

BUSI 2505E - SOLUTIONS TO SUGGESTED EXERCISES

CHAPTERS 2 AND 10

Q2-8

$$\begin{aligned}
 \text{Net capital spending} &= \text{Net Fixed Assets}_{\text{end}} - \text{Net Fixed Assets}_{\text{beginning}} + \text{Depreciation} \\
 &= \$4.7M - \$4.2M + \$925K \\
 &= \mathbf{\$1.425M}
 \end{aligned}$$

Q2-10

$$\begin{aligned}
 \text{Cash flow to creditors} &= \text{Interest paid} - \text{Net new borrowing} \\
 &= \$340K - (\text{Long Term Debt}_{\text{end}} - \text{Long Term Debt}_{\text{beginning}}) \\
 &= \$340K - (\$3.1M - 2.8M) \\
 &= \mathbf{\$40K}
 \end{aligned}$$

Q2-12

using cash flow identity,

$$\left(\begin{array}{c} \text{Cash flow} \\ \text{from assets} \end{array} \right) = \left(\begin{array}{c} \text{Cash flow} \\ \text{to creditors} \end{array} \right) + \left(\begin{array}{c} \text{Cash flow to} \\ \text{stockholders} \end{array} \right) = \$40K - 235K = -\$195K$$

but also

$$\left(\begin{array}{c} \text{Cash flow} \\ \text{from assets} \end{array} \right) = \text{OCF} - \left(\begin{array}{c} \text{Change} \\ \text{in NWC} \end{array} \right) - \left(\begin{array}{c} \text{Net capital} \\ \text{spending} \end{array} \right) = \text{OCF} - (-\$165K) - 760K = -\$195K$$

therefore

$$\text{OCF} = -\$195K - \$165K + \$760K = \mathbf{\$400K}$$

Q2-18

(a)

Income Statement

Sales	850,000
COGS	630,000
A&S expenses	120,000
Depreciation	130,000
EBIT	(30,000)
Interest	85,000
Taxable income	(115,000)
Taxes (35%)	0
Net income	(115,000)

(b)

$$\text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes} = (-\$30,000) + 130,000 - 0 = \mathbf{\$100,000}$$

(c)

Net income was negative because of the tax deductibility of depreciation and interest expense. However, the actual cash flow from operations was positive because depreciation is a non-cash expense and interest is a financing expense, not an operating expense.

Q2-20

(a)

Income Statement	
Sales	12,800
COGS	10,400
S&A expenses	0
Depreciation	1,900
EBIT	500
Interest	450
Taxable income	50
Taxes (40%)	20
Net income	30

(b)

$$\text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes} = \$500 + \$1,900 - \$20 = \mathbf{\$2,380}$$

(c)

$$\begin{aligned} \left(\begin{array}{c} \text{Cash flow} \\ \text{from assets} \end{array} \right) &= \text{OCF} - \left(\begin{array}{c} \text{Change in} \\ \text{NWC} \end{array} \right) - \left(\begin{array}{c} \text{Net Capital} \\ \text{spending} \end{array} \right) \\ &= \$2,380 - \$350 - \$2,500 \\ &= \mathbf{-\$470} \end{aligned}$$

(d)

$$\begin{aligned} \left(\begin{array}{c} \text{Cash Flow to} \\ \text{Creditors} \end{array} \right) &= \left(\begin{array}{c} \text{Interest} \\ \text{paid} \end{array} \right) - \left(\begin{array}{c} \text{Net new} \\ \text{borrowing} \end{array} \right) = \mathbf{\$450} \\ \left(\begin{array}{c} \text{Cash flow to} \\ \text{shareholders} \end{array} \right) &= \left(\begin{array}{c} \text{Dividends} \\ \text{paid} \end{array} \right) - \left(\begin{array}{c} \text{Net new} \\ \text{equity} \end{array} \right) = \mathbf{\$500} \end{aligned}$$

$$\text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes} = \$1,891 + \$578 - \$632.80 = \$1,836.20$$

$$\begin{aligned} \text{Change in NWC} &= \text{NWC}_{\text{end}} - \text{NWC}_{\text{beginning}} \\ &= (\text{CA} - \text{CL})_{\text{end}} - (\text{CA} - \text{CL})_{\text{beginning}} \\ &= (\$10,393 - \$2,528) - (\$9,855 - \$2,620) \\ &= \$7,865 - \$7,235 \\ &= \$630 \end{aligned}$$

$$\begin{aligned} \left(\begin{array}{c} \text{Net capital} \\ \text{spending} \end{array} \right) &= \left(\begin{array}{c} \text{Net Fixed} \\ \text{Assets} \end{array} \right)_{\text{end}} - \left(\begin{array}{c} \text{Net Fixed} \\ \text{Assets} \end{array} \right)_{\text{beginning}} + (\text{Depreciation}) \\ &= \$18,091 - \$17,669 + \$578 \\ &= \$1,000 \end{aligned}$$

$$\begin{aligned} \left(\begin{array}{c} \text{Cash flow} \\ \text{from assets} \end{array} \right) &= (\text{OCF}) - \left(\begin{array}{c} \text{Change in} \\ \text{NWC} \end{array} \right) - \left(\begin{array}{c} \text{Net Capital} \\ \text{spending} \end{array} \right) \\ &= \$1,836.20 - \$630 - \$1,000 \\ &= \mathbf{\$206.20} \end{aligned}$$

$$\begin{aligned} \left(\begin{array}{c} \text{Cash flow} \\ \text{to creditors} \end{array} \right) &= (\text{Interest}) - \left(\begin{array}{c} \text{Net new Long} \\ \text{Term Debt (LTD)} \end{array} \right) \\ &= (\text{Interest}) - (\text{LTD}_{\text{end}} - \text{LTD}_{\text{beginning}}) \\ &= \$309 - (\$8,232 - \$7,056) \\ &= \mathbf{-\$867} \end{aligned}$$

$$\begin{aligned} (\text{Net new equity}) &= (\text{Common stock})_{\text{end}} - (\text{Common stock})_{\text{beginning}} \\ \text{Common stock} + \text{Retained earnings (RE)} &= \text{Total owners equity (OE)} \end{aligned}$$

$$\begin{aligned} (\text{Net new equity}) &= (\text{OE} - \text{RE})_{\text{end}} - (\text{OE} - \text{RE})_{\text{beginning}} \\ &= \text{OE}_{\text{end}} - \text{OE}_{\text{beginning}} + \text{RE}_{\text{beginning}} - \text{RE}_{\text{end}} \end{aligned}$$

$$\text{RE}_{\text{end}} = \text{RE}_{\text{beginning}} + \text{Additions to RE}$$

therefore

$$\begin{aligned} \text{Net new equity} &= \text{OE}_{\text{end}} - \text{OE}_{\text{beginning}} + \cancel{\text{RE}_{\text{beginning}}} - (\cancel{\text{RE}_{\text{beginning}}} + \text{Additions to RE}) \\ &= \text{OE}_{\text{end}} - \text{OE}_{\text{beginning}} - (\text{Additions to RE}) \\ &= \$17,724 - \$17,848 - \$410.20 \\ &= \mathbf{-\$534.20} \end{aligned}$$

$$\left(\begin{array}{l} \text{Cash flow to} \\ \text{stockholders} \end{array} \right) = \text{Dividends} - \left(\begin{array}{l} \text{Net new} \\ \text{equity} \end{array} \right) = \$539 - (-\$534.20) = \mathbf{\$1,073.20}$$

As a check, cash flow from assets is \$206.20:

$$\left(\begin{array}{l} \text{Cash flow} \\ \text{from assets} \end{array} \right) = \left(\begin{array}{l} \text{Cash flow to} \\ \text{creditors} \end{array} \right) + \left(\begin{array}{l} \text{Cash flow to} \\ \text{stockholders} \end{array} \right) = -\$867 + \$1,073.20 = \$206.20$$

Q2-30

NOTE: answers in textbook on page 812 are wrong by a factor of 10.

Year	Beginning UCC	20% CCA	Ending UCC
1	\$500,000 ^(*)	\$100,000	\$400,000
2	\$900,000	\$180,000	\$720,000
3	\$720,000	\$144,000	\$576,000
4	\$576,000	\$115,200	\$460,800
5	\$460,800	\$92,160	\$368,640

note: (*) 50% of \$1,000,000 to incorporate the half-year rule.

Q2-32

CCA on equipment

Year	Beginning UCC	20% CCA	Ending UCC
2005	\$2,100,000*	\$420,000	\$1,680,000
2006	\$3,780,000	\$756,000	\$3,024,000

note: (*) 50% of \$4,200,000 (includes the installation cost) to incorporate the half-year rule.

CCA on building

Year	Beginning UCC	5% CCA	Ending UCC
2005	\$2,000,000*	\$100,000	\$1,900,000
2006	\$3,900,000	\$195,000	\$3,705,000

note: (*) 50% of \$4,000,000

$$\text{CCA for 2005} = \$420,000 + \$100,000 = \mathbf{\$520,000}$$

$$\text{CCA for 2006} = \$756,000 + \$195,000 = \mathbf{\$951,000}$$

Q2-36

(a)

$$UCC_0 = \$99,200 \cdot (1/2) = \$49,600$$

$$CCA_1 = \$14,880$$

$$UCC_1 = \$84,320$$

$$UCC_5 = \$84,320(1 - .30)^4 = \mathbf{\$20,245.23}$$

(b) Since the asset has no value and the asset pool remains open, there are no tax consequences.

Q10-2

Sales due solely to the new product line are:

$$21,000(\$12,000) = \$252,000,000$$

Increased sales of the motor home line occur because of the new product line introduction; thus:

$$5,000(\$45,000) = \$225,000,000$$

in new sales is relevant. Erosion of luxury motor coach sales is also due to the new mid-size campers; thus:

$$1,300(\$85,000) = \$110,500,000$$

loss in sales is relevant. The net sales figure to use in evaluating the new line is thus:

$$\$252,000,000 + 225,000,000 - 110,500,000 = \mathbf{\$366,500,000}$$

Q10-4

To find the OCF, we need to complete the income statement as follows:

Sales	\$912,400
Costs	593,600
Depreciation	135,000
EBT	\$183,800
Taxes (34%)	62,492
Net income	\$121,308

The OCF for the company is:

$$OCF = EBIT + Depreciation - Taxes = \$183,800 + 135,000 - 62,492 = \mathbf{\$256,308}$$

The depreciation tax shield is the depreciation times the tax rate, so:

$$\text{Depreciation tax shield} = T_c \cdot \text{Depreciation} = .34(\$135,000) = \mathbf{\$45,900}$$

The depreciation tax shield shows us the increase in OCF by being able to expense depreciation.

Q10-6

Sales	\$ 900,000
Variable costs	468,000
Fixed costs	190,000
CCA	112,000
EBIT	\$ 130,000
Taxes (39%)	50,700
Net income	\$ 79,300

Q10-12

A/R fell by \$5,000, and inventory increased by \$2,605, so net current assets fell by \$2,395. A/P rose by \$4,100.

$$\Delta NWC = \Delta(CA - CL) = -2,395 - 4,100 = -6,495$$

$$\text{Net cash flow} = \text{Sales} - \text{Cost} - \Delta NWC = 67,000 - 28,500 - (-6,495) = \mathbf{\$44,995}$$

Q10-16

After-tax net revenue year 0

$$-625,000 - 160,000 = -\$785,000$$

After-tax net revenue years 1 through 5

$$(8,400,000 - 6,000,000 - 205,000)(1 - .38) = \$1,360,900$$

Ending cash flows (year 5) is \$160,000.

Present Value of CCA Tax Shield (note salvage value S_n is zero so second term of formula is zero)

$$PVCCATS = \frac{625,000(.25)(.38)}{.17 + .25} \cdot \frac{1 + .5(.17)}{1 + .17} = \$131,099$$

year	cash flow
0	-785,000
1	1,360,900
2	1,360,900
3	1,360,900
4	1,360,900
5	1,360,900 + 160,000=1,520,900

Therefore, using CF feature of BA II Plus calculator,

$$CF_0 = -785,000; C01 = 1,360,900; F01 = 4; C02 = 1,520,900; I = 17;$$

$$NPV \text{ CPT } = 3,641,968 + 131,099 = \mathbf{\$3,773,067}$$

Since the NPV is positive, it is a good project.

Q10-20

Currently the firm has sales of

$$18,000(\$12,500) + (36,700)(\$42,600) = \$1,788,420,000$$

With the introduction of a new mid-sized car its sales will change by

$$(24,500)(\$31,500) + (9,000)(\$12,500) - (7,500)(\$42,600) = \mathbf{\$564,750,000}$$

This amount is the incremental sales and is the amount that should be considered when evaluating the project.

Q10-26

According to the top down approach:

$$\begin{aligned} OCF &= (S - C) - (S - C - D) \times T \\ &= (\$400,000 - \$305,000) - (\$400,000 - \$305,000 - \$25,000) \times 0.36 \\ &= \mathbf{\$69,800} \end{aligned}$$

According to the tax shield approach:

$$\begin{aligned} OCF &= (S - C)(1 - T) + TD \\ &= (\$400,000 - \$305,000) \times (1 - 0.36) + 0.36 \times \$25,000 \\ &= \mathbf{\$69,800} \end{aligned}$$

Q10-34

$$PVCCATS = \frac{450,000(.2)(.36)}{.2 + .36} \cdot \frac{1 + .5(.18)}{1 + .18} - \frac{(75,000)(.2)(.36)}{(.2 + .36)(1 + .18)^4} = \$71,430.40$$

$$\text{Annual after-tax savings} = \$150,000(1 - .36) = \$96,000$$

In each year there is any additional cash outflow of \$2,000 to finance inventory costs. At the end of the project, there is a recovery of the initial and annual outflows of $\$22,000 + 4(\$2,000) = \$30,000$.

year	cash flow
0	-450,000-22,000=-472,000
1	96,000-2,000=94,000
2	96,000-2,000=94,000
3	96,000-2,000=94,000
4	96,000-2,000+75,000+30,000=199,000

Therefore, using $\boxed{\text{CF}}$ feature of BA II Plus calculator,

$$CF_0 = -472,000; C01 = 94,000; F01 = 3; C02 = 199,000; I = 18;$$

$$NPV \boxed{\text{CPT}} = -164,980 + 71,430.40 = \mathbf{-\$93,546}$$

Since the NPV is negative, we should reject this project.

Q10-36

New excavator costs are \$700,000 but 1st yr savings $SV_0 = \$35,000$. Therefore $\Delta CF_0 = -\$665,000$. $\Delta(\text{After-tax operating revenues}) = \$65,000(1 - .39) = 39,650$ and $\Delta SV_{10} = 115,000 - 5,000 = \$110,000$.

$$\text{PV of CCATS} = \frac{700,000(.25)(.39)}{.14 + .25} \frac{1 + .5(.14)}{1 + .14} - \frac{(110,000)(.25)(.4)}{.14 + .25} \frac{1}{1.14^{10}} = \$148,623.71$$

year	cash flow
0	-665,000
1-9	39,650
10	39,650+110,000=149,650

$$CF_0 = -665,000; C01 = 39,650; F01 = 9; C02 = 149,650; I = 14;$$

$$\text{NPV [CPT]} = -428,509 + 148,623.71 = \mathbf{-\$279,885}$$

We should not replace the existing excavator.

Q10-50

NOTE: don't expect a problem this long on a quiz/midterm/exam, but maybe a scaled down version with the same features, say with only 1-2 years.

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Units per year		95,000	105,000	105,000	112,000	62,500
Price per unit		360	360	360	360	360
Variable cost per unit		240	240	240	240	240
Sales		34,200,000	37,800,000	37,800,000	40,320,000	22,500,000
Less: Variable Costs		22,800,000	25,200,000	25,200,000	26,880,000	15,000,000
Less: Fixed Costs		160,000	160,000	160,000	160,000	160,000
Taxable Income		11,240,000	12,440,000	12,440,000	13,280,000	7,340,000
Less: Taxes		4,496,000	4,976,000	4,976,000	5,312,000	2,936,000
Net Income		6,744,000	7,464,000	7,464,000	7,968,000	4,404,000
Change in NWC	-600,000	-1,260,000	0	-882,000	0	2,742,000
Capital Spending	-16,700,000	0	0	0	0	4,175,000
PVCCATS	2,599,908	-	-	-	-	-
Total Cash Flow	-14,700,092	5,484,000	7,464,000	6,582,000	7,968,000	11,321,000

$$CF_0 = -14,700,092; C01 = 5,484,000; F01 = 1; C02 = 7,464,000; F02 = 1;$$

$$C03 = 6,582,000; F03 = 1; C04 = 7,968,000; F04 = 1; C05 = 11,321,000; F05 = 1;$$

$$I = 22; \text{NPV [CPT]} = \mathbf{\$6,220,033}; \text{IRR [CPT]} = \mathbf{38.55\%}.$$