

*Multiple choice – 3 points each – 30 points total*

1. A stock with an actual return that lies below the security market line has:
  - A. has more systematic risk than the overall market.
  - B. more risk than warranted based on the rate of return.
  - C. a higher return than expected for the level of risk assumed.
  - D. less systematic risk than the overall market.
  - E. a return equivalent to the level of risk assumed.
  
2. For a multi-product firm with all equity, if a project's beta is different from that of the overall firm, then the:
  - A. CAPM can no longer be used.
  - B. project should be discounted at the T-bill rate.
  - C. project should be discounted using the overall firm's beta.
  - D. project should be discounted at the market rate.
  - E. project should be discounted at a rate commensurate with its own beta.
  
3. You hold four stocks in your portfolio: A, B, C, and D. The portfolio has a beta of 1.20. Stock C comprises 40 percent of your portfolio and has a beta of 1.60. If you sell all of your holdings in Stock C and replace it with Stock E with a beta of 1.25, what is the new beta of your portfolio?
  - A. 1.00
  - B. 1.06
  - C. 1.12
  - D. 1.25
  - E. 1.32
  
4. Which one of the following statements is correct concerning the standard deviation of a portfolio?
  - A. The greater the diversification of a portfolio, the greater the standard deviation of that portfolio.
  - B. Standard deviation measures only the systematic risk of a portfolio.
  - C. The standard deviation of a portfolio can often be lowered by changing the weights of the securities in the portfolio.
  - D. Standard deviation is used to determine the amount of risk premium that should apply to a portfolio.
  - E. The standard deviation of a portfolio is equal to a weighted average of the standard deviations of the individual securities held within the portfolio.

5. The internal rate of return on a project is 11.24%. Which of the following (is) are true if the project is assigned a 9.5% discount rate? Assume conventional cash flows.
- I. The project will have a negative net present value.
  - II. The profitability index will be greater than 1.0.
  - III. The initial investment is less than the market value of the project.
  - IV. The project will have a positive effect on shareholders if it is accepted.
- A. I only  
 B. I, II, III, and IV  
 C. I and III only  
 D. II and III only  
 E. II, III, and IV only
6. Given the following information: The risk-free rate is 7%, the beta of stock A is 1.2, the beta of stock B is 0.8, the expected return on stock A is 13.5%, the expected return on stock B is 11.0%. We also know that stock A is fairly priced and the betas of stocks A and B are correct. Which of the following must be true?
- A. Stock B is also fairly priced.
  - B. The price of stock B is too high.
  - C. The price of stock B is too low.
  - D. The expected return on stock B is too high.
  - E. The expected return on stock A is too high.
7. In an efficient market, the price of a security will:
- A. always rise immediately upon the release of new information with no further price adjustments related to that information.
  - B. react to new information over a two-day period after which time no further price adjustments related to that information will occur.
  - C. rise sharply when new information is first released and then decline to a new stable level by the following day.
  - D. react immediately to new information with no further price adjustments related to that information.
  - E. be slow to react for the first few hours after new information is released allowing time for that information to be reviewed and analyzed.
8. The timing option that gives the option to wait:
- I. may be of minimal value if the project relates to a rapidly changing technology.
  - II. is partially dependent upon the discount rate applied to the project being evaluated.
  - III. is defined as the situation where operations are shut down for a period of time.
  - IV. has a value equal to the net present value of the project if it is started today versus the net present value if it is started at some later date.
- A. I and III only  
 B. II and IV only  
 C. I and II only  
 D. II, III, and IV only  
 E. I, II, and IV only

9. An investigation of the degree to which NPV depends on assumptions made about any singular critical variable is called a(n):

- A. operating analysis.
- B. sensitivity analysis
- C. marginal benefit analysis.
- D. decision tree analysis.
- E. real option analysis.

10. You are considering the purchase of one of the following two machines. Each will be replaced as it wears out. If the required return is 10%, which machine should you purchase?

	<u>Machine A</u>	<u>Machine B</u>
Initial cost	-\$80,000	-\$125,000
Cost per year	-7,000	-10,000
Life	8 years	10 years

- A. Machine A because it has a higher NPV.
- B. Machine A because it effectively costs less to operate each year.
- C. Machine B because it has a higher NPV.
- D. Machine B because it effectively costs less to operate each year.
- E. Neither, since the NPV is negative for both.

**Partial Credit Problems --- SHOW ALL WORK**

**Problem 1 (10 points)** Calculate the WACC for the following company:

Debt: 125,000 bonds with a par value of \$1,000 and a quoted price of 106.35. The bonds have coupon rate of 5.6 percent paid semiannually and 11 years to maturity. 150,000 bonds with a par value of \$2,000 and a quoted price of 109.65. The bonds have 25 years to maturity.

Common Stock: 8.5 million shares of stock selling at a market price of \$92. The stock has a beta of 1.15. The company just paid a dividend of \$4.10 and the dividends are expected to grow at 5.5 percent forever.

Market: The expected market return is 11 percent and the risk-free rate is 3.1 percent. The company is in the 40 percent tax bracket.

**Problem 2 (12 points)** Guentzel Industries is considering the production of a new composite hockey stick. The new stick will sell for \$325 per unit. The equipment necessary for production will cost \$12.5 million and will be depreciated on a 5-year MACRS schedule. In five years, the equipment can be sold for 15 percent of its original cost, although the company will keep the equipment for use in another product line. The projected sales are 75,000, 85,000, 95,000, 80,000, and 65,000 sticks per year for the next five years, respectively. Fixed costs are estimated at \$1.35 million per year. Net working capital of 20 percent of sales will be required to be built up in the year of sale. The company has a tax rate of 40 percent and a required return of 11 percent on new product lines. In the company's analysis, although it has estimated the variable cost per stick, but management is concerned about the accuracy of this number. What is the highest variable cost per stick that would still make the project acceptable?

**Problem 3 (13 points)** Crosby Corp. has completed an evaluation of a new energy efficient washer-dryer set. The set would currently sell for \$1,200 and have variable costs of \$550 per set. Equipment necessary for production will cost \$28.5 million. Crosby has received a special dispensation that will allow the company to depreciate the equipment on a 3-year MACRS schedule. Six years from now, the equipment will be worth \$750,000. In other words, the company will receive a check for \$750,000 when it sells the equipment. Fixed costs would be \$9.9 million per year in today's dollars. Unit sales are projected to be 15,900, 28,600, 37,500, 41,800, 34,200, and 12,300 units per year. Additionally, the company has overhead of \$20 million per year. The new project will be allocated 7 percent of this cost. The price, variable costs, fixed costs, and overhead are expected to increase at the inflation rate of 3.1 percent. Crosby has a nominal required return of 10 percent and a tax rate of 38 percent. What is the NPV of the new washer-dryer set?

**Problem 4 (10 points)** Sheary Inc. is in negotiations to purchase Schultz Corp. Unfortunately, Schultz is a private company, so there is no market value for the company, although both companies are in the pet toy industry. Sheary currently has debt outstanding with a market value of \$125 million and a YTM of 5.8 percent. The market value of Sheary stock is \$420 million, and the required return on equity is 11 percent. Schultz currently has debt outstanding with a market value of \$42.5 million. The EBIT for Schultz next year is projected to be \$11.9 million. EBIT is expected to grow at 15 percent, 12 percent, 8 percent, and 6 percent over the following four years before slowing to 3 percent in perpetuity. Net working capital, capital spending, and depreciation as a percentage of EBIT are expected to be 8 percent, 15 percent, and 9 percent, respectively. Schultz has 1.25 million shares outstanding, and the tax rate for both companies is 38 percent. What is the price per share of Schultz stock?

## Problem 5 (25 points)

### Greater Ohio Agriculture and Tree Company

The Greater Ohio Agriculture and Tree Company (GOAT) has been involved in mowing yards and fields, as well as tree trimming, for the past 50 years. The company is deciding whether to add a herd (several herds actually) of goats to be used to clear areas that require a less manicured look and for individuals who prefer this method of lawn care. As an employee of the company, you have been asked to analyze the goat project.

**The Project:** Using goats to clear land uses no herbicides, is eco-friendly, and is often 50 percent cheaper than hiring men and machinery. GOAT is trying to determine whether to invest in goat herds. Because it is believed that it will take several years to grow sales, it is estimated that the company will employ 600, 900, 1,100, 1,400, and 1,600 goats per year over the next five years, respectively. The annual cost is expected to be \$800 per goat, including veterinary expenses and upkeep. The sales per goat will be \$1,500, \$1,525, \$1,575, \$1,600, and \$1,650 per year over the next five years, respectively.

The company will also be required to hire goat herders. The annual cost per herder will be \$60,000, including all benefits. The management of GOAT has determined that the equipment necessary to transport the goats from job to job, as well as the buildings to house the goats will cost \$2.65 million and will be depreciated on a 7-year MACRS schedule. The project will require an investment of 8 percent of current year's total sales in net working capital for each year and will have fixed costs of \$275,000 per year.

An outside consultant, who was hired at a cost of \$75,000, has determined that the company will lose sales of \$110,000, \$140,000, \$155,000, \$195,000, and \$240,000 from its existing landscape contracts per year over the next five years, respectively. The existing contracts have a variable cost equal to 45 percent of sales and fixed costs of \$325,000 per year.

**Other Issues:** GOAT believes that the cash flows from the goat mowing operations will grow at an annual rate of 2.2 percent for the indefinite future after Year 5. GOAT has a capital structure of 25 percent debt. The floatation costs of debt are 3 percent and the floatation costs of equity are 6 percent. The company finances the 80 percent of the equity of a project using retained earnings. Because the company feels that the goat project is riskier than its current operations, it will require a risk adjustment factor of 2.5 percent. Net working capital does not require floatation costs. While the goats are on a project, any manure will be left at the project site. However, as goat manure can be used as an effective fertilizer, you feel that each goat will produce \$20 worth of manure each year while it is housed at the company's barns.

A close friend who also works for GOAT is aware that you are analyzing the goat mowing project. He recently proposed a gecko project to company management, who rejected the project. The geckos were to be used as an ecologically friendly way to control insects. Your friend comes to you and tells you that the project should not have been rejected as it cost \$1.4 million and has cash flows of \$320,000 per year for 10 years. In discussing the gecko project with your friend, he notes that it would be easy to add the cost and cash flows from the gecko project to the cash flows of the new goat project and present the one large project to company management.

The tax rate for GOAT is 40 percent. The company has a WACC of 9 percent and has other profitable operations.

**Analysis:** Calculate the profitability index, NPV and IRR.