# 2220 - Entrepreneurial Finance and Venture Capital Final Exam

## Question 1

Multiple choice (5 points each, no explanation needed)

- A. Which of the following statements are true?
  - i. If asset intensity is *positive*, then a fast-growing, *profitable* firm may have *negative* free cash flow.
  - ii. If asset intensity is *negative*, then a fast-growing, *unprofitable* firm may have *positive* cash-flow.
  - iii. None of the above statements are true.
- B. Which of the following statements are true?
  - i. The stronger network effects are, the easier it is for a new entrant with a superior product to gain a competitive advantage over an established player with an inferior product.
  - ii. A factory benefits from network effects if its cost per unit decreases with volume.
  - iii. None of the above statements are true.
- C. Which of the following deal terms do NOT protect investors from downside risk?
  - i. Pre-emption (or pro-rata) rights
  - ii. Liquidation preference
  - iii. Weighted average anti-dilution protection
  - iv. All of the above terms protect investors from downside risk
- D. Which of the following statements about convertible notes are true?
  - i. They do not require investors and founders to agree on valuation
  - ii. They require less due diligence than a priced round
  - iii. They do not dilute founders
  - iv. If there is a discount, founders prefer to make it as high as possible
  - v. If there is a cap, founders prefer to make it as high as possible
- E. If a VC invests in convertible preferred stock with no dividends, then the VC will choose to convert to common stock at exit if the exit value exceeds:
  - i. The pre-money valuation at which the VC invested
  - ii. The post-money valuation at which the VC invested
  - iii. Not enough information to answer
- F. Which of the following are typical advantages of IPOs over sales:
  - i. Founders get to keep or regain control from investors
  - ii. Prestige for founders
  - iii. The first-day increase in stock price post-IPO

## Question 2

A new venture wants to raise 6 million euros from a VC. The VC expects the company to be sold for 150 million euros in 4 years, and is targeting an IRR of 50%. There are 2.5 million shares outstanding before the deal. Unless otherwise stated, assume all deals are done in convertible preferred stock.

- A. What equity stake will the VC demand? (6 points)
- B. How many shares does the VC get? What is the implied share price? (6 points)

- C. Draw the VC's payoff diagram. (7 points)
- D. If the deal was instead done in participating convertible preferred stock, and assuming the company would be sold as planned, what equity stake would the VC actually need in order to achieve an IRR of 50%? (7 points)
- E. Assume now that the VC expects that there will be two additional funding rounds, and that the second and third round VCs will take exit stakes of 15% and 6% respectively. What equity stake will the first VC now demand? What is the postmoney valuation of the first round? (7 points)
- F. Suppose that the first VC invests under the terms in the previous question, but the company performs poorly after the deal. When the time comes to raise the next round, the second VC insists on a pre-money valuation of 15 million in exchange for an investment of 4 million, and the deal is agreed on these terms. Calculate what the first VC's equity stake after this round will be if the first VC has:
  - i. No anti-dilution protection (6 points)
  - ii. Full-ratchet anti-dilution protection (Hint: note that the deal with the second round VC determines a valuation for the round, not a share price. The share price is itself affected by the anti-dilution protection.) (7 points)

## Question 3

A new venture has developed an innovative product. Mass producing the product will require an investment of 20 million euros and return 100 million euros with 25% probability (and 0 otherwise). The founders are considering two options. First, they could choose to start mass production right away. Second, they could choose to produce a small quantity and test the product with early adopters first, and then decide whether to mass produce it. In the second case, they expect the test with early adopters to have a positive outcome with 40% probability. If the test has a positive outcome, then the probability of success in mass production will increase to 62.5%. If the test has a negative outcome, then mass production will fail for sure. The test will generate no revenue and will have no effect on the investment required or on the return from successful mass production. The project's risk is entirely diversifiable and the risk free rate is 0%.

- A. How much, if anything, should the founders be willing to pay to run the test? (7 points)
- B. Suppose instead that if the test has a positive outcome, the probability of success in mass production increases to 31%, and that if the test has a negative outcome, the probability of success in mass production decreases to 21%. The test still has a positive outcome with 40% probability, as before. How much, if anything, should they be willing to pay to run the test now? (7 points)

## **Question 4**

A VC fund raises 500 million euros from investors. The fund will have a 10-year life and charge management fees of 3% throughout its life and 20% carried interest. The GPs expect the following distribution of returns: 40% of the fund's investments will return 0X, 40% will return 2X and 20% will return 10X. What do they expect the gross multiple (5 points) and the net multiple (5 points) of the fund to be?