000. Cost of goods sold equals opening inventory plus purchases minus ending inventory, so 2004 COGS is too low by $500 (opening inventory + purchases + $1,000 - (ending inventory + $500)). (“Available inventory” is $1,000 too low and ending inventory is $500 too low, for a net effect of $500 reduction in COGS.)

1. December 31, 2004 inventory is $500 understated (lower than it should be).
2. No effect on Dec.31, 2005 inventory. The timing problem was cleared up Jan.4, 2005 and hopefully the 2004 counting error was not repeated at the end of 2005.
3. 2004 COGS is $500 understated (lower than it should be (see above)).
4. 2005 COGS is $500 overstated (higher than it should be). The 2005 purchases are $1,000 higher than they should be and the 2005 beginning inventory is $500 lower than it should be, for a net effect of $500 increase in 2005 COGS.)
5. 2004 net income is overstated by $500 due to the COGS being lower (part c), but there is also an overstatement in income tax expense of 40% of that $500, so the final effect on 2004 net income is that it is overstated by $300. (December 31, 2004 income tax liability is also overstated, by $200.)
6. 2005 net income is understated by $300 ($500 from part d less 40% income tax).
7. Accounts payable at December 31, 2004 are understated by $1,000.
8. No effect on accounts payable at Dec.31, 2005 assuming this error was not repeated.
9. Retained earnings at Dec. 31, 2004 were overstated by $300 (due to net income).
10. No effect on retained earnings at Dec. 31, 2005. The errors were all gone by then. Also, retained earnings were pushed up $300 by the 2004 income overstatement and back down by $300 by the 2005 income understatement, for zero net effect.

The balance sheet at December 31, 2004 would have shown the following effects:

<table>
<thead>
<tr>
<th>Assets</th>
<th>Liabilities and Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory understated</td>
<td>Accounts payable understated $1,000</td>
</tr>
<tr>
<td></td>
<td>Income tax liability overstated (200)</td>
</tr>
<tr>
<td></td>
<td>Retained earnings overstated (300)</td>
</tr>
<tr>
<td>$500</td>
<td>$500</td>
</tr>
</tbody>
</table>

**Sleeman Breweries Problems (10.45, 10.46, 10.47)**

Wrinkles: Sleeman’s Financial Statements have a couple of wrinkles that students should be aware of. Firstly, since it is a beer company, part of its revenues include government taxes therefore the net revenue figures NOT including these taxes have been used in all calculations.
Solution Outline for Problem 10.42

1. Cash from operating activities ($4,279) is much greater than earnings ($1,757) because earnings included net noncash expenses of $1,755 million, $235 million in noncash exploration expenses and there was a $133 million increase in noncash working capital, together with $399 proceeds from the sale of A/R.

2. Note 9 would include things like amortization, write-offs, and, as the cash flow statement line indicates, noncash exploration expenses (separately identified versions of amortization, etc.). With help from the working capital accounts in Petro-Canada’s balance sheet, we can see that Note 10 would include a large decrease in accounts receivable and a decrease in accounts payable, no significant change in inventories, a small decrease in prepaid expenses, and an increase in income tax payable.

3. Major cash flow components over the three years:
   - Earnings are always positive and significant and have been increasing over the last three years.
   - Noncash expenses added back are always very large, and changes in noncash working capital are significant but vary in direction.
   - The result of the above is that cash from operating activities is a very large source of cash each year.
   - Cash from operations is also the only regular source of cash: each year, there are some proceeds from disposal, and small inflows from common share issues, but otherwise, financing (and investing) were cash outflows every year (with the exception of 2002’s financing activities due to a sizeable issue of long term debt).
   - Expenditures on property, plant, and exploration were significant each year and were paid for largely through operations.
   - Total change in cash has bounced around: in 2002, cash decreased, there was a large increase in 2003 and a decrease in 2004. The company’s overall cash on hand has not been constant over the last three years.

4. The details of the points in Section 10.5 are left for you to refer to. Some remarks:
   - Financing strategy is to use operating cash flows, not borrow very often.
   - The company has had little activity in financing or investing in terms of cash inflows except for a large inflow from the issue of long-term debt in 2002. Large expenditures on property, plant and equipment have been maintained each year and a large debt repayment was made in 2003.
   - The add-backs for noncash expenses are large each year, but are exceeded by the investments in property, plant, and exploration, so the company’s assets are growing and there is no indication any are getting out of date.
   - The company pays a regular amount in dividends each year, with a 50% increase in 2004 compared with each of 2003 and 2002.

Solution Outline for Problem 10.43

<table>
<thead>
<tr>
<th>2004</th>
<th>2003</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>$18,100</td>
<td>$14,774</td>
</tr>
<tr>
<td>Working capital ratio</td>
<td>0.685</td>
<td>1.27</td>
</tr>
<tr>
<td>Working capital</td>
<td>-912</td>
<td>577</td>
</tr>
<tr>
<td>Quick (acid test) ratio</td>
<td>.4914</td>
<td>1.005</td>
</tr>
<tr>
<td>Collection ratio (based on operating revenue)</td>
<td>31.83</td>
<td>42.53</td>
</tr>
<tr>
<td>Debt-equity ratio</td>
<td>1.071</td>
<td>0.947</td>
</tr>
<tr>
<td>Interest coverage</td>
<td>23.85</td>
<td>17.26</td>
</tr>
<tr>
<td>Net income</td>
<td>$1,757</td>
<td>$1,650</td>
</tr>
</tbody>
</table>
• The company’s net income and assets increased.
• The overall financial position has changed much from 2003. The working capital ratio has decreased significantly through a decrease in cash and A/R, compounded by a sizeable increase in A/P and the incidence of short term debt due. The acid test has also fallen to half its prior level. Conversely, the collection ratio has vastly improved, dropping by over 11 days.
• Petro-Canada relied on leverage as the debt-equity ratio has increased 13% to 1.07.

Solution Outline for Problem 10.44

1. 

<table>
<thead>
<tr>
<th>2004</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>0.201</td>
</tr>
<tr>
<td>Tax rate</td>
<td>0.459</td>
</tr>
<tr>
<td>After-tax interest</td>
<td>76.8</td>
</tr>
<tr>
<td>ROA (ATI)</td>
<td>0.101</td>
</tr>
<tr>
<td>Sales return (use operating revenue)</td>
<td>0.120</td>
</tr>
<tr>
<td>Gross margin (purchases are COGS)</td>
<td>0.541</td>
</tr>
<tr>
<td>EPS (diluted)</td>
<td>6.55</td>
</tr>
<tr>
<td>Dividend payout</td>
<td>0.090</td>
</tr>
<tr>
<td>Asset turnover</td>
<td>0.794</td>
</tr>
</tbody>
</table>

2. Petro-Canada performed extremely well in 2004 and 2003. ROE was high but dropped slightly in 2004. Sales return and gross margin both decreased in 2004 showing marginally weaker profit margins. EPS increased in 2004 as did the dividend payout ratio.

3. Financial leverage effects can be seen by comparing ROE and ROA(ATI). Petro-Canada has benefited from leverage in both 2004 and 2003 since ROE is greater than ROA(ATI). Leverage increased marginally in 2004 rising to 0.100 (0.201 – 0.101) from 0.098 (0.217 – 0.119).

Solution Outline for Problem 10.45

<table>
<thead>
<tr>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>14,426/121,784 = 0.118 12,253/103,800 = 0.118</td>
</tr>
<tr>
<td>ROA(ATI)</td>
<td>(14,426+4,331)/300,152 = 0.063 12,253+3,557)/242,755 = 0.065</td>
</tr>
<tr>
<td>Sales Return</td>
<td>14,426/213,354 = 0.068 12,253/185,036 = 0.066</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>197,147/213,354 = 0.502 88,333/185,036 = 0.477</td>
</tr>
<tr>
<td>Average Interest Rate</td>
<td>6,643 /178,368 = 0.037 6,097 / 138,955 = 0.044</td>
</tr>
<tr>
<td>Cash Flow to Total Assets</td>
<td>13,199 / 300,152 = 0.044 13,593 /242,755 = 0.056</td>
</tr>
<tr>
<td>EPS *</td>
<td>14,426,000/ 16,259,645= 0.887 12,253,000/ 15,971,050= 0.767</td>
</tr>
<tr>
<td>Book Value per share</td>
<td>121,784,000/ 16,259,645= 7.490 103,800,000/ 15,971,050= 6.499</td>
</tr>
<tr>
<td>PE</td>
<td>Based on current share price</td>
</tr>
<tr>
<td>Dividend Payout</td>
<td>No dividends</td>
</tr>
</tbody>
</table>

Supporting calculations:

<table>
<thead>
<tr>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income tax rate</td>
<td>7,702/22,128 = 0.3481 8,750/21,003 = 0.4166</td>
</tr>
<tr>
<td>ATI</td>
<td>6,643x(1-.3481) 4,331 6,097 x (1-0.4166) 3,557</td>
</tr>
</tbody>
</table>

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* The EPS figures calculated above are slightly different that shown on the financial statements. The financial statements number probably uses a weighted average for the number of shares.

Sleeman’s performance changed only marginally from 2004 to 2005. ROE was constant at 11.8%. The slight decline in the ROA(ASI) is offset as the improved Gross Margin led to higher Sales Return. The higher volume combined with improved sales return allowed the ROE on the higher 2005 equity to remain constant. Dividends were not paid once again in 2005 as all available funds were invested in additional assets. The company’s average interest rate decreased about 16% from 2004 to 2005. This would seem to be the result of a decline in market rates as interest bearing debt increased with no appreciable change in non-interest bearing debt. Cash from operations was about double the net income in both years.

### Solution Outline for Problem 10.46

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total asset turnover</td>
<td>213,254/300,152 = 0.711</td>
<td>185,036/242,755 = 0.762</td>
</tr>
<tr>
<td>Inventory turnover</td>
<td>106,207/39,147 = 2.713</td>
<td>96,703/31,054 = 3.114</td>
</tr>
<tr>
<td>Collection</td>
<td>34,529/(213,354/365)= 59.071</td>
<td>30,322/(185,036/365)= 59.813</td>
</tr>
<tr>
<td>Debt-equity</td>
<td>178,368 / 121,784 = 1.465</td>
<td>138,955 / 103,800 = 1.339</td>
</tr>
<tr>
<td>Long-term debt-equity</td>
<td>103,616 / 121,784 = 0.851</td>
<td>71,916 / 103,800 = 0.693</td>
</tr>
<tr>
<td>Debt to assets</td>
<td>178,368 / 300,152 = 0.593</td>
<td>138,955 / 242,755 = 0.572</td>
</tr>
<tr>
<td>Working capital</td>
<td>90,158 / 60,823 = 1.482</td>
<td>73,118 / 55,512 = 1.317</td>
</tr>
<tr>
<td>Acid test</td>
<td>(34,529+9,196+697)/60,823= 0.730</td>
<td>(30,322+6,363) / 55,512 = 0.661</td>
</tr>
<tr>
<td>Interest coverage</td>
<td>(14,426+7,702+6,643)/6,43 = 4.331</td>
<td>(12,253+8,750+6,097)/6,097= 4.445</td>
</tr>
</tbody>
</table>

The company’s asset and inventory turnovers both decreased marginally in 2005 but is consistent with the nature of the business. Inventory turnover decreased but the company still moves almost 3 times the amount of inventory it has each year. The company’s collection ratio has decreased (improved) slightly but still showing it takes about two months to collect. This might be something to watch for if customers are slow in paying. However, given the high proportion of Sleeman’s sales that will be to government agencies and the Brewer’s retail in Ontario this may be the best they can hope to achieve. There is little risk of non-collection from such customers but also little chance of speedier collection.

The debt-equity and long-term debt-equity both increased from 2004 to 2005. This is the result of increased borrowings to finance business acquisitions and additions to property plant and equipment. The increase in inventories is the cause of the higher working capital ratio. The increased inventory may be the inventories of newly acquired businesses. The current liabilities increased year over year but at a lower rate than the current assets, thus allowing for higher Acid test and Working capital ratios. Interest coverage is little changed despite increased long term borrowing. This may be explained by lower interest rates.

In both years Sleemans showed no net cash flow. This is the result of matching borrowings to the amount needed to supplement cash flows from operating activities to meet financing requirements.
Solution Outline for Problem 10.47

Scott Formula

2005: \[ \text{ROE} = (\text{SR(ATI)} \times \text{AT}) + (\text{ROA(ATI)} - \text{IN(ATI)}) \times \text{L/E} \]
\[ = \frac{(14,426+4,331) \times 213,354}{213,354/300,153} + \left( \frac{(14,426+4,331)}{300,152} - \frac{4,331}{178,368} \right) \times \frac{178,368}{121,784} \]
\[ = 0.0879 \times 0.7108 + (0.0625 - 0.0243) \times 1.4646 \]
\[ = 0.0625 + 0.0559 \]

Sleemans uses positive leverage to almost double its return. The operating return increased slightly in 2005, offsetting the small decline in the effect of leverage. Overall, Sleemans appears to be achieving a stable return while managing its growth carefully. Its use of leverage does increase financial risk but they are operating in a stable industry.

Solution Outline for Problem 10.48

1. Major components of cash flow:
   - CN has a constant and increasing net income that helps produce a strong inflow from operating activities.
   - CN consistently adds more to its properties than amortization expense, which indicates that equipment is not becoming obsolete.
   - In 2004, CN made significant acquisitions of BC Rail and GLT which resulted in a $1,531 million outflow of cash.
   - Cash flow from operations was not enough to cover this acquisition thus for the first time in three years, financing activities became an inflow. This arose mainly due to a large issuance of new debt partially offset by repaying older debt.
   - CN keeps an extremely low amount of cash on hand ($147 million in 2004 and on $130 million in 2003).

2. Financing activities became a cash inflow because of the need to help finance the large acquisition of BC Rail and GLT in 2004. Without this acquisition, cash flow from operations would have covered investing activities and the additional long-term borrowing may not have been needed.
3. ROE 1,297/7,347 = 0.177 734/6,480 = 0.113
ROA(ATI) (1,297+190)/19,271 = 0.077 (734 + 217)/17,150 = 0.056
Sales return 1,297/6.548 = 0.198 734/5,884 = 0.125
Average interest rate 282/11,924 = 0.024 317/10,670 = 0.030
Cash flow to total assets 2,139/19,271 = 0.111 1,500/17,150 = 0.088
EPS (diluted) given 4.48 given 2.52
Book value per share 7,347/283.1 = 25.95 6,480/280.2 = 23.13
Dividend payout 222/1,29 = 0.1712 191/734 = 0.2602
Net income given 1,297 given
734

Supporting calculations:
Tax rate 631/1,928 = 0.3273 338/1,072 = 0.3153
ATI 282(1-.3273) = 190 317(1-.3153) = 217
Total liabilities 2,259+3,591+1,488+4,586 = 11,924 1,977+3,365+1,153+4,175 = 10,670

CN’s financial performance in 2004 was significantly better than 2003. ROE increased about 57% as a result of increased revenues with decreased operating expenses. As a result, EPS increased by almost 78% and the company increased the per share dividends paid by $0.11. Sales return increased as the company collected almost 20 cents in profit for every dollar of revenue in 2004 v only 12.5 cents in 2003.

**Solution Outline for Problem 10.49**

Scott Formula

2004 ROE = (SR(ATI) x AT) + (ROA(ATI) – IN(ATI)) x L/E
0.1765 = (1,297+190)/6,548 x 6,548/19,271 + ((1,297+190)/19,271) – 190/11,924
X 11,924/7,347
0.1765 = 0.2271 x 0.3398 + (0.0772 – 0.0159) x 1.6230
0.1765 = 0.0772 + 0.0995
(Operating) (Leverage)

Note Actual total is 0.1767 out by .0002 because of rounding

2003: ROE = (SR(ATI) x AT) + (ROA(ATI) – IN(ATI)) x L/E
0.1133 = (734+217)/5,884 x 5,884/17,150 + ((734+217)/17,150) – 217/10,670
X 10,670/6,480
0.1133 = 0.1616 x 0.3431 + (0.0555 – 0.0203) x 1.6466
0.1133 = 0.0555 + 0.0580
(Operating) (Leverage)

Note Actual total is 0.1334 out by .0001 because of rounding

CN benefited from positive leverage in 2004, and 2003. In both years, the company’s leverage return was higher than its operating return indicating the company uses leverage to a great extent.
Solution Outline for Problem 10.50

Students can respond to this question in a variety of ways. Here are a few brief points.

- Firstly, CN is the larger company with nearly double the assets of CPR and $2.5 billion more in revenue.
- The companies’ ROE are similar in 2003 but, while CP’s declined slightly in 2004 CN’s improved by over 50% largely due to improved cost control.
- Again because of better cost control CN evidences a higher sales return; 19.8% vs 14.9%.
- Both companies use leverage to increase their returns. This leverage is either greater than or just under the operating return that the companies produce.
- In terms of cash flow, CPR has a vastly larger amount of cash on hand ($353.0 million vs. $147 million for CN) in 2004. CPR’s cash position increased in 2001 showing that it may be poised for a takeover or other kind of strategic move.
- Both companies have a quick ratio below 1 and relatively weak working capital ratios. This position, constant across both companies, may indicate the nature of the industry at the moment where both believe that they have enough resources to cover short-term liabilities.

Solution Outline for Case 10A

This case is a sort of summary of the whole course. It raises issues (like the Big Bath) that have come up quite often. Below are comments first to relate the “red flags” to the textbook’s coverage and then to bear on the four bullets at the beginning of the case.

Flag 1: Big Bath. See section 3.10 and some FYI’s since. See also the discussion of goodwill accounting in section 8.14 and Case 9A.

Flag 2: All but the bad. Comments on EBITDA and pro forma earnings were also made in section 3.10. Manipulation of the operating cash flow this way has not been highlighted, but was included in Case 8A. See its solution for some ideas.

Flag 3: Remove the debt. See Enron, section 9.5 and Case 9B.

Flag 4: Pension accounting. Section 9.3 has some discussion of the problems of estimating pension liabilities, but doesn’t deal with the under-funding issue. Manipulating such estimates would be hard to spot without considerable disclosure.

Flag 5: Expenses into assets. See the WorldCom and Xerox examples, section 8.14 and Case 8A.

Flag 6: Core operations. Section 3.5 described the format of the income statement and the attempt thereby to make it clear what earnings are recurring and what are not. Recording tax assets is acceptable (section 9.3) but constantly changing the estimates is a problem – a problem that might be exacerbated by the recent change in GAAP to require tax expenses or credits to be based on annual re-estimates of tax liabilities and assets.

Flag 7: Stock options. Examined in section 9.5.

Flag 8: Channel stuffing. Revenue recognition criteria and some problems in those were in Chapter 6 and Case 6A. The inventory turnover and collection ratios in Chapter 10 might help identify such behavior.

Flag 9: Changing horses. The detailed effects of accounting under various GAAPs are beyond this book, but it doesn’t hurt to point out that there are differences (section 5.5) and a company’s choice of which GAAP is a policy choice (section 6.4) that could be motivated by a wish to have accounting standards thought more congenial to the company’s situation.

Flag 10: Exception basis. As noted in sections 5.8 and 5.7, as well as implied by the various accounting policy disclosures described in Chapters 8 and 9, it pays to read the information carefully, including the auditor’s report and the footnotes, and to watch for information that is unexpected.
To the bullets in the case:

- The above summary of the parts of the textbook that provide knowledge related to the red flags should address this bullet. It is hoped that a good understanding of how accrual accounting works and how footnote disclosure and financial statement format provide important information will also help the students avoid being misled by the accounting numbers.

- Ratio and leverage analysis should help uncover trends or comparisons that don’t seem proper, or seem too good. This question could be discussed by mentioning some of the main ratios in Chapter 10 (ROE, ROA, leverage return, etc.) and asking how each, or some, of the “abuses” mentioned under the red flags would affect such ratios and how the ratios might be compared to other companies or tracked over time to reveal problems. See also Case 10B.

- The students may enjoy discussing this question. One objective of including it is to give the instructor an opportunity to counter the excess of skepticism or distaste that students might develop about accounting after seeing examples of bad behavior. While financial accounting has its weaknesses (need for estimates, management’s role in producing the information, auditor incentives to work with management instead of being objective, lack of clarity in many disclosures and format choices, large impact of accounting policy choices, etc.), these are largely a function of accounting’s being a human artifact rather than a numerical “truth” and so cannot be eliminated. In fact, accounting might be said to be doing a reasonable job most of the time in coping with vast and growing business complexity. There are doubtless many more well-constructed sets of financial statements than there are poor ones, and many more managers with integrity than there are bad eggs. While vigilance and prudence are always a good idea, turning up some dramatically bad examples like Enron should not make people think the whole enterprise is rotten.

- Students might be able to suggest some others. Some possibilities include: very large goodwill on acquisition, failure to consolidate majority-owned subsidiaries (related to Flag 3), cash from operations not being much greater than accrual net income (see section 10.5), aggressive revenue recognition (using revenue recognition policies that pump up earnings and/or that are not typical in similar companies), or market capitalization being far in excess of book value (or share price being far in excess of EPS – see section 10.4 re price-earnings and price-to-book ratios).

**Solution Outline for Case 10B**

Initial comments:

1. The analysis below is provided as a basis for discussion, not to imply that students will necessarily be able to do it all (though it is similar to the analysis points in section 10.5 on cash flow and 10.6 on integrative analysis, so asking students to make a stab at it will prepare them for discussion). Much of the point of the case is to show how the company’s problems might have been anticipated with a careful financial analysis of the sort outlined in Chapter 10, in particular how attention to cash flow information would have been instructive.
2. Another approach to this analysis would be to take the cash flow analysis points in section 10.5 and go through each in regard to the information in the case – the comments below do some of this, but not as systematically as section 10.5 does.

3. A third approach would be to work through the ratios given, and prepare an overall evaluation of the sort indicated at the end of section 10.4 and the beginning of section 10.6. This would be less focused on the cash flow and the Scott formula and more on the set of ratios in section 10.4.

Below, financial statement figures are in millions of dollars.

- W.T. Grant’s ROE doesn’t indicate any cause for alarm until 1974 when it falls from .113 in 1973 to .025 in 1974.

- However, looking at the components of the Scott formula we can see that the deterioration began before 1974.

- ROA fell throughout the period. In this period the company strategy was to shift from low-priced goods to higher-priced goods in competition with several department store chains. If the strategy was successful we would have expected to see a decrease in asset turnover (which for the most part we do see) over the period, accompanied by an increase in sales return which we don't see. Higher-priced goods normally have higher margins than low-priced goods. However, the gross margin of the company remained relatively stable over the period going from 33% in 1970 to 31% in 1974. It may be that the company tried to offer lower prices on the high-priced goods than its competitors in order to gain market share. The strategy apparently did not work.

- The company's cash flow problems became serious in 1972-73, two years before income turned negative. In hindsight, we can see that the company's demise might have been better and earlier predicted from the cash flow figures than the accrual figures.

- Over the entire period the company had negative cash flow from operations. This likely occurred because changes in working capital ate up more than the income from operations. Note that changes in working capital from accounts receivable, inventory and accounts payable resulted in a use of funds as follows: 1970, $2; 1971, $79; 1972, $124; 1973, $28.

- Thus operations had to be financed in all of the years between 1970 and 1975. Calculations indicate that the majority of this financing was done by way of long-term debt. If one takes prior years’ equity, adds net income and deducts dividends one can see that only a small part of the financing was done by way of share issues. Using this calculation, issue (repurchase) of shares was as follows: 1971, $8; 1972, $10; 1973, $8; 1974, $2. If dividends are included as a cash outflow from financing activities in these years, long-term debt would have increased as follows: 1971, $4; 1972, $65; 1973, $92; 1974, $119, giving an aggregate net increase in long-term debt in these years of $280. If dividends were not included in financing activity, the aggregate increase in long-term debt would have been $364. The increase in long-term liabilities during this period was $180, however some of the long-term debt would have been included in current liabilities, to the extent that it was due in the current year.

- Note that the spread between ROA and IN decreases in each year. This is partially because of the decreases in ROA noted above and partially because of the increase in long-term debt. The debt to equity ratio also increases significantly over this period. This can contribute to an increase in leverage return as long as the spread between ROA and IN remains healthy. However, when spread becomes negative, as we see in 1974, this results in a significant decrease in ROE.
Note that the company continued to make similar dividend payments in every year until 1975, despite cash flow problems. Managers often tend to do this to maintain investor confidence in the company. As we can see from the Jan. 31 closing prices per share, investors remained relatively confident up until the end of 1973, although share price dipped somewhat by the end of 1973. Had dividends not been paid from 1970 to 1974 there would have been a reduced need for increases in long-term debt of $104.

The collection ratio indicates that over the period it took the company about 120 days to collect its receivables. This appears to be a fairly long time, however whether that is the case depends on the collection experience of other similar companies in the industry.

Inventory turnover decreased over the period, indicating that the company may have had too much invested in inventory. We see inventory increasing in each year from $222 in 1970 to $451 in 1974. Certainly with increased sales we would need higher levels of inventory to support those sales. However, the company’s inventory does not appear to have been handled efficiently.

The working capital ratio does not look too bad until 1975 when it declines to 1.23. This indicates that throughout the period current assets were sufficient to cover current liabilities. However, the acid test ratio indicates that by 1973 the company did not have enough current assets to cover current liabilities unless inventory was liquidated.

The interest coverage ratio looks quite healthy until 1974. The steep drop was the result of a combination of lower net income and higher interest costs.

Solution Outline for Case 10B (Continued)

Overall, the earliest warning signal was the negative cash flow from operations in every year from 1970 to 1975 (with its large downturn beginning in 1972-73, a period in which the company continued to expand or need to maintain asset base (see cash used in investment activities) and pay dividends). This resulted in increases to long-term debt which eventually crippled the company.