



**Corporate Finance**  
**Final Exam – Spring 2009/2010**

**2 hours and 30 minutes**

This exam consists of 5 problems. This is a closed book exam. You are allowed one double-sided page of notes. Calculators are permitted. Good luck!

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### Problem 1

A company is borrowing 200,000 today, which that will be paid back through 6 semi-annual constant instalments. The first installment will be paid six-month from today. The interest rate is 7% (stated annually).

- a) What is the value of the installment (1 point)?
- b) What is the value of the reimbursement and interest payment six-month from now (1 point)?
- c) What should be the number of semi-annual installments assuming that the firm can only pay up to 25,000 per semester (1 point)?

### Problem 2

Consider a project has with the following financials (corporate tax rate is 30%):

	Year 1	Year 2	Year 3
Revenues	1,000,000	1,500,000	1,500,000
COGS	600,000	800,000	800,000

Initial capital expenditures are 600,000 with a life of 3 years (straight-line depreciation). Capital expenditures during the life of the project are equal to depreciation. Salvage value of fixed assets is equal to 100,000. Working capital is 20% of next year revenues. Project cost of debt is 5%. The industry levered beta is 2, the industry debt-to-equity is 0.5 and the industry cost of debt is 3%. The risk-free rate is 3% and expected market risk premium is 5%.

- a) What is NPV assuming the project is entirely financed by equity (2 points)?
- b) What is NPV assuming the project is financed with a debt-to-equity ratio of 1 (2 points)?
- c) What is NPV assuming that the project is financed with a three-year loan of 300,000 at an interest rate of 3% and repayment at the end (1 point)?

### Problem 3

The price of a two-year maturity bond with a coupon of 5% (with annual frequency) is 96.428. The price of a one-year maturity bond with a coupon of 6% (with annual frequency) is priced at par. The face value of both bonds is 100.

- a) What are the 1-year and 2-year spot rates (1 point)?
- b) What is the forward rate from year 1 to year 2 (1 point)?
- c) What is the price of a 2-year zero coupon bond with a face value of 100 (1 point)?

#### Problem 4

Consider the following data on a stock market where the CAPM holds:

	Expected return	Standard deviation	Beta
Stock A	20%	50%	?
Stock B	?	30%	0.8
Market portfolio	12%	20%	1
T-bill	4%	0%	0

- What is the beta and idiosyncratic (firm-specific) standard deviation of stock A (1 point)?
- What should be the portfolio composition and standard deviation of an efficient portfolio with an expected return of 20% (1 point)?
- What is the risk aversion coefficient of an investor with a quadratic utility and an efficient portfolio with a standard deviation of 10% (1 point)?
- Stock B has a price-earnings ratio of 12 and a payout ratio of 40%. Current earnings per share are \$1 and will grow at a constant rate thereafter. What is the price today of stock B (2 points)?

#### Problem 5

An entrepreneur must choose between two mutually exclusive projects with zero systematic risk but different volatility. Capital expenditures are sunk costs. The firm will operate for only one year and salvage value will be zero. The entrepreneur has to make a 400 payment to debtholders in one-year. The risk-free rate is zero. The projects will generate cash flows in one year conditional on the state of the economy:

	Probability	Project A	Project B
Recession	0.5	400	100
Expansion	0.5	600	700

- What is the firm's equity, debt and total value if project A is undertaken (1 point)?
- What is the firm's equity, debt and total value if project B is undertaken (1 point)?
- Which project will the entrepreneur prefer? Explain (2 points).