

Arundel partner



The questions in this sample exam are mostly quantitative, but you should also expect some qualitative ones, such as true/false questions, on the exam. I did not include any here, as each true/false will require a different reasoning than others.

Question 1: Consider a project with the following risk-free cash flows: $t = 0$ $t = 1$ $t = 2$ -40 20 25 Suppose that one year zero-coupon bonds yield 6% and two year zero-coupon bonds yield 8%.

1a) Find the NPV of the project. $20/(1+6\%)+25/(1+8\%)^2-40= 0.3014$

1b) Describe the tracking portfolio for this project. $FV= 25$ and 20

c) Describe how you could finance the project to make arbitrage profits at $t = 0$ (i. e. , a sure cash inflow at $t = 0$ without any future obligation). Please be explicit about what assets you would invest in, how much each would cost at $t= 0$, and what each would pay at $t= 1$ or $t= 2$. (Hint: You will have to consider investing in the project and a portfolio at the same time). Short sell bond by 40. $3014, 18.8679$ and 21.4335

1d) Suppose now that instead of the zero coupon bonds described above, there are two risk-free bonds in the market (Bond A and Bond B) that can be described as follows:) Bond A pays a \$10 coupon at $t= 1$ and matures at $t= 2$ when the bondholders will receive \$110. Today (i. e. , at $t= 0$) the market price of the bond is $B_a = \$104.743$.

b) Bond B pays a \$20 coupon at $t= 1$ and also matures at $t= 2$ when the bondholders will receive \$95. Its price today is $B_b = \$100.790$. Calculate the NPV of project X. (Hint: Note that the interest rates in the economy may have changed. To solve this question, you will need to form a tracking portfolio of the project).

Question 2: A lot is suitable for either six or nine condominium units.

Assume:

- Risk free rate is 10%
- Per unit construction costs (now or next year): \$100, 000 for building with six units \$110, 000 for building with nine units
- Assume that construction does not take any time; i. e. , if we decide to build (either now or next year), we can do so and sell the condos immediately
- Current price of each unit is \$140, 000
- Per year rental rate is \$10, 000 per unit (to be received at the end of the year)
- Next year, if market conditions are: Favorable, condos sell for \$186, 000 Unfavorable, condos sell for \$116, 000

a) Suppose we decide to build this year and sell immediately. Should we build six or nine units? What is the value of the lot given that we build this year? $6 \times (140 - 100) = 240$ $9 \times (140 - 110) = 360$ build 9 units

2b) Suppose we decide to wait and make the construction decision next year. Calculate the value of the lot now.

2c) Suppose that as in part a, we decide to build today, but we do not sell immediately. Instead, we rent out the condos for a year, and sell them next year. How does the value of the lot change relative to your answer in part a?

Please answer without doing any calculations.

Question 3: A gold mine will produce all of its output two years from now. The mine has a reserve of 100 pounds of gold. The gold can be extracted at no cost and sold in year 2. We have the following data:

- The two-year forward price of gold is \$10, 000 per pound today.
- In year 2, gold price will be either \$14, 000 per pound, or \$8, 000 per pound.
- The one-year risk-free rate is 10%. The risk-free rate will remain at 10% next year too.

3c) Now suppose that there is some uncertainty about the reserves of the mine.

The mine's reserves are either 100 pounds or zero, with each outcome equally likely. In year 1, we will learn whether the reserves are 100 pounds

or zero. We receive an offer today for the mine that is conditional on the reserves. The bidder offers \$1.1 million if reserves prove to be 100 pounds, but only \$55,000 if the reserve turns out to be zero. The offer is valid for two years. In either case, the payment is to be received in year 2 if the offer is accepted. What is the value of the mine today? Question 4: A diversified firm consists of two divisions, industrial equipment and beer production. A year from now, the industrial equipment division will produce either \$150 if the economy is in expansion, or \$50 if the economy is in a recession. The beer division will make \$30 if the economy is in expansion, but \$170 if the economy is in recession. Each state of the economy is equally likely. The firm has outstanding bonds with face value \$120 to be repaid a year from now, and 100 outstanding shares. Assume that the risk-free rate is zero, all investors are risk-neutral, there are no taxes, and no bankruptcy costs. a) What is the current market value of the debt? What is the current share price? 4b) Now suppose that the firm decides to sell the beer division, and pay the proceeds to its shareholders as a dividend. How much will the beer division sell for? Immediately after this decision is announced, but before the actual sale and the dividend takes place, what is the market value of the bonds? What is the per share price? 4c) Suppose now that rather than directly selling the beer division, the firm spins it off.

Specifically, for each outstanding share of the original company, one new share representing an ownership claim in the newly created beer firm is issued and is given to shareholders. The new beer company assumes half of the face value of the outstanding debt. After the spin-off, the original shares keep trading (now representing a claim only on the industrial equipment

business), while the newly issued beer shares start trading separately. Immediately after this spin-off takes place, what is the market value of the debt of the industrial equipments firm?

What is the market value of the debt of the beer production firm? What are the per share prices of each company? 4d) Show that the Modigliani-Miller Proposition holds, i. e. , that the total firm value is independent of the capital structure decisions of the firm in parts a, b, and c. Question 5: Hollifield Inc. has a current market value of \$10, 000, 000, which is composed of \$3, 000, 000 perpetual risk-free debt and \$7, 000, 000 equity with 500, 000 shares outstanding. Hollifield plans to announce that it will issue an additional \$2, 000, 000 of perpetual bonds (also risk-free) and use these funds to repurchase equity.

The bonds will have a 6-percent coupon rate, which is the risk-free rate. After the sale of the bonds and the share repurchase, Hollifield will maintain the new capital structure indefinitely. The corporate tax rate for Hollifield is 40% and there are no personal taxes. 5a) What will the stock price be immediately after Hollifield announces its plan to issue bonds and repurchase equity? What will the total market value of the firm's equity be immediately after Hollifield announces its plan to issue bonds and repurchase equity? 5b) How many shares will Hollifield repurchase?

What will be the market value of Hollifield's equity after the new bond is issued and the shares are repurchased? 5c) Suppose that after the firm announces its intention to recapitalize but before the pricing and the issuance of the new bond take place, unexpectedly, the president announces that corporate taxation will be immediately removed. Find the effect on the

stock price and on the price of the current debt right after the president's announcement is made. (Note: Assume that removal of taxes is permanent and has no other effects on the firm's investment policy or in the economy).

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