Due in class, November 7th (.11 section) or 8th (.12 section).

Hard copy is strongly preferred, but if you can’t attend class, you can email solution by 6pm November 7th to Keith Siilats [ksiilats@stern.nyu.edu].

Can work in teams of up to three students. Be sure to list all team members’ names.

The questions are equal-weighted unless otherwise indicated.

1) In the U.S., what is the most common source of funds for investment?

Retained earnings (“internal finance”/“internal cash”) is the most common source.

2) In the U.S., what is the most commonly-used source of external finance?

Debt is the most common. Equity is the least common.

3) A firm’s market-value balance sheet shows $100 M of debt finance and $20 M equity finance. What is the debt-to-equity ratio? What is the debt-to-value ratio?

D/E = 100/20 = 5. D/V = 100/(100+20) = 0.83.

4) A stock certificate has a value stated on it.

(a) This amount is called the ________.

(b) It is (very meaningful / not very meaningful) to investors.

(a) Par value.
(b) Not very meaningful.

5) Shares of stock that have been repurchased by the corporation are called ________ shares.

Treasury.

6) The equity accounts of DotCom Inc. are as follows:
Common shares ($1 par value) 10,000,000
Additional paid-in-capital  50,000,000
Retained earnings 125,000,000
Treasury shares at cost 1,000,000
Net common equity 186,000,000

Suppose the firm sells 1,000,000 new shares at $20 per share.
(a) What is the new value of the “Common shares” account?
(b) What is the new value of “Net common equity”?

(a) Common shares goes up to 11,000,000.
(b) Net common equity goes up to 206,000,000. (I made a mistake in the original question -- Treasury shares should be a negative entry, so the original “net common equity makes more sense as 184,000,000. So if you said for part (b) that net common equity goes up to 204,000,000, we would also accept that as a correct answer.)

7) Debt that can be paid off before maturity, at the company’s discretion, is called _____ debt.

Callable

8) Preference in position among creditors is called (security/seniority/absolute priority).

Seniority

9) A security that gives the owner the right to purchase stock directly from the firm at a fixed price during a specified period is known as a _______.

Warrant

10) Moose Stores has one million shares of common stock outstanding, with a total market value of $40 million. It now announces an issue of one million warrants at $5 each. Each warrant entitles the owner to buy one Moose share for $30 any time within the next 5 years. Moose is not going to pay any dividends within this period. The annual standard deviation of Moose stock returns is 20%, and the annually-compounded interest rate is 8%.

(a) What is the market value of each warrant? (Hint: the Black-Scholes value of a European call option on a share selling for $45 each, with exercise price of $30, with 5 years to expiry, 8% interest rate, and 20% standard deviation = $24.57.)
(b) What is the market value of each share after the warrant issue? (Hint: The value of the shares is equal to the total value of the equity minus the value of the warrants.)
(a) Value of equity = $45 million. So $V/N = 45$. So Black-Scholes call value on “alternative firm” is $24.57$ (given). So warrant value $= 1/(1+q) * 24.57$. Now $q = 1$, so warrant value $= 24.57/2 = $12.29.
(b) Market value of each common share is $45 - 12.29 = $32.71.

11) Rational Demiconductor has $1,000 cash, and had earmarked $1,000 for investment, but learns project is a loser (NPV<0), so plans to distribute the cash by a dividend. Given the following information (left side), fill in (a) through (f). What does this illustrate about dividend policy?

<table>
<thead>
<tr>
<th>Original</th>
<th>Post-dividend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>1,000</td>
</tr>
<tr>
<td>Asset Value</td>
<td>9,000</td>
</tr>
<tr>
<td>New Project</td>
<td>0</td>
</tr>
<tr>
<td>Total Value</td>
<td>10,000</td>
</tr>
<tr>
<td># of Shares</td>
<td>1,000</td>
</tr>
<tr>
<td>price/share</td>
<td>$10</td>
</tr>
</tbody>
</table>

(a) 0
(b) 9000
(c) 0
(d) 9000
(e) 1000
(f) 9

Because the pre-dividend price per share ($10) = the post-dividend price per share ($9) plus the dividend itself ($1), the example illustrates that dividend policy does not change shareholder wealth.

12) In a Modigliani-Miller world, does increasing leverage increase:
   (a) The cost of debt? (explain – one sentence)
   (b) The cost of equity? (explain – one sentence)
   (c) The overall opportunity cost of capital? (explain – two sentences)

   (a) Yes: the debt becomes riskier (now default is more likely)
   (b) Yes: the equity becomes riskier, since now there is more debt (with higher priority), default is more likely
   (c) No: $r = (D/V)r_D + (E/V)r_E$. Both $r_D$ and $r_E$ go up when $D/V$ increases, but $r$ does not change because increasing leverage puts more “weight” on $r_D$, which is lower than $r_E$ to begin with.

13) In a Modigliani-Miller world, suppose there is an unlevered firm U and a levered firm L. They have the same cash flows. Which firm has the higher total market value of its securities?

   They are exactly equal.
14) In a world with corporate taxes but otherwise Modigliani-Miller, which firm (U or L) has the higher total market value?

*L has higher market value because its value includes interest tax shields.*

15) The theory of capital structure in which the optimal debt ratio is determined by tax benefits and distress costs of debt is called the _______ theory.

*Tradeoff.*

16) The Salad Oil Storage (SOS) Company has financed a large part of its facilities with long-term debt. There is a significant risk of default (in fact, there would be default if the debt matured today). Explain intuitively (one or two sentences each):

(a) Why SOS stockholders could lose by investing in an NPV>0 project financed by a new equity issue

(b) Why SOS stockholders could gain by investing in an NPV<0 project financed by cash

(c) Why SOS stockholders could gain from paying out a large cash dividend.

(d) The value losses from these “games” can be counted among the “costs of _______”

(a) The initial gains accrue to the bondholders, so shareholders lose if they make the investment and then SOS goes bankrupt anyway.

(b) If the new project is very risky, it may pay off even for shareholders. Shareholders have nothing to lose if the project doesn’t pay off, but may gain if it pays off big.

(c) The market value of the shares go down by less than the dividend; the decline in firm value is shared with creditors, and the shares may still retain some “option value.”

(d) financial distress

17) Solve BM6 Practice Question #1, page 574. (Hint: First, “net out” accounts payable by moving it to the left-hand side and constructing a “net working capital” asset entry. Then compute WACC on the remaining three sources of finance.)

*Assuming that the bank loan can be regarded as a permanent source of financing,*

\[ V = V_{ST} + D_{LT} + E = 280 + 1800 + (900 \times 10) = 2980 \text{ million}. \]

*So WACC = \[.10 \times (1-.35) \times (280/2980) + .09 \times (1-.35) \times (1800/2980) + .18 \times (900/2980) = .096 \]

18) Solve BM6 Practice Question #3, page 574. (This is a one-sentence answer.)

*Calculate APV by subtracting $4 million from base-case NPV.*
19) Solve BM6 Practice Question #8, page 576.

*Base-case NPV = -1000000 + 600000/1.12 + 700000/(1.12)^2 = $93,750*

<table>
<thead>
<tr>
<th>Year</th>
<th>Debt at start</th>
<th>Interest</th>
<th>Tax shield</th>
<th>PV(Tax shield)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>300000</td>
<td>24000</td>
<td>7200</td>
<td>6667</td>
</tr>
<tr>
<td>2</td>
<td>150000</td>
<td>12000</td>
<td>3600</td>
<td>3086</td>
</tr>
</tbody>
</table>

*APV = 93,750 + (6667+3086) = $103,503.*