

PART I: Calculation (If you have passed the midterm you can skip this part. You may try to increase your points from the midterm in which case the better result of those two will be credited in the final grading.)

1. The yield to maturity on two 10-year maturity callable bonds currently is 7%. Each bond has a call price of 1,100 and a par value of 1,000. One bond has a coupon rate of 6%, the other 8%. The coupons are paid annually. Assume that the bonds are called as soon as the present value of their remaining payments exceeds their call price. What will be the capital gain on each bond if market interest rate suddenly falls to 6%. 20p
2. The term structure for zero-coupon bonds is currently: for a 1-year zero the YTM is 4%, 2-year zero it is 5%, and 3-year zero it is 6%. Next year at this time *you* expect the term structure to be: 1-year zero YTM will be 5%, 2-year will be 6% and 3-year will be 7%.
 - a) What do *you* expect the rate of return to be over the coming year on a 3-year zero-coupon bond?
 - b) Under the expectations theory, what yields to maturity does *the market* expect to observe on 1- and 2- year zeros at the end of the year? Is the market's expectation of the return on the 3-year bond over the coming year greater or less than yours (show by calculating market expected return for the 3-year zero over the coming year)? 20p
3. A futures exchange has just introduced a single-stock futures contract on a company stock. Currently the company pays no dividends. Each contract is for delivery of 1000 shares of stocks in 1 year. The risk-free interest rate is 6% per year.
 - a) If the stock now sells for 120 per share, what should be the futures price?
 - b) If the share price falls by 3%, what will be the change in futures price and the change in the investors margin account?
 - c) If the margin on the contract is 12,000, what is the percentage return on the investor's position? 10p

PART II: Theory

1. Briefly explain the following words and expressions
 - a) Auction market
 - b) Bond stripping
 - c) Convexity
 - d) Intrinsic value of an option
 - e) Risk neutral probability 10p
2. Briefly (no more than 10 lines / answer!) answer the following questions. Remember to **explain** your answers!
 - a) Give an example of three financial intermediaries and explain how they act as a bridge between small investors and large capital markets or corporations.
 - b) Describe one advantage and one disadvantage for the investor to invest in a callable bond.
 - c) Give an intuitive explanation of why the early exercise of an American put becomes more attractive as the risk-free rate increases and volatility decreases?
 - d) The party with a short position in a futures contract sometimes has options as to the precise asset that will be delivered, where delivery will take place, when delivery will take place, and so on. Do these options increase or decrease the futures price?
 - e) In an interest rate swap, which of the legs (floating or fixed leg) is more likely to affect the present value of the swap more if interest rates change? 20p

When answering the following two essay-type questions, start with a table of contents!

3. Which are the three main methods for calculating the default probability for publicly traded debt (bonds), and why do the different methods produce different estimates on default probability? (Hull ch. 23) 10p
4. Management of credit risk (counterparty risk) for exchange traded futures and futures traded in the OTC markets. Discuss the workings of the main methods for mitigating (reducing) the risk of loss for an investor on the derivative transactions in case of default of the futures contract counterparty? (Hull, 2.4-5, 23.8) 10p

$$c = S \times N(d_1) - Xe^{-rT} \times N(d_2) \quad d_1 = \frac{\ln\left(\frac{S}{X}\right) + \left(r + \frac{\sigma^2}{2}\right)T}{\sigma\sqrt{T}}$$

$$p = Xe^{-rT} \times N(-d_2) - S \times N(-d_1), \quad d_2 = d_1 - \sigma\sqrt{T}$$