Name: Key

You must show logically correct work, including calculator inputs and outputs for all problems to receive credit. Show signs on calculator inputs. Differentiate calculator outputs from inputs.

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Industry median</th>
<th>AgBiz Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit margin (PM = ROS)</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Total Asset Turnover</td>
<td>3 x</td>
<td>4.5 x</td>
</tr>
<tr>
<td>Debt ratio (TL/TA)</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>DSO (also called ACP)</td>
<td>32 days</td>
<td>20 days</td>
</tr>
<tr>
<td>ITO (COGS/inventory)</td>
<td>6 x</td>
<td>9 x</td>
</tr>
<tr>
<td>ROE</td>
<td>30%</td>
<td>32.14%</td>
</tr>
<tr>
<td>Accounts payable deferral</td>
<td>20 days</td>
<td>20 days</td>
</tr>
</tbody>
</table>

Use the above data for questions 1-3.

1. (10 points) Construct the extended Du Pont equation for both AgBiz Inc. and for the industry. Then analyze each of the three components of the company’s ROE in a side-by-side comparison to the industry (say something about each component).

\[
\begin{align*}
\text{Ag.B.} & \quad 5 \times 4.5 \times 1.43 = 32.14\% \\
\text{Ind.} & \quad 5 \times 3 \times 2 = 30\% \\
\text{Ratio} & \quad 1.0 \quad 1.5 \quad 0.71
\end{align*}
\]

AgBiz has a slightly higher ROE than the industry as a net result of a 50% greater TAT and 28.5% lower EM. Profit margin was the same as the industry. So AgBiz has a higher ROE due to asset management, in spite of using less financial leverage. Therefore, AgBiz is more profitable than the industry and has less financial risk.

2. (10 points) Show a side by side comparison of the cash conversion cycle for AgBiz Inc. with the industry. Use the CCC to analyze working capital management for AgBiz Inc. in comparison to the industry (say something about each component).

\[
\begin{align*}
\frac{360}{q} & = 40 \\
\frac{360}{6} & = 60
\end{align*}
\]

AgBiz has a much better working capital management with a CCC that is 32 days shorter. This comes from better inventory management (20 days shorter ICP), better receivables mgmt (12 day shorter DSO) and the same AP deferral.

3. (3 points) Based on questions 1 and 2 point out any red flags or successes that you see for AgBiz Inc.

Successes: Asset mgmt. (high TAT, low CCC); high ROA (PM x TAT); and low debt

Red flags: low debt could indicate an opportunity to increase ROE by borrowing more.
4. (6 points) Adams Inc. recently borrowed money for one year at 9%. The pure rate is 3%, and Adams' financial condition warrants a default risk premium of 2% and a liquidity risk premium of 1%. There is little or no maturity risk in one-year loans. What inflation rate do lenders expect next year? Show work

\[ K = K_{PR} + \text{INFL} + DR + LR + MR \]

\[ q = \frac{3 + \text{INFL} + 2 + 1 + 0}{3} \Rightarrow \text{INFL} = 3\% \]

5. a. (7 points) What is the monthly payment on a 5-year car loan of $30,000 at 4.25% interest compounded monthly? Show work

\[ N = 5 \times 12 = 60 \]
\[ 1 = 4.25/12 \]
\[ PV = 30,000 \]
\[ FV = 0 \]
\[ PMT \] ? \[ 555.89 \]

b. (13 points) Construct an amortization table below for the first 2 months of the loan.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30,000</td>
<td>555.89</td>
<td>106.25</td>
<td>449.64</td>
<td>29,550.36</td>
<td>29,550.36</td>
</tr>
<tr>
<td>29,550.36</td>
<td>555.89</td>
<td>104.60</td>
<td>451.23</td>
<td>29,099.13</td>
<td></td>
</tr>
</tbody>
</table>

6. (6 points) You want to purchase a beach house for $220,000 funding as much of the cost as possible with a home mortgage loan. Banks are currently offering standard thirty year mortgages at 8% (monthly compounding). Unfortunately, you can only afford payments of $1,500 per month. How much cash will you need for a down payment in order to buy the home? (Round to the nearest dollar) Show work

\[ N = 30 \times 12 = 360 \]
\[ 1 = 8/12 \]
\[ PMT = -1500 \]
\[ FV = 0 \]
\[ PV = 204,425.24 \]
\[ 220,000 - 204,425.24 = 15,574.76 \]

7. (4 points) What is the most you should pay to receive the following cash flows if you require a return of 12 percent? Show work

<table>
<thead>
<tr>
<th>Year</th>
<th>CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$5,000</td>
</tr>
<tr>
<td>2</td>
<td>$8,000</td>
</tr>
<tr>
<td>3</td>
<td>$12,000</td>
</tr>
<tr>
<td>Years 4-10</td>
<td>$15,000/yr.</td>
</tr>
</tbody>
</table>

\[ i = 12 \]
\[ N = 10 \]
\[ \text{NPV} = 68,109.08 \]
8. (8 points) Smith Blarney is trying to sell my grandmother a semiannual, 10% coupon, $1000 face value bond with 12 years to maturity. Currently the market requires a 6% rate of return on bonds of this risk. What is this bond worth? **Show work**

\[ N = 12 \times 2 = 24 \]
\[ i = \frac{6}{2} = 3 \]
\[ FV = 1000 \]
\[ PMT = \frac{1000}{2} = 50 \]
\[ PV = 1383.71 \]

9. Thompson Tires Inc. has an outstanding semiannual, 12% coupon, $1000 face value bond that is selling for $1185 and has 10 years to maturity.

a. (8 points) What yield to maturity of this bond? **Show work**

\[ N = 10 \times 2 = 20 \]
\[ PV = 1185 \]
\[ FV = 1000 \]
\[ PMT = \frac{1200}{2} = 60 \]
\[ i = 4.56 \]
\[ YTM = 9.14 \]
\[ \times 2 \]

b. (4 points) What is the current yield of this bond? **Show work**

\[ \frac{120}{1185} = 10.13\% \]

10. (8 points) Assume the Thompson Tires bond above is callable in 5 years with a $50 call premium. What is the YTC? **Show work**

\[ N = 10 \]
\[ PV = 1185 \]
\[ FV = 1050 \]
\[ PMT = 60 \]
\[ i = 4.12 \]
\[ YTC = 8.24\% \]
\[ + 2 \]

11. (8 points) Smith Blarney is back trying to sell Grandma a 10 year, callable, semiannual, $1000 face value, 12% coupon bond for sale. It is callable in 1 year with a $100 call premium. If comparable bonds of this risk yield 6% and you expect this bond to be called, what is its value? **Show work**

\[ N = 10 \]
\[ FV = 1000 + 100 = 1100 \]
\[ PMT = \frac{1200}{2} = 60 \]
\[ i = \frac{6}{2} = 3 \]

12. (8 points) Frazier Manufacturing paid a dividend last year of $2, which is expected to grow at a constant rate of 5%. Frazier has a beta of 1.3. If the market is returning 11% and the risk-free rate is 4%, calculate the value of Frazier’s stock. **Show work**

\[ K_{Frazier} = 4 + 1.3(11 - 4) = 13.12 \]
\[ \frac{2}{.131 - .05} = 25.93 \]

\[ P_{Frazier} = \frac{2(1.05)}{.131 - .05} \]
13. (24 points) Additional Funds needed with financial feedback
Forecast AFN with a 20% sales increase; at 80% of capacity last year; any additional funds will come from Notes payable, or a surplus will reduce notes payable. The interest rate is 10%. Round to the nearest whole dollar.

<table>
<thead>
<tr>
<th>Last</th>
<th>Factor</th>
<th>1st Pass</th>
<th>Feedback</th>
<th>2nd Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>36,000</td>
<td>1.2</td>
<td>43,200</td>
<td>7272</td>
</tr>
<tr>
<td>-VC</td>
<td>-17,440</td>
<td>1.2</td>
<td>-20,928</td>
<td>-34</td>
</tr>
<tr>
<td>-FC</td>
<td>-15,000</td>
<td>1.0</td>
<td>-15,000</td>
<td>526</td>
</tr>
<tr>
<td>EBIT</td>
<td>3,560</td>
<td>1.2</td>
<td>7272</td>
<td>526</td>
</tr>
<tr>
<td>-interest</td>
<td>-560</td>
<td></td>
<td>560</td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>3,000</td>
<td>1.2</td>
<td>6,712</td>
<td>6,748</td>
</tr>
<tr>
<td>-Taxes (40%)</td>
<td>-1,200</td>
<td></td>
<td>-2,685</td>
<td>-2,698</td>
</tr>
<tr>
<td>NI</td>
<td>1,800</td>
<td>1.2</td>
<td>4,627</td>
<td>4,648</td>
</tr>
<tr>
<td>-Div (45%)</td>
<td>-810</td>
<td></td>
<td>-1,812</td>
<td>-1,822</td>
</tr>
<tr>
<td>Add. RE</td>
<td>990</td>
<td></td>
<td>2,215</td>
<td>2,226</td>
</tr>
</tbody>
</table>

| Cash   | 1,080  | 1.2      | 12,96    |          |
| AR     | 6,480  | 1.2      | 7,726    |          |
| Inv    | 9,000  | 1.2      | 10,800   |          |
| CA     | 16,560 | 1.0      | 18,972   |          |
| NFA    | 12,600 |          | 12,160   |          |
| TA     | 29,160 |          | 32,472   | 32,472   |

| AP     | 4,320  | 1.2      | 5,184    | 5,184    |
| Accr.  | 2,880  | 1.2      | 3,456    | 3,456    |
| Notes  | 2,100  |          | 2,100    | -343     |
| CL     | 9,300  |          | 10,740   | 10,397   |
| Bonds  | 3,500  |          | 3,500    | 3,500    |
| Stock  | 3,500  |          | 3,500    | 3,500    |
| RE     | 12,860 |          | 22,15    | 15,075   |
| TL+E   | 29,160 |          | 32,815   | 32,483   |

What is AFN for each iteration and total AFN after two iterations?

\[
AFN_1 = -343 \quad AFN_2 = -11
\]

Total AFN = -354 \Rightarrow surplus of 354

Show capacity, and interest calculations here:

1.2 \times 1.8 = .96 \Rightarrow need no more fixed assets

342 \times .10 = 34.20 reduction in interest
14. (15 points) Cantaloupe Growers Corp. is expanding into a new geographic area. Management expects the new market to fuel growth of 30% for three years. After that normal growth of 4% will resume. Cantaloupe's most recent annual dividend was $1.00. Other fruit companies of the same risk have been returning about 12% lately. How much should a share of Cantaloupe Growers be worth? Show work

\[
\begin{align*}
D_1 &= 1.30 \\
D_2 &= 1.69 \\
D_3 &= 2.20 \\
D_4 &= 2.28 \\
C_F_0 &= 0 \\
C_F_1 &= 1.30 \\
C_F_2 &= 1.69 \\
C_F_3 &= 2.20 + 28.56 = 30.76 \\
T &= 125\% \\
NPV &= \$24.40
\end{align*}
\]

\[
\begin{align*}
100,000 &= 2E - E \\
100,000 &= E
\end{align*}
\]

15. (2 points) Which of the following does not appear on the income statement?
   a. Cost of Goods Sold
   b. Depreciation Expense
   c. Accumulated Depreciation
   d. Earnings Before Interest and Tax
   e. Gross Margin

16. (2 points) EBIT is also called:
   a. net profit
   b. operating profit
   c. pretax profit
   d. gross profit

17. (2 points) Accounting accruals are important in
   a. accounting for depreciation
   b. providing for unpaid payroll, rent, interest, and other expenses that relate to the current accounting period
   c. drawing checks on the last day of the current accounting period to properly reflect expense in that period
   d. providing for bad debts that may eventually be deemed uncollectible

18. (2 points) CVD, Inc. has an equity multiplier of 2. What is CVD's stockholders' equity if total liabilities are $100,000? Show work.
   a. $100,000
   b. $150,000
   c. $200,000
   d. $50,000
19. (2 points) Which organization typically helps a company market new securities?
   a. Commercial bank
   b. Insurance company
   c. Investment bank
   d. Mutual fund

20. (2 points) The yield curve is:
   a. inverted when short-term rates are higher than long-term rates.
   b. normal when it slopes upward to the right
   c. a plot of interest rates versus term, also called the term structure of interest rates.
   d. all of the above

21. (2 points) The underlying principles of portfolio theory include:
   a. diversifying business-specific risk away.
   b. basing decisions on stocks’ risk/return characteristics in a portfolio context rather than on a stand-alone basis.
   c. getting the highest available return for the amount of risk the investor is comfortable with.
   d. all of the above

22. (2 points) Which of the following statements is false?
   a. Beta is meaningful only if an investor holds a well-diversified portfolio.
   b. You can completely eliminate risk if you hold a well diversified portfolio.
   c. A portfolio composed of only one stock will not be well diversified.
   d. A wise investor diversifies to capture the high average return of stocks while avoiding as much risk as possible.
   e. All of the above statements are correct.

23. (2 points) The only component of the CAPM equation that relates specifically to a company is:
   a. \( \beta_X \)
   b. \( k_M \)
   c. \( k_R \)
   d. \( (k_M - k_R) \)

24. (3 points) If you invest 30% of your funds in AT&T stock with an expected rate of return of 10% and the remainder in GM stock with an expected rate of return of 15%, the expected return on your portfolio is: Show work.
   a. 12.5%.
   b. 13.0%.
   c. 13.5%.
   d. 14.5%.
   e. none of the above

   \[ 0.3(10) + 0.7(15) = 13.5 \]

25. (3 points) Determine the beta of a portfolio consisting of equal investments in the following common stocks: Show work.

<table>
<thead>
<tr>
<th>Security</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Computer</td>
<td>1.15</td>
</tr>
<tr>
<td>Coca-Cola</td>
<td>1.05</td>
</tr>
<tr>
<td>Harley-Davidson</td>
<td>1.50</td>
</tr>
<tr>
<td>Homestake Mining</td>
<td>0.50</td>
</tr>
</tbody>
</table>

\[ \frac{1.2}{4} = 0.3 \]

\[ 4.20 \]
26. (5 points) Elephant Company common stock has a beta of 1.2. The risk-free rate is 6 percent and the expected market rate of return is 12 percent. Determine the required rate of return on the security.

Show work
a. 7.2%
b. 14.4%
c. 19.2%
d. 13.2%

27. (3 points) Selected financial statement accounts are as follows. How much is the firm’s ending equity? Show work
Income for the year $25,000
Dividends paid 6,000
Beginning equity for the year 56,000
Additional stock sold 22,000

28. (12 points) The following question(s) refer to the year-end account balances for UBUS Inc. The accounts are listed in alphabetical order, NOT in the order they appear on the financial statements.

The applicable tax rate is 40%. Show work on all parts.

**UBUS Income Statement**
- Cost of Goods Sold: 330
- Depreciation Expense: 35
- Interest Expense: 20
- Operating Expense (excluding depreciation): 115
- Sales: 600
- Tax: ???

**UBUS Balance Sheet**
- Accounts Payable: 35
- Accounts Receivable: 65
- Accruals: 30
- Accumulated Depreciation: (175)
- Cash: 35
- Common Stock: 120
- Fixed Assets (gross): 390
- Inventory: 135
- Long-Term Debt: 200
- Retained Earnings: 65

a) What was UBUS Inc.’s earnings before interest and taxes (EBIT)?
- a. $155
- b. $120
- $100
- d. $215
- e. $200

b) What is UBUS Inc.’s tax liability?
- a. $48
- b. $60
- c. $55
- d. $40
- e. $35

c) What was UBUS Inc.’s Net Income?
- a. $72
- b. $45
- c. $60
- d. ($20)
- e. $100

d) What is UBUS Inc.’s Total Assets?
- a. $420
- b. $570
- c. $625
- d. $450
- e. $490

e) What is UBUS Inc.’s Total Equity?
- a. $115
- b. $120
- c. $185
- d. $205
- e. $240

f) What is UBUS Inc.’s Net Working Capital?
- a. $35
- b. $70
- c. $100
- d. $130
- e. $170
29. (12 points) Project S costs $15,000 and is expected to produce benefits (cash flows) of $4,500 per year for five years. Project L costs $37,500 and is expected to produce cash flows of $11,100 per year for five years.

a. Calculate the NPV, IRR, and payback period for each project, assuming a required rate of return of 14 percent. **Show work**

\[
\begin{align*}
\text{Project S} & \\
C_F &= (15,000) \\
C_{F,5} &= 4,500 \\
\text{PB} &= 3.33 \text{ yrs} \\
\text{NPV} &= 448.86 \\
\text{IRR} &= 15.24 \\
\text{Project L} & \\
C_F &= (37,500) \\
C_{F,5} &= 11,100 \\
\text{PB} &= 3.38 \text{ yrs} \\
\text{NPV} &= 607.20 \\
\text{IRR} &= 14.67
\end{align*}
\]

b. If the projects are independent, which project(s) should be selected? Why?

*Both*  \(NPV > 0\) for *both*

c. If they are mutually exclusive projects, which project actually should be selected? Why?

*Project L*  \(NPV\) highest

30. (40 points) Two years ago our company bought equipment for $2 million that has been depreciated straight line over a five-year life. The existing equipment has a current market value of $300,000 (but would be worth only $50,000 if kept 5 more years). More efficient equipment can be purchased today for $3 million and is expected to last 5 years (economic life), at which time its anticipated salvage value would be $400,000. However, the new equipment would be depreciated straight line over only four years to a zero salvage value. Our company would realize a $1,000,000 per year operating cost savings by replacing the old equipment with the new equipment. Also, our Net Working Capital requirement would decrease by $75,000 as soon as we bought the equipment, but would increase again when it is sold at the end of its economic life (5 years). Our marginal tax rate is 40% and the firm’s WACC is 10%. Identify the relevant cash flows for this project, NPV, IRR, Payback, and should the company make this replacement investment (state why)?

31. (4 points extra credit) Conestoga Ltd. has the following probability distribution of returns. Calculate Conestoga’s expected return, variance, standard deviation of return, and the return’s coefficient of variation. **Show work**

<table>
<thead>
<tr>
<th>Return</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>4%</td>
<td>.20</td>
</tr>
<tr>
<td>12%</td>
<td>.50</td>
</tr>
<tr>
<td>14%</td>
<td>.30</td>
</tr>
</tbody>
</table>
### Initial Outlay

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>CWC</td>
<td>+75,000</td>
</tr>
<tr>
<td>NWC</td>
<td>+690,000</td>
</tr>
<tr>
<td>CFO</td>
<td>-2,825,150</td>
</tr>
</tbody>
</table>

### Depreciation (Initial Basis = 3,000,000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Dep New</th>
<th>Dep Old</th>
<th>Δ Dep</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>2</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>3</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>4</td>
<td>750,000</td>
<td>400,000</td>
<td>350,000</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Both machines will have to be adjusted basis after 5 years.

---

### Operating Cash Flow

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost Savings</th>
<th>EBT</th>
<th>Less Taxes</th>
<th>EAT</th>
<th>Dep. add-back</th>
<th>OCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,000,000</td>
<td>650,000</td>
<td>-260,000</td>
<td>390,000</td>
<td>+350,000</td>
<td>-740,000</td>
</tr>
<tr>
<td>2</td>
<td>1,000,000</td>
<td>250,000</td>
<td>-100,000</td>
<td>150,000</td>
<td>+750,000</td>
<td>900,000</td>
</tr>
<tr>
<td>3</td>
<td>1,000,000</td>
<td>250,000</td>
<td>-100,000</td>
<td>150,000</td>
<td>0</td>
<td>600,000</td>
</tr>
</tbody>
</table>

---

### Terminal CF

- NWC Offset: $25,000
- NWC Old: $30,000
- NWC New: $240,000
- TCF: $135,000

### TCF Workspace (OLD)

- Sell: $400,000
- Gain: $50,000
- Tax: $20,000
- Sell NSV: $240,000
- NSV: $30,000

---

### Timeline and Calculator Inputs/Outputs and Investment Decision

- CF0: $2,165,000
- CF1: $740,000
- CF2: $740,000
- CF3: $740,000
- CF4: $900,000
- CF5: $600,000 + $135,000 = $735,000
- NPV: $464,359.76
- IRR: 26.46%

Yes, make investment because NPV > 0.