1. (10 points) Organize the 2020 Balance Sheet and Income Statement for a company given the following accounts (assume there is no depreciation):

Accounts Receivable	939,776
Accounts Payable	298,484
Revenue	8,281,989
Interest	50,000
Treasury Stock	200,000
Preferred Stock	1,200,000
Selling, General, and Administrative Costs	1,323,368
Additional Paid-in Capital	2,000,000
Long Term Debt	500,000
Retained Earnings	2,612,465
Building and Equipment	1,348,800
Common Stock	337,500
Notes Payable	1,170,127
Accrued Expenses	203,000
Land	1,575,000
Cost of Goods sold	5,383,293
Inventory	490,000
Other Current Assets	893,000
Cash	2,875,000

Cash	2,875,000
Accounts Receivable	939,776
Other Current Assets	893,000
Inventory	490,000
Total Current Assets	5,197,776
Land	1,575,000
Building and Equipment	1,348,800
Total Assets	8,121,576
Accounts Payable	298,484
Notes Payable	1,170,127
Accrued Expenses	203,000
Total Current Liabilities	1,671,611
Long Term Debt	500,000
Total Liabilities	2,171,611
Preferred Stock	1,200,000
Common Stock	337,500
Additional Paid-in Capital (Capital Surplus)	2,000,000
Treasury Stock	200,000
Retained Earnings	2,612,465
Total Equity	5,949,965
Total Liabilities and Equity	8,121,576

Revenue	8,281,989
Cost of Goods sold	5,383,293
Selling, General, and Administrative Costs	1,323,368
Interest	50,000
Tax (40%)	610,131.2
Net Income	915,196.8

Red cells 1 point, green cell 4 points.

2. (10 points) Using the financial statements in question 1, calculate the following ratios.

Current Ratio = *5,197,776/1,671,611 = 3.1 2 points*
Equity Multiplier = *8,121,576 /5,949,965 = 1.36 2 points*
Du-Pont Identity = *PM*EM*TAT = (915,196.8/8,281,989)*(1.36)*(8,281,989/8,121,576) = 0.11*1.36*1.02 = 0.15 2 points*

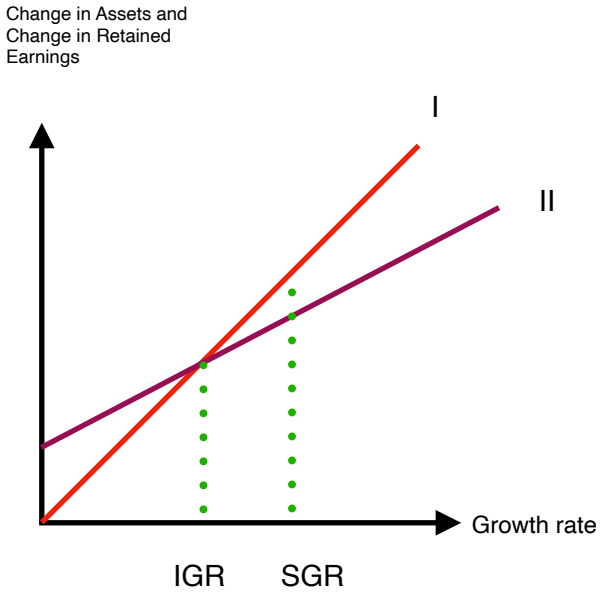
During the board meeting, one of the board members bring up TWO negative aspects of the Equity Multiplier number for the company's finances and its future growth rate. Please indicate with a few sentences what these two issues could be.

Equity Multiplier is less than 2, that is Debt to Equity ratio is less than 1, that means the company is mostly funded by equity rather than debt, This implies that the company is not taking full advantage of: 1. interest deductions 2 points
and 2. Increasing its growth rate by increasing assets funded by additional debt. 2 points

3. (10 points) Zovid Inc. is a capital intensive pharmaceutical company (capital intensive: high asset levels compared to sales). Currently, it has zero Net Income, assets that are used to full-capacity, 0.5 retention ratio, and 0.5 debt to equity ratio. Zovid is considering its future growth opportunities, using percentage of sales approach. Assume no spontaneous liabilities.

Copy the graph below to your exam paper and then, please draw the following two lines on this graph

I. The required change in assets.
II. The change in Retained Earnings.



a) Where does I cross the x-axis and y-axis? Why?

2.5 points *At the Origin, BECAUSE the assets are used to full capacity, any growth would require additional assets, no growth would require zero asset change. (Note that, if the company had excess capacity then it could grow at low rates without increasing its assets, therefore the line would not start at the origin but would cross the x-axis at a positive point.)*

b) Where does II cross the x-axis and y-axis? Why?

2.5 points *It does not cross the x-axis at a positive point but it crosses the y-axis at a positive point BECAUSE currently the company has positive profit and retention ratio. This combination implies that even if the company grows at zero rate, it will still have positive addition to retained earnings.*

c) Mark the Internal Growth Rate on the graph.

2.5 points *Where I and II crosses.*

d) Mark the Sustainable Growth Rate on the graph.

2.5 points *It has to be to the right of IGR since the company has positive debt.*

4. (10 points) FURO Inc. is adding a new product to its production line. Market research indicates that the company will sell 1,000 units each year for the coming 5 years. The variable cost per unit is $5, the annual fixed cost is $10,000. The tax rate is 20% and the market rate is 10%. The company needs to purchase a $20,000 machine today, to use it for the next five years. (assume straight-line depreciation)

a) What should be the price per unit for Furo Inc to financially brea-even?
b) What is the annual financing cost?

a) Financial break-even condition:
*(Price*Q –VC*Q-FC-Dep)*(1-t)-(EAC-Dep) = 0*

*Price * 1,000 - $5*1,000-$10,000-$4,000)*(1-20%) - (EAC - $4,000)*

where 20,000 = (EAC/.10)(1-1/1.1^5), EAC = $5,276*

Price = $20.595 *6 points*

b) Financing cost is $5,276 - $4,000 = $1,276 *4 points*

5. (10 points) Consider the same company as in question 4. FURO Inc. decided to sell its product for $30 per unit.

a) If the company is expecting to sell the machine in year 5 for $3,000, what is the NPV of this new product. (Assume no synergies or erosion. Also assume no changes to be made to Net Working Capital).

Please see the table below.

b) Can you tell whether NPV is positive, negative, or zero? Explain with one sentence.

Because the company is financially breaking even, we already know, without making the calculations in part a that NPV is positive. *1 point*

Years	0	1	2	3	4	5	
Fixed Asset -depreciates straight-line 5 years	-20,000						
Revenue		20,595	20,595	20,595	20,595	20,595	1 point
Var cost		-5,000	-5,000	-5,000	-5,000	-5,000	1 point
Dep		-4,000	-4,000	-4,000	-4,000	-4,000	1 point
Fixed Cost		-10,000	-10,000	-10,000	-10,000	-10,000	1 point
Pretax		1,595	1,595	1,595	1,595	1,595	
Tax		319	319	319	319	319	
NI		1,276	1,276	1,276	1,276	1,276	1 point
OCF		5,276	5,276	5,276	5,276	5,276	1 point
Salvage						2,400	1 point
Incremental Cash Flow	-20,000	5,276	5,276	5,276	5,276	7,676	1 point
NPV	1,490						1 point

6. (10 points) Market rate is 10%. Your company is considering investing $10,000. There are three projects available: A, B, and C.

You can invest on A individually, or on B individually, or on C individually.
You can also invest on A and B at the same time but you cannot invest on the following combinations:
A and C
B and C
A, B, and C
Using the profitability index method, find the best investment opportunity:

Years	*A*	*B*	*C*	*A and B*	*C-B*	*(AandB) - C*
0	*-5,000*	*-5,000*	*-8,000*	*-10,000*	*-3,000*	*-2,000*
1	*200*	*2,050*	*2,300*	*2,250*	*250*	*-50*
2	*1,200*	*1,100*	*2,150*	*2,300*	*1,050*	*150*
3	*1,200*	*1,200*	*2,150*	*2,400*	*950*	*250*
4	*1,400*	*1,200*	*2,150*	*2,600*	*950*	*450*
5	*2,800*	*1,200*	*2,150*	*4,000*	*950*	*1,850*
PI	*0.95*	*1.05*	*1.04*	*1.00*	*1.02*	*0.86*

1 point for each cell in the last raw, a total of 6 points.

Invest $8,000 on C and $2,000 on the market. 4 points

7. (10 points) Assume that the market rate is positive. If a company has a new product to introduce to the market with a Profitability Index of 1.2, then:

The company will break-even from an accounting perspective. YES. / NO / CANNOT TELL.

The company will financially break-even. YES / NO / CANNOT TELL

The NPV is greater than zero. YES. / NO / CANNOT TELL

Each YES is 3.3 points.

8. (10 points) A bond is issued today with $1,000 face value and 2% Coupon Rate that will mature in two years. The market rate is 3%.

a) What is the current yield and the capital gains yield that you expect for the coming year.

Bond Price today = 20/1.03+1020/1.03^2 = $980.865 1 point
Bond Price in One year = 1020/1.03^2 = $990.3
Current Yield = 20/$980.865 =2% 2 points
Capital Gains Yield can be calculated in two ways:
Market rate = current yield + capital gains yield
3% = 2% + 1%
2 points for the capital gains
Or (990.3-980.865)/980.865 = 1%

b) Assume that one year passed, the first coupon is distributed and the market rate went down to 1%. What is the current yield and the capital gains yield that you expect in the following year?

Bond Price today = 1020/1.01 = $1,009.9 1 point
Bond Price in One year = 1020/1.03^2 = $1,000
Current Yield = 20/$1,009.9 =1.98% 2 points
Capital Gains Yield can be calculated in two ways:
Market rate = current yield + capital gains yield
1% = 1.98% - 0.98%
2 points for the capital gains
Or (1,000-1,009.9)/1,009.9 = -0.98%

9. (10 points) TOUR, Inc. is a young start-up with a beta of 1.3. It is estimated that the company will not be paying any dividends for the coming 5 years as it needs to use its earnings to fuel growth. The company is expected to pay dividends of $4 a share at year 6 and will increase the dividends at 10% per year thereafter.

Risk free rate is 3% and the market rate is 12%.
What is the current stock price?

(As long as the equations are correct, no need for explanation to get the full points)

The rate that will be expected from such a stock can be calculated using the CAPM model:

R = Rf+ beta (Rm-Rf)
R = 3% + 1.3 (12%-3%)
R = 14.7% 3 points

Here we have a stock that pays no dividends for 5 years. Once the stock begins paying dividends, it will have a constant growth rate of dividends. We can use the constant growth model at that point. It is important to remember that general form of the constant dividend growth formula is:
$P_t = [D_{t+1}] / (R - g)$
This means that since we will use the dividend in Year 6, we will be finding the stock price in Year 5. The dividend growth model is similar the PV of a perpetuity: The equation gives you the PV one period before the first payment. So, the price of the stock in Year 5 will be:
$P_5 = D_6 / (R - g) = \$4 / (.147 - .1) = \$85.11$ *4 points*

The price of the stock today is simply the PV of the stock price in the future. We simply discount the future stock price at the required return. The price of the stock today will be:
$P_0 = \$85.11 / 1.147^5 = \$42.87$ *3 points*

10. (10 points) A portfolio that is composed of the risk free asset and stock X has an expected return of 7.5% and standard deviation of 27%. Stock X has expected return of 12% and the risk-free rate is 3%. The expected market return is 10.86% and the variance of market return is 18%. What is the correlation (ρ) between the returns of stock X and the market?

*Portfolio return = 7.5% = weight of risk free *3%+(weight of X)*12%*

Weight of X = 50% *2 points*

Standard deviation of portfolio = 27% = 0.5 standard deviation of X.*

Standard deviation of X = 54%. *2 points*

Using the CAPM:

0.12 = 0.03 + (beta of Z) (0.1086-0.03)

beta of Z = 1.145 *2 points*

Using the formula

$$\beta_i = \frac{Cov(R_i, R_M)}{\sigma^2(R_M)}$$

1.145 = Cov(X,M)/.18

Cov(X,M) = 0.2061 *2 points*

*Corr(X,M) = 0.2061/ (0.54 * $0.18^{1/2}$) = 0.90 (rounded)* *2 points*