AGEC S424S EXAM 2 (110 points)
October 27, 2005

Name ____________________________

Seat # ________________

Please show your work for all questions. Logically correct work, including calculator inputs when appropriate, must be shown to receive credit for your answers.

1. a. (5 points) What is the monthly mortgage payment on a 30-year loan of $250,000 at 6% interest?

   \[
   N = 30 \times 12 = 360 \quad P = 0 \quad I = 6/12 = .5 \quad A_n = \frac{1498.88}{.06/12} \quad P V = 250,000
   \]

b. (10 points) Construct an amortization table for the first 2 months of the loan.

<table>
<thead>
<tr>
<th>Month</th>
<th>Beg Bal</th>
<th>Payment</th>
<th>Interest</th>
<th>Prin. Reduction</th>
<th>End Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$250,000</td>
<td>$1498.88</td>
<td>$1250.00</td>
<td>$248.88</td>
<td>$249,751.12</td>
</tr>
<tr>
<td></td>
<td>$249,751.12</td>
<td>1498.88</td>
<td>$1248.76</td>
<td>$250.12</td>
<td>$249,501.00</td>
</tr>
</tbody>
</table>

2. (3 points) Lee Childs is negotiating a contract to do some work for Haas Corp. over the next five years. Haas proposes to pay Lee $10,000 at the end of each of the third, fourth and fifth years. No payments will be received prior to that time. If Lee discounts these payments at 8%, what is the contract worth to him today?

\[
\begin{align*}
CF_3 &= 0 \\
CF_4 &= 0 \\
CF_5 &= 10,000 \\
NPV &= 22,041.45 \\
\end{align*}
\]

3. (3 points) What would you pay for an annuity of $2,000 paid every six months for 12 years if you could invest your money elsewhere at 10% compounded semiannually?

\[
\begin{align*}
N &= 24 \\
I &= 5 \\
\text{PMT} &= 2000 \\
FV &= 0 \\
PV &= 27547.28
\end{align*}
\]

4. (4 points) How long does it take for the following to happen?
   a. $856 grows into $1,122 at 7%.
   b. $450 grows into $725.50 at 12% compounded monthly.

   \[
   \begin{align*}
   &a. \quad 856 (1.07)^n = 1122 \\
   &\quad n = 7 \\
   &\quad 7.9945 \approx 4 \text{ years} \\
   \end{align*}
   \]

   \[
   \begin{align*}
   &b. \quad PV = -450 \quad PMT = 0 \quad FV = 725.50 \\
   &\quad n = 4.94906 \quad I = 12 \% \\
   &\quad n \approx 4 \text{ years} \\
   \end{align*}
   \]
5. (3 points) First Bank offers you a car loan at an annual interest rate of 10% compounded monthly. What effective annual interest rate is the bank charging you?
   a. 10.38%
   b. 10.42%
   c. 10.45%
   d. 10.47%

   \[ \text{EAR} = \left(1 + \frac{0.10}{12}\right)^{12} - 1 \]
   \[ = 1.104713 - 1 = 0.104713 \]
   \[ = 10.47\% \]

6. (3 points) A perpetuity has a cash flow of $20 and a discount rate of 10%. What is the value of the perpetuity?
   a. $22
   b. $500
   c. $200
   d. none of the above

   \[ \frac{20}{0.10} = 200 \]

7. (4 points) J&J Manufacturing issued a bond with a $1,000 par value. The bond has a coupon rate of 7% and makes payments semiannually. If the bond has 30 years remaining and the annual market interest rate is 9.4%, what will the bond sell for today?
   a. $760.91
   b. $861.29
   c. $937.42
   d. $1,000.00
   e. $1,025.32

   \[ N = 30 \times 2 = 60 \]
   \[ I = 9.4/2 = 4.7 \]
   \[ P_{MT} = 70/2 = 35 \]
   \[ FV = 1000 \]
   \[ P_{V} = 760.9045 = 760.91 \]

8. (4 points) Aurand Inc. has outstanding bonds with an 8% coupon paid semiannually. The bonds have a par value of $1,000, a current price of $904, and will mature in 14 years. What is their yield to maturity?
   a. 15.80%
   b. 10.47%
   c. 9.24%
   d. 7.90%
   e. 4.62%

   \[ N = 14 \times 2 = 28 \]
   \[ P_{V} = 904 \]
   \[ P_{MT} = 80/2 = 40 \]
   \[ FV = 1000 \]
   \[ I = 441787 \times 2 = 9.24\% \]
9. (4 points) If a 30-year bond with a quoted price of $810 pays $40 interest semiannually, its current yield (coupon yield) would be about:
   a. 8.0%
   b. 4.0%
   c. 5.5%
   d. 9.9%

\[
\frac{80 \times 2}{810} = \frac{80}{810} \approx 9.765\% \approx 9.9\%
\]

10. (4 points) Williamson Inc.'s bonds have a coupon rate of 12% and a par value of $1,000. The bonds have 15 years left to maturity. If Williamson's bonds are currently selling for $1,430, calculate their yield to maturity. Assume semiannual coupon payments.
   a. 3.1%
   b. 5.3%
   c. 7.2%
   d. 9.8%

\[
N = 15 \times 2 = 30
\]
\[
PV = -1430
\]
\[
PMT = 120/2 = 60
\]
\[
FV = 1000
\]
\[
I = 3.6252 \times 2 \approx 7.25\%
\]

Problem 11 refers to the bonds of the Apollo Corporation, all of which have a call feature. The call feature allows Apollo to pay off bonds anytime after the first 15 years, but requires that bondholders be compensated with an extra year's interest at the coupon rate if such a payoff is exercised.

11. (4 points) Apollo's Alpha bond was issued 10 years ago for 30 years with a face value of $1,000. Interest rates were very high at the time, and the bond's coupon rate is 20%. The interest rate is now 10%. At what price should an Alpha bond sell?

Assume the bonds will be called (in 5 years), so figure price to call.

\[
N = \frac{5}{100} = 0.05
\]
\[
PMT = 1200
\]
\[
FV = 1200
\]

12. (4 points) Berry Corp. issued a $1,000 bond with a 14% coupon paid semiannually. It has a yield to maturity of 11%. The bond matures in 15 years. However, it is callable in 10 years with a call premium of one year's interest. What is the bond's yield to call if it is purchased today at a price determined by its yield to maturity?
   a. 5.40%
   b. 5.56%
   c. 8.65%
   d. 10.79%
   e. 11.12%

\[
N = 10 \times 2 = 20
\]
\[
PV = -1218
\]
\[
I = \frac{5.564729 \times 2 = 11.129\%}{11.129\%}
\]
13. (4 points) A stock just paid an annual dividend of $2.00, which is expected to remain constant indefinitely. The market return is 14%. The estimated selling price of the stock is:
   a. $1.76
   b. $14.29
   c. $10.43
   d. none of the above

   \[ P_0 = \frac{2}{.14} = 14.29 \]

14. (4 points) The Spinnaker Company has paid an annual dividend of $2 per share for some time. Recently, however, the board of directors voted to grow the dividend by 6% from now on. What is the most you would be willing to pay for a share of Spinnaker if you expect a 10% return on your stock investments?

   \[ P_0 = 2 \times (1.06) = 2.12 \quad \text{or} \quad \$5.30 \]

15. (4 points) A share of stock is currently selling for $20.80. If the dividend just paid is $2.00 and investors are seeking a 14% return, what is the anticipated rate of constant growth?
   a. 1%
   b. 4%
   c. 0%
   d. none of the above

   \[ 20.80 = \frac{2(1.04)^g}{.14-g} \implies 20.8(1.04-g) = 2 + 2g \implies 2.12 - 20.8g = 2 + 2g \implies 22g = .912 \implies g = .04 = 4% \]

16. (4 points) A share of stock is currently selling for $31.80. If the anticipated constant growth rate for dividends is 6% and investors are seeking a 16% return, what is the dividend just paid?
   a. $1.91
   b. $3.18
   c. $3.00
   d. $5.09

   \[ .16(31.80) = D0(1.06) \implies D0 = \frac{3.18}{1.06} = \$3.00 \]

17. (6 points) Long Life Insurance Inc just paid a dividend of $1.50, and projects supernormal growth at of 12% for the next three years. After that growth is expected to slow down to a normal 4% and go on at that rate for the foreseeable future. Similar stocks are earning a return of 10%. How much would you pay for a share of Long Life today?

   a. $37.70
   b. $32.08
   c. $26.00
   d. $28.28

   \[ D_0 = 1.50 \quad \text{CF}_1 = 1.68 \quad \text{CF}_2 = 1.84 \quad \text{CF}_3 = 38.64 \quad \text{I} = 10 \quad \text{NPV} = ? \]

   \[ \text{NPV} = \frac{D_0}{.10-.04} + \frac{1.68}{1.04} + \frac{1.84}{1.04^2} + \frac{38.64}{1.04^3} = 38.53 \]

   \[ \text{NPV} = 32.11 \]
18. (6 points) Garrett Corp. has been going through a difficult financial period. Over the past three years, its stock price has dropped from $50.00 to $18.00 per share. Throughout this downturn, Garrett has managed to pay a $1.00 dividend each year. Management feels the worst is over, but intends to maintain the $1.00 dividend for three more years, after which they plan to increase it by 6% per year indefinitely. Comparable stocks are returning 11%. If these projections are accurate, is Garrett stock a good buy at $18.00?

\[
\begin{array}{c|c|c|c|c}
\text{Year} & 1 & 2 & 3 & 4 \\
\text{K} & 15 & 15 & 15 & 15 \\
\text{g} & 10 & 10 & 10 & 10 \\
\text{CF} & 0 & 2 & 3 & 4 \\
\end{array}
\]

\[
\begin{align*}
CF_0 &= 0 \\
CF_1 &= 2 \\
CF_2 &= 3 \\
CF_3 &= 4 \\
\text{g} &= .10 \\
\text{K} &= .15 \\
\end{align*}
\]

\[
\begin{align*}
\text{PV} &= \frac{1}{(1 + .15)^1} + \frac{2.10}{(1 + .15)^2} + \frac{2.20}{(1 + .15)^3} + \frac{2.30}{(1 + .15)^4} \\
\text{PV} &= \frac{1.00}{(1 + .10)^3} \\
\text{PV} &= 21.20 \\
\text{NPV} &= 17.94
\end{align*}
\]

Not a good buy, but not overly over-priced. An okay buy.

19. (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, ✔
   all of the above ✔

20. (2 points) Stocks that have high financial rewards are generally accompanied by:
   a. high dividend payments, ✔
   b. low dividend payments because of internally generated growth, ✔
   c. high risk,
   d. all of the above, ✔

21. (2 points) Market risk:
   a. is the degree to which a stock’s return moves with the market’s return, ✔
   b. is caused by things that affect specific companies or industries, ✔
   c. can be diversified away, ✔
   d. is the chance of losing money in the stock market.

22. (2 points) Which of the following is not an example of a source of systematic or market risk?
   a. Interest rate changes ✔
   b. Foreign competition with a specific industry’s products ✔
   c. Changes in the overall economic outlook ✔
   d. Changes in the inflation rate ✔
23. (2 points) Which of the following statements is false?
   a. The most commonly used index with which to measure risk is the standard deviation.
   b. The standard deviation measures the average deviation of the various outcomes from the expected rate of return.
   c. The variance is the square root of the standard deviation.
   d. The greater the volatility, the larger the standard deviation.
   e. All of the above statements are correct.

24. (2 points) A stock has an expected return of 10% and a variance of 0.25. Its coefficient of variation is:
   \[ \frac{\sqrt{0.25}}{0.10} = \frac{0.50}{0.10} = 5 \]

25. (6 points) Charlie Dobbs is considering investing in Astrotech. His research has revealed the following:
   a. The market is returning 11%.
   b. Three-month treasury bills are yielding 5%.
   c. Astrotech's beta is 1.2.
   d. Astrotech recently paid a dividend of $1.50.
   e. Analysts expect Astrotech to grow at 4% indefinitely.
   How much should Charlie be willing to pay for a share of Astrotech?
   a. $19.02
   b. $12.00
   c. $10.26
   d. $18.29

26. (8 points) The following information is available in general and about investments in stocks J and K.

   The market return (km)
   The risk-free rate (kRF)
   Stock J's beta
   Expected share price of stock J
   Investment in stock J
   Stock K's beta
   Expected share price of stock K
   Investment in stock K

   a. What are the expected returns on Stock J and Stock K individually?

   \[ K_J = 5 + (4-5) * 0.8 = 8.2\% \]
   \[ K_K = 5 + (4-5) * 1.4 = 10.6\% \]

   b. What is the expected return on the portfolio?

   \[ \frac{80}{200} * 8.2 + \frac{120}{200} * 10.6 = 9.64\% \]

   c. If Stock K just paid a dividend of $2.50, what is Stock K's intrinsic value?

   \[ P_{0,K} = \frac{2.50 (1.07)}{0.10 - 0.07} = \frac{2.675}{0.03} = 89.14\]
27. (3 points) Phoenix Company common stock is currently selling for $20 per share. Security analysts at Smith Blaney have assigned the following probability distribution to the price of (and rate of return on) Phoenix stock one year from now:

<table>
<thead>
<tr>
<th>Price</th>
<th>Rate of Return</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$16</td>
<td>-20%</td>
<td>0.25</td>
</tr>
<tr>
<td>20</td>
<td>0%</td>
<td>0.30</td>
</tr>
<tr>
<td>24</td>
<td>+20%</td>
<td>0.25</td>
</tr>
<tr>
<td>28</td>
<td>+40%</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Assuming that Phoenix is not expected to pay any dividends during the coming year, determine the expected rate of return on Phoenix Stock.

a. 8%

\[ \frac{1}{4} \times (-20\%) + \frac{1}{3} \times 0\% + \frac{1}{4} \times 20\% + \frac{1}{2} \times 40\% \]

\[ \frac{-5}{4} + \frac{0}{4} + \frac{5}{4} = \frac{4}{4} = 8\% \]

d. 40%

28. (3 points) Determine the beta of a portfolio consisting of equal investments in the following common stocks:

<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>

\[ \\text{calculate the sum, then divide by } 4 \]

\[ \frac{1.15 + 1.05 + 1.50 + 0.50}{4} = \frac{4.20}{4} = 1.05 \]