

IEMS 326 Final

3/16/2009

Solutions are due by 5pm on Tuesday in my email inbox. State your final answers in the email body and include as an attachment a document (such as a spreadsheet) showing your work. This document should show your work in a clear and organized fashion, and its file name should be your last name.

You may use your notes, Excel, your book, and material posted on the course website. You may not communicate with other people (except with me) about the exam.

1. What are the current interest rates for 15 and 30 year mortgages?
2. What is the monthly payment on a 30-year mortgage with 6% APR on \$100k home with 10% down payment?
3. Will the monthly payments on 15-year or 30-year mortgages be more affected by changes in interest rates?
4. Consider a 6% mortgage with 15 years left and \$90k outstanding. It costs \$4k to refinance the mortgage with a new a 15 year mortgage (these costs are added to the mortgage amount). How low must interest rates be for refinancing to make sense?
5. You're drilling an oil well. Suppose it is equally likely to contain 5, 6, 7, ..., or 20 millions barrels of oil. You can pump 1m barrels a year at a profit of \$10m a year. What is the expected net present value of the oil well? Your discount rate is 12% compounded annually.
6. Energy efficient alternatives (e.g., cars, appliances, building insulation, etc.) have lower running costs compared to their conventional counterparts but often have higher up-front costs. Does depreciation favor the energy efficient alternatives? Why or why not?
7. You work for a state-subsidized housing development and responsible for selecting roofing material. The table below gives the current costs of different materials.

	cheap shingles	good shingles	metal
Buy	\$35	\$70	\$120
Install	\$70	\$70	\$100
Annual maintenance	\$5	\$3	\$1
Life (years)	15	25	50

The housing development uses an annual discount rate of 6%. Which of the following two grades of shingles and metal roofing is most cost-effective? Calculate the NPV of the alternatives. All costs are per square (equals 100 square feet).

- a) Ignore inflation and assume that the buildings will be maintained for 50 years. The roofing has no salvage value.
- b) Incorporate 3% annual inflation and assume the buildings will be maintained 150 years.
- c) Ignore inflation and assume the building will be maintained for 60 years. Assume the tax-rate is 35%. Assume roofing material and installation can be depreciated over 10 years (10% each year — straight-line depreciation) while maintenance can be expensed.
8. Twitter is worth 250m today. For the next five years their cash flow will be 0. What are they expected to be worth in 5 years assuming a 20% discount rate?
9. Suppose you had invested \$1000 on 1/1/1999 in a fund tracking the S&P 500 index (reinvesting the dividends). Suppose you withdraw the money on 1/1/2009. How much

would money would you have? What APY does this correspond to?

10. True or false. The benefits of diversification increase with increased correlation. Why or why not?

11. True or false. If the yield is above the coupon rate, then the price is below par? Why or why not?

12. Was Lehman Brothers a giant Ponzi scheme?

13. Using the latest quarterly data from Yahoo finance calculate the leverage ratio of Goldman Sachs, JP Morgan, GE, and Microsoft.

14. For each of the following, state whether adverse selection or moral hazard may be an issue. If it is, then state what may limit its effect.

-mandatory car liability insurance

-car collision insurance

15. You believe GE stock will go down because of the difficulties of its financial arm. Name two strategies for betting on this belief.

16. Assume the risk-free interest rate is 1.3%. Consider the stock options on Citigroup expiring in June with a \$5 strike price. What stock price must you assume for them to satisfy put-call parity? What is the actual stock price? Is there a way to make money off the difference and if so then how?