

**Guanghua School of Management Final Exam  
Fall Semester, 2021-2022**

**Course: Corporate Finance (Course Number: E2833431)**

**Instructor: Jiangmin Xu**

**Exam Date: January 4, 8:30am to 10:30am      Length: 2 hours**

**Student Name:**

**Student ID:**

**Format: Closed book. Please write all your answers on the exam paper.**  
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**INSTRUCTIONS**

You have 2 hours to complete this exam. This exam is strictly closed book and closed notes, except for one sheet of A4-sized paper with your notes/formulas written on one side only.

You are NOT allowed to use any electronic devices such as cell phones, PDAs, laptops, MP3 players, iPods, iPads etc. during the exam. Calculators are allowed, but you must NOT use any calculator-related apps on your electronic devices.

There are **12 questions** in total. Use your time wisely.

To ensure fairness, you are requested to stop writing promptly at the end of the exam.

**Please do not turn over this cover page, until requested.**

1. (10%)

Firm AAA is an all-equity firm with a cost of equity of 10%. The risk-free rate is 4% and market risk premium 6%. Assume that capital markets are perfect and there are no taxes. Suppose that the firm changes its capital structure so that it has an equity-to-debt ratio of 1.25. The debt of the firm is riskless. What would be the new cost of equity of the firm? (Round your answer to 1 decimal place in percentages)

2. (10%)

Assume that company BBB's stock price is \$20 per share in the market and the company has 50 million shares outstanding. The company changes its capital structure by borrowing \$800 million permanent debt, and uses the borrowed money to repurchase outstanding shares. All securities and debts are fairly priced in the market. The company pays a constant tax rate of 40%.

(a) What is the minimum repurchase price so that shareholders are willing to tender their shares? (Round your answer to 1 decimal places in dollars) (5%)

(b) At the repurchase price in (a), how many shares are remaining after the repurchase? (Round your answer to 2 decimal places in millions) (5%)

3. (10%)

Company DDD is in high leverage and might suffer from debt overhang problem. Today (now) is year 0. Suppose equity holders of the company now have an opportunity to invest \$10 billion to try to save the firm. This investment has similar risk to the rest of the firm. The investment is assumed to generate a free cash flow of \$3 billion in year 1, and it grows at 5% every year after until year 5. After year 5, it terminates and stops generating free cash flows any more. Assume the company has a debt-to-equity ratio of 3/1. The company has an after-tax WACC of 12%, the risk-free rate is 3%, and the market risk premium 6%. The company's cost of debt is 10%, and it pays a corporate tax rate of 40%. What is the maximum possible value for the beta of the debt,  $\beta_D$ , so that the equity holders are still willing to make the investment without triggering the debt overhang problem? (Round your answer to 3 decimal places)

4. (10%)

Assume a firm is going to pay its shareholders \$30 million in dividends today (year 0). Assume the firm has no debt and its unlevered cost of capital is 10%. The firm has 20 million shares outstanding. The firm will generate a free cash flow of \$50 million in year 1, and it grows at 2% thereafter forever. The firm will maintain the same number of shares outstanding forever. The firm is expected to pay out all of its free cash flows as dividends to shareholders every year from year 1.

(a) Assume for now that there is no tax at all, and capital markets are perfect. What will be the cum-dividend price per share of the firm? (Round your answer to 2 decimal places in dollars) (5%)

(b) Now assume the firm raises the \$30 million money from its shareholders in order to pay them the \$30 million dividends right now. Dividends are taxed at a 50% tax rate. Capital gains are taxed at a 15% tax rate. How much will shareholders receive after taxes, given that there are no other market imperfections except taxes? (Round your answer to 1 decimal place in millions) (5%)

5. (5%)

Company GGG is an all-equity firm with 500 million shares outstanding. GGG has \$200 million in cash and expects future free cash flows of \$100 million every year forever. Management plans to use the 200-million cash to expand the firm's operations, which will in turn increase future free cash flows to \$108 million in every year. If the cost of capital of GGG's investments is 10%, how would a decision to use the cash for a share repurchase rather than the expansion change the share price (i.e., the difference between doing a repurchase and the expansion), assuming capital markets are efficient? (Round your answer to 2 decimal places in dollars)

6. (10%)

NFT Corporation's stock is currently trading at \$50 per share. There are 20 million shares outstanding, and the company has no debt. You are a partner in a PE firm that specializes in leveraged buyouts. Your analysis indicates that the management of this corporation could be improved considerably. If the managers were replaced with more capable ones, you estimate that the total value of the company would increase by 80% from the current total value. You decide to initiate a leveraged buyout and issue a tender offer for at least a controlling interest—50% of the outstanding shares. This means that if you offer a buyout price of \$X per share, shareholders must be willing to tender at least 50% of the shares to you at the price \$X. You will finance the purchase of shares by borrowing the necessary amount of money, i.e., using debt. After the leveraged buyout, you attach this debt to the company NFT's balance sheet.

(a) What is the minimum price \$X you can offer so the buyout deal will be successful? (Round your answer to the nearest whole number in dollars) (5%)

(b) At this minimum price, what is the company NFT's equity value after the buyout? (Round your answer to the nearest whole number in millions of dollars) (5%)

7. (5%)

Consider two firms, East Corporation and West Corporation. Both corporations will either make \$60 million or \$-10 million profit (i.e., a loss of 10 million) next year with equal probability. The only difference is that the firms' profits are perfectly negatively correlated. That is, in any year East Corporation earns \$60 million, West Corporation earns \$-10 million, and vice versa. Assume that the corporate tax rate is 40%. Assume also that when firms make losses (negative profits), they do not need to pay any taxes at all, and there is no tax loss carryforward.

What is the increase in total expected after-tax profits for the two firms together next year, if the two firms are merged into one corporation called EW Corporation, but there is no synergy from the merger at all, compared to the case where the two firms are two separate firms? (Round your answer to the nearest whole number in millions of dollars)

8. (5%)

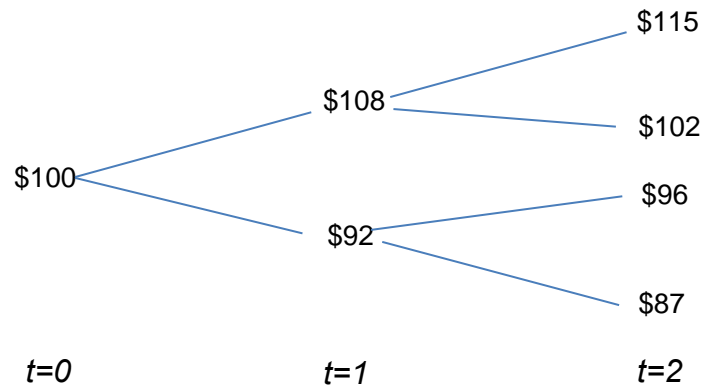
You founded your own company three years ago. Initially, you contributed \$1 million of your money and, in return, received 2 million shares of stock. Since then, you have sold an additional 1 million shares to angel investors. You are now considering raising even more capital from a VC firm. The VC firm has agreed to invest \$10 million with a post-money valuation of \$20 million for your company at the pre-money share price. Assuming that this is the VC firm's first investment in your company, and no original shareholders will sell their shares after the VC investment. What is the percentage of the shares you own for your company after the VC's investment? (Round your answer to 1 decimal place in percentages)

9. (5%)

You are the CFO of a company whose equity value is \$1500 million in the market. The firm has 300 million shares outstanding. You have announced a rights issue. Each existing shareholder is sent one right for every share he or she owns. You will require three rights to purchase one new share at a price of \$4 per share, and assume that there is no signaling effect. What is the share price after the issue? (Round your answer to 2 decimal places in dollars)

10. (10%)

Consider the following binomial tree for the price of a stock. The stock does not pay any dividend. The risk-free rate is 3% over any one period. There is an **American put** option written on the stock with strike price  $K = \$110$  which expires at  $t = 2$ . What is the price of this American put option at  $t = 0$ ? (Round your answer to 1 decimal place in dollars)



11. (10%)

XYZ Corporation pays no dividends and has a current stock price of \$20 per share. Its returns have a volatility of 20% per year and the risk-free rate is 4% per year. For a one-year at-the-money European call option on the firm XYZ's stock, according to the Black-Scholes-Merton option pricing formula (use  $K/(1+r)^T$  to calculate the present value of  $K$ ):

(a) What is the option delta  $\Delta$  of this call option? (Round your answer to 4 decimal places) (5%)

(b) What is the option price? (Round your answer to 2 decimal places in dollars) (5%)

Use the standard normal CDF tables given below for selected values:

$x$	$N(x)$
0.046	0.5184
0.096	0.5383
0.146	0.5581
0.196	0.5777
0.246	0.5972
0.296	0.6164
0.346	0.6354
0.396	0.6540
0.446	0.6722
0.496	0.6901

12. (10%)

(a) What is the idea behind the dividend signaling hypothesis? According to the dividend signaling hypothesis, what are the implications when a firm increases its dividend and decreases its dividend? (5%)

(b) Based on the optimal leverage theory, what are the implications for the debt levels of R&D-intensive firms and low-growth, matured firms? (5%)