

15.501/516  
Final Examination  
*December 18, 2002*

Student Name: \_\_\_\_\_

School: \_\_\_\_\_

Professor: \_\_\_\_\_

- ◆ The exam consists of 13 numbered pages. Be sure your copy is not missing any pages.
- ◆ There are 125 points in total -- point allocations are stated at the beginning of each question. You have 3 hours. **Budget your time well.** We suggest you quickly go over the entire exam first before starting.
- ◆ Write your answers in the space provided, and show any computations you make.
- ◆ Write as legibly as possible -- we can't grade what we can't read!
- ◆ If a question is unclear, make an appropriate assumption that does not contradict any information given in the question.

GOOD LUCK !!

## I. Interpreting the statement of cash flows. (10 points)

The following exhibit presents the statement of cash flows for Nike, Inc., maker of athletic shoes, for three recent years.

Nike Inc.: Statement of Cash Flows (amounts in millions)	Year 1	Year 2	Year 3
<b>Operations</b>			
Net income	167	243	297
Depreciation and amortization	15	17	34
Other Addbacks/Subtractions	(5)	5	3
<i>Working Capital provided by Operations</i>	<i>177</i>	<i>265</i>	<i>324</i>
(Increase) Decrease in Accounts Receivable	(38)	(105)	(120)
(Increase) Decrease in Inventories	(25)	(86)	(275)
(Increase) Decrease in Other Operating Current Assets	(2)	(5)	(6)
(Increase) Decrease in Accounts Payable	21	36	59
(Increase) Decrease in Other Operating Current Liabilities	36	22	32
<b>Cash Flow from Operations</b>	<b>169</b>	<b>127</b>	<b>14</b>
<b>Investing</b>			
Sale of Property, Plant and Equipment	3	1	2
Acquisition of Property, Plant and Equipment	(42)	(87)	(165)
Acquisition of Investment	(1)	(3)	(48)
<b>Cash Flow from Investing</b>	<b>(40)</b>	<b>(89)</b>	<b>(211)</b>
<b>Financing</b>			
Increase in Short-term Debt	0	0	269
Increase in Long-term Debt	0	1	5
Issue of Common Stock	3	2	3
Decrease in Short-term Debt	(96)	(8)	0
Decrease in Long-term Debt	(4)	(2)	(10)
Dividends	(22)	(26)	(41)
<b>Cash Flow from Financing</b>	<b>(119)</b>	<b>(33)</b>	<b>226</b>
<i>Change in Cash</i>	<i>10</i>	<i>5</i>	<i>29</i>
Cash, Beginning of the Year	74	84	89
Cash, End of the Year	84	89	118

Answer the following questions:

1. Why did Nike experience increasing net income but decreasing cash flow from operations during this three-year period? (5 points)

*NIKE's growth in sales and net income led to increases of account receivable and inventories. NIKE, however, did not increase its accounts payable and other current operating liabilities to help finance the buildup in current assets. Thus, its cash flow from operations decreased.*

2. How did Nike finance its investing activities during the three-year period? Evaluate the appropriateness of Nike's choice of financing during Year 3. (5 points)

*NIKE used cash flow from operations during Year 1 and Year 3 to finance its investing activities. The excess cash flow after investing activities served to repay short- and long-term debt and pay dividends. Cash flow from operations during Year 3 was insufficient to finance investing activities. NIKE engaged in short-term borrowing to make up the shortfall and finance the payment of dividends.*

*Operating cash flows should generally finance the payment of dividends. Either operating cash flows or long-term sources of capital should generally finance acquisitions of property, plant and equipment. Thus, NIKE's use of short-term borrowing seems inappropriate. One might justify such an action if NIKE (1) expected cash flow from operations during Year 4 to return to its historical levels, (2) expected cash outflows for property, plant and equipment to decrease during Year 4, or (3) took advantage of comparatively low short-term borrowing rates during Year 3 and planned to refinance this debt with long-term borrowing during Year 4.*

## II. Inventory accounting (10 points)

The inventory footnote to the annual report of Ballistic Brothers & Co. reads in part as follows:

Because of continuing high demand throughout the year, inventories were unavoidably reduced and could not be replaced. Under the LIFO system of accounting, used for many years by Ballistic Brothers & Co., the net effect of all the inventory changes was to increase pretax income by \$900,000 over what it would have been had inventories been maintained at their physical levels at the start of the year.

The price of Ballistic Brothers & Co.'s merchandise purchases was \$26 per unit during the year, after having risen erratically over past years. Ballistic Brothers & Co.'s inventory positions at the beginning and the end of the year appear below:

Date	Physical Count of Inventory	LIFO Cost of Inventory
January 1 <sup>st</sup>	200,000 units	?
December 31 <sup>st</sup>	150,000 units	\$600,000

Answer the following questions:

1. What was the average cost per unit of the 50,000 units removed from the January 1<sup>st</sup> inventory? (5 points)

*\$8. Cost of goods sold was \$900,000 lower than it would have been had the firm maintained inventories at 200,000 units. The average cost of the 50,000 units removed from the beginning inventory was \$18 (= \$900,000/50,000 units) less than current cost: \$26 - \$18 = \$8*

2. What was the January 1<sup>st</sup> LIFO cost of inventory? (5 points)

*\$1,000,000. Derived as follow: \$8 X 50,000 units = \$400,000 decline in inventory during the year. Beginning inventory must have been \$400,000 + \$600,00 (ending inventory) = \$1,000,000.*

### III. Accounting for bonds (25 points)

On January 1, 1985, First National Bank (FNB) acquired \$10 million of face value bonds issued on that date by Metro Area Inc. The bonds carried 12 percent annual coupons and were to mature 20 years from the issue date. Metro Area Inc. issued the bonds at par.

By 1990, Metro Area Inc. was in severe financial difficulty and threatened to default on the bonds. After much negotiation with FNB (and other creditors), it agreed to repay the bond issue but only on less burdensome terms. Metro Area Inc. agreed to pay 5 percent per year, i.e., annually, for 25 years and to repay the principal on January 1, 2015, or 25 years after the negotiation. FNB will receive \$500,000 every year starting January 1, 1991, and \$10 million on January 1, 2015.

By January 1, 1990, Metro Area Inc. was being charged 20 percent per year, compounded annually, for its new long-term borrowings.

Remember that the theoretical present value factor of an ordinary annuity is:

$$(PV \text{ annuity, } n \text{ years, } i\%) = \frac{1-(1+i)^{-n}}{i}$$

and answer the following questions:

1. At what value is Metro Area's bond recorded on FNB's balance sheet *before* the renegotiations? (*Hint*: FNB holds the bond as an investment and values the investment at present value. The accounting treatment of this investment in Metro Area's bond mirrors the treatment of the bond in Metro Area's balance sheet.) (5 points)

*\$10 million (issued at par)*

2. Determine the value of the bonds that FNB holds at the time of renegotiations using the market interest rate at the time of initial issue, 12 percent, compounded annually. In other words, what is the present value of the newly promised cash payments discounted at Metro Area's historical borrowing rate? (5 points)

$$\begin{aligned} 500,000 * (PV \text{ factor annuity, } 12\%, 25 \text{ years}) &= 500,000 * 7.843 = 3,921,570 \\ 10,000,000 * (PV \text{ factor, } 12\%, 25 \text{ years}) &= 10,000,000 * 0.059 = \frac{588,233}{4,509,803} \end{aligned}$$

3. Consider two accounting treatments for this negotiation (called a "troubled debt restructuring" by the FASB in its *Statement of Financial Accounting Standards* No. 114). (10 points)

**Scenario a:** Write down the bonds to the value computed in part 2, and base future interest revenue computations on that new book value and the historical interest rate of 12 percent per year, compounded annually.

**Scenario b:** Make no entry to record the negotiation, and record interest revenue as the amount of cash, \$500,000, that FNB receives annually.

Record using the balance sheet equation the transactions that take place on January 1, 1990 and January 1, 1991 under each of the two alternatives.

<b>Scenario a</b>	Cash	Investment in Bonds	Other Assets	Liabilities	Equity
1/1/1990		(5,490,197)			(5,490,197)
1/1/1991	500,000	41,176			541,176 <sup>a</sup>

<sup>a</sup> 12% \* (10,000,000-5,490,197)=12% \* 4,509,803

<b>Scenario b</b>	Cash	Investment in Bonds	Other Assets	Liabilities	Equity
1/1/1990		0			0
1/1/1991	500,000				500,000

4. Which of the two methods listed in 3 best reflects the economic events that take place during and after the debt restructuring? Can you think of a third method to record the effect of the renegotiations? (5 points)

*Scenario a reflect part of the loss that FNB incurs during these renegotiations. Scenario b is not a good method since there is an inconsistency between the interest revenue received and the value recorded for the bond on the balance sheet.*

*A better alternative method to record the effect of the negotiations would be to use the current borrowing rate of Metro Area, i.e., 20% to do all the calculations. That is, we would use this 20 % to compute the present value of the bond at the time of renegotiations and then apply this 20% rate to compute annual interest revenues.*

#### IV. Cost Accounting (15 points)

The Tyson Company buys chickens and disassembles them into fillets, wings and drumsticks. Suppose a whole chicken cost \$1.6 each, and on average weighs 32 ounces. The cost to process each chicken into parts is \$0.40 per chicken. Once the parts are obtained, separate processing is necessary to obtain marketable fillets, wings, and drumsticks. The fillets obtained from the chicken on average weigh 16 ounces, the wings weigh 4 ounces and the drumsticks weigh 12 ounces. Each part must be cleaned, inspected and packaged. The costs of cleaning and packaging fillets, wings and drumsticks are \$0.8, \$0.16 and \$0.04 respectively per chicken. Once cleaned and packaged, the fillets can be sold for \$2.4, wings for \$0.3 and drumsticks for \$0.8.

Answer the following questions:

1. What is the common cost per chicken shared by all three of Tyson's product lines (i.e., fillet, wings and drumsticks)? Allocate the cost to the three products based on weights, and show the related profits (losses). (5 points)

*Common Cost to be allocated is \$2 per chicken.*

<i>Weight</i>	<i>Total</i>	<i>Fillets</i>	<i>Drumsticks</i>	<i>Wings</i>
	<i>32 oz</i>	<i>16 oz</i>	<i>12 oz</i>	<i>4 oz</i>
<i>Percent of weight</i>		<i>0.50</i>	<i>0.375</i>	<i>0.125</i>
<i>Allocated costs</i>		<i>2*0.50=\$1</i>	<i>0.75</i>	<i>0.25</i>
<i>Profitability Analysis</i>				
<i>Sales</i>	<i>\$3.50</i>	<i>\$2.40</i>	<i>\$0.80</i>	<i>\$0.30</i>
<i>Cost beyond split-off point</i>		<i>0.8</i>	<i>0.04</i>	<i>0.16</i>
<u><i>Joint costs allocated</i></u>		<u><i>\$1</i></u>	<u><i>0.75</i></u>	<u><i>0.25</i></u>
<i>Profit (loss)</i>		<i>\$0.6</i>	<i>0.01</i>	<i>-0.11</i>

2. The management is contemplating dropping chicken wings and only producing fillets and drumsticks. Do you agree? Why or why not? (10 points)

*They should not drop the chicken wings. This is because the joint cost \$2 is incurred whether or not the wings are dropped from production. If wings are dropped, the same \$2 has to be allocated to the remaining two products: fillets and drumsticks. As we can see, now we are showing a loss for drumsticks. Should we drop drumsticks, too? This is referred to as the 'death spiral' problem. As we can see before, the total profit (from three product lines ) is \$0.5. Now it is only \$0.36. We are worse off without the wings!*

	<u><i>Total</i></u>	<u><i>Fillets</i></u>	<u><i>Drumsticks</i></u>
<i>Weight</i>	<i>28 oz</i>	<i>16 oz</i>	<i>12 oz</i>
<i>Percent of weight</i>		<i>57%=16/28</i>	<i>43%</i>
<i>Allocated costs</i>		<i>\$1.14</i>	<i>0.86</i>
<i>Profitability Analysis</i>			
<i>Sales</i>	<i>\$3.50</i>	<i>\$2.40</i>	<i>\$0.80</i>
<i>Cost beyond split-off point</i>		<i>0.8</i>	<i>0.04</i>
<u><i>Joint costs allocated</i></u>		<u><i>\$1.14</i></u>	<u><i>0.86</i></u>
<i>Profit (loss)</i>		<i>\$0.46</i>	<i>-0.10</i>

## V. Leases (25 points)

On January 1, 2001, Kruder Products, as lessee, leases a machine used in its operations. Kruder uses straight-line depreciation for all of its equipments. The annual lease payment of \$10,000 is due on Dec 31 of 2001, 2002 and 2003. The machine reverts to the lessor at the end of three years. The lessor can either sell the machine or lease it to another firm for the remainder of its expected total useful life of five years. The interest rate appropriate for Kruder Products is 12 percent annually. The market value of the machine at the inception of the lease is \$30,000.

1. Is this lease an operating lease or a capital lease? (5 points)

*This lease does not satisfy any of the criteria for a capital lease, so it is an operating lease. The leased asset reverts to the lessor at the end of the lease period. The life of the lease is less than 75% of the expected useful life of the asset. The present value of the lease payments is 24,018 ( $=10,000 \times 2.40183$ ), which is less than 90% of the market value of the asset.*

2. Assume this lease qualifies as an operating lease. What are the expenses recorded for the lease in 2001, 2002 and 2003? (5 points)

*If this is an operating lease, then the rent expense is \$10,000 per year*

3. Assume this lease qualifies as a capital lease. What are the expenses recorded for the lease in 2001? (5 points)

*The expenses include a depreciation expense and an interest expense.*

*Depreciation expense =  $24,018/3 = \$8006$*

*Interest expense =  $24,018 \times 12\% = \$2882$*

4. Which of the above methods, i.e., operating vs. capital lease results in a higher ROA (return on assets= $\text{income}/\text{average assets}$ ) in 2002? Which method results in a higher leverage (liability/shareholder's equity) in 2002? Why? (5 points)

*The total expense is \$10,000 under operating lease. Under capital lease, we need to calculate the new depreciation and interest expense for 2002. Depreciation stays the same at \$8006. Interest expense =  $16900 \times 12\% = \$2028$ . Therefore total expense is higher under capital lease. Furthermore, capital lease is going to result in higher assets in 2001 and 2002. **Therefore, ROA is higher under operating lease.** Because capital lease results in higher liability and lower shareholder's equity, **leverage is higher under capital lease.***

5. Which of the above methods, i.e., operating vs. capital lease results in a higher Cash Flow from Operations in 2001? Why? (5 points)

*Capital will result in a higher cash flow from operating activities. This is because  $\text{CFO} = \text{net income} \pm \text{adjustments}$ . Capital lease results in lower income, but the depreciation part needs to be added back so the net effect is only  $-\$2882$  vs  $-\$10,000$  for operating lease. Intuitively, the cash outflow under capital lease is split into two parts: the interest expense part goes into **CF from operating**, and the part that reduces the principal goes into **cash flow from financing** activities.*

## VI. Miscellaneous issues (20 points)

CBC Corporation is searching for ways to improve its performance. The head of marketing wants to offer larger sales discounts to repeat customers, while the head of operations wants reduce shipping and handling costs. The company's controller thinks there could also be an "accounting answer"-- his idea is to reduce the estimated life of packaging and delivery equipment in order to increase the amount of depreciation expense. He believes this would improve cash flow because depreciation expense is "added back" on the statement of cash flows.

CBC Corporation's 2002 income statement and selected balance sheet accounts appear below.

### Income Statement (selected items)

Sales	\$135,000
Cost of goods sold	(90,000)
Selling and admin.expenses (includes \$8,000 depreciation)	(25,000)
Gain on sale of equipment*	10,000
Interest expense	(5,000)
Income taxes	(5,000)
Net income	<u>\$20,000</u>

\*Equipment had an original cost of \$35,000; selling price was \$18,000.

### Balance Sheet (selected items)

	12-31-02 (Ending)	01-01-02 (Beginning)
Cash	\$14,000	\$21,000
Accounts receivable	40,000	30,000
Merchandise inventories	55,000	61,000
Prepaid expenses	5,000	8,000
Accounts payable	35,000	40,000
Deferred revenue	15,000	12,000
Other liabilities	5,000	3,000

1. Determine the accumulated depreciation on the equipment sold in 2002? (5 points)

$$\text{Selling price} - (\text{cost} - \text{accumulated depreciation}) = \text{gain on sale}$$

$$\$18,000 - (\$35,000 - x) = \$10,000; x = \$27,000$$

2. CBC deferred \$5000 of their revenue to 2003 because the merchandise has not yet been shipped although the customers already paid in cash. Does deferring the revenue result in a deferred tax asset or liability? Why? (5 points)

*This will result in Deferred Tax Asset. This is because the deferred revenue is going to cause GAAP income < IRS income, and therefore tax expense is less than tax payable.*

3. How much cash was paid to merchandise suppliers in 2002 (assume all merchandised were purchased on account)? **(5 points)**

$$61,000 + \text{New merchandise} - \text{COGS} = 55,000$$

$$\Rightarrow \text{New merchandise} = 145,000 - 61,000 = 84,000$$

$$A/P \text{ ending} = A/P \text{ beginning} + \text{new merchandise purchased on account} - \text{cash paid}$$

$$\Rightarrow 35,000 = 40,000 + 84,000 - \text{cash paid}$$

$$\Rightarrow \text{cash paid} = 89,000$$

4. Use the chart below to indicate how increasing depreciation expense would affect the financial statements. Use + for increase, - for decrease, and NE for no effect. How do you like the controller's accounting solution? **(5 points)**

Operating Cash Flow	<i>Net Income</i>	<i>Total Assets</i>	Total Liabilities	<i>Total Stock-Holders' Equity</i>
<i>NE</i>	-	-	<i>NE</i>	-

## VII. Consolidation (20 points)

The Coca Cola Company [KO] owns 44% of Coca Cola Enterprises [CCE], one of its anchor bottlers. Since its ownership percentage is lower than 50%, KO accounts for its investment in CCE using the equity method. Analysts have pointed out though that KO has a dominant influence on CCE and that to reflect the true economics of the relation between both companies, KO ought to **consolidate** CCE, rather than use the equity method.

- a) Consider the simplified balance sheets of both KO and CCE on 12/31/Y1 **on the following page**. Using the information about the ownership percentage of KO in CCE, that is 44%, consolidate CCE's accounts into KO's. Notice that we have already started the consolidation. You just need to complete the consolidated balance sheet. (*Hint*: you need to first eliminate intra-company accounts, i.e., amounts CCE owns KO or vice versa before you can carry out the consolidation).

Show all calculations. (10 points)

- *We eliminate intra-company transactions from both the amounts due and the accounts payable (6).*
- *We eliminate the investment in CCE (556).*
- *We realize that book value of equity of KO is the same whether we follow the equity method or fully consolidate.*
- *We record minority interest: 56% of the book value of CCE*
- *We record the plug: in this case a negative goodwill of 62*

## Simplified Balance Sheets (12/31/Y1)

ASSETS	<u>KO</u>	<u>CCE</u>	<u>Consolidated</u> Adjustment	
<i>Current Assets</i>				
Cash and MS	1,315	8		1,323
Accounts receivable	1,695	510		2,205
Amounts due from the Coca Cola Co.	0	6	<b>-6</b>	<b>0</b>
Inventories	1,117	225		1,342
<i>Equity method investments</i>				
Coca Cola Enterprises	556	0	<b>-556</b>	<b>0</b>
<i>PPE, net</i>	4,336	2,158		6,494
<i>Intangibles</i>	944	5,924	<b>-62</b>	<b>6,806</b>
<i>Other Assets</i>	5,078	233		5,311
<b>Total assets</b>	<b>15,041</b>	<b>9,064</b>		23,481
LIABILITIES				
<i>Current liabilities</i>				
Accounts Payable	4,425	796	<b>-6</b>	<b>5,215</b>
Notes Payable	2,923	63		2,986
<i>Non-current liabilities</i>				
Long-term debt	1,141	4,138		5,279
Other non-current liabilities	966	630		1,596
Deferred income taxes	194	2,032		2,226
<i>Minority Interest</i>	0	0	<b>787</b>	<b>787</b>
EQUITY				
Common stock	428	145	<b>-145</b>	<b>428</b>
APIC	1,291	1,116	<b>-1116</b>	<b>1,291</b>
Retained earnings	3,673	144	<b>-144</b>	<b>3,673</b>
<b>Total liabilities + equity</b>	<b>15,041</b>	<b>9,064</b>		23,481

- b) Consider now the following intra-company sales during the same fiscal year:  
 KO paid CCE \$2,424 (i.e., booked as revenue for CCE and COGS for KO)

We also have the following excerpts from the published income statements of both companies in fiscal Y1:

	<b>KO</b>	<b>CCE</b>
Sales	18,018	6,773
COGS	6,940	4,267
<b>Gross Profit</b>	<b>11,078</b>	<b>2,506</b>

The gross profit for KO is computed with CCE treated as an equity investment. Based on our information, what would have been KO's gross profit **if it had consolidated CCE rather than used the equity method? (5 points)**

*We would eliminate \$2,424 from both the revenues of CCE and the COGS of KO. Net this means that the two adjustments cancel out, so Gross Profit stays exactly the same.*

- c) CCE reports a net income of \$82 in its published income statement of fiscal Y1. KO reports a net income of \$2,986 in its published income statement of fiscal Y1, after incorporating the results of CCE using the equity method. What would be the net income of **KO** in Y1 **if it had consolidated CCE rather than used the equity method?** Explain why. **(5 points)**

*Net income is the same under both methods. Equity method reflects our stake in one line. Full consolidation spreads our stake out over all the revenue and expense items on the income statement and adjusts for the minority interest: net effect on income is therefore the same under either method.*