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ÉCOLE DE GESTION
SCHOOL OF MANAGEMENT



LIÉE *au* LINKED *with* LEADERSHIP

ADM 2350
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Final Examination
Version #1 Solutions

Name: _____
Student ID #: _____

Section M Prof. Tassé (Tues. 8:30 AM – 10:00 AM & Fri. 10:00 AM – 11:30 AM)
Section N Prof. Rentz (Mon. 1:00 PM – 2:30 PM & Wed. 11:30 AM – 1:00 PM)
Section P Prof. Rentz (Mon. 10:00 AM – 11:30 AM & Wed. 8:30 AM – 10:00 AM)
Section Q Prof. McIlkenny (Tues. 7:00 PM – 10:00 PM)

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Statement to be signed by the student:

I have read the text on academic integrity and I pledge not to have committed or attempted to commit academic fraud in this examination.

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General Instructions:

1. Please **CIRCLE YOUR SECTION** and **SIGN** the academic integrity statement above.
2. There are **SIXTEEN** pages and **THREE** parts to this exam.
3. Please put your **Name and Student ID# on ALL SIXTEEN pages**.
4. This is an **open book and open notes exam**. Notes are **any handwritten or printed materials**, including but not limited to, previous assignments, quizzes, and exams plus their solution sets.
5. The use of **scientific and financial calculators is encouraged**.
6. **Laptop computers or any other devices that can be used for communication are NOT permitted**.
7. Please **do NOT take apart the pages** of this exam.
8. You have **3 hours** to work this exam. In order to finish this exam, **it is highly recommended that students allocate no more than 40 minutes to Part I, 80 minutes to Part II, and 30 minutes to Part III. This will permit the student to have 30 minutes to review the work.**
9. **GOOD LUCK!**

Part I: (40 minutes) There are **FOURTEEN QUESTIONS** in this part of the exam. Each question counts 1 mark. Choose the one answer that **BEST** answers each question. No credit is given for a wrong answer, an omitted answer, or more than one answer to a question.

1. Which of the following securities is a marketable financial asset.
 - a. Canada savings bonds.
 - b. Treasury bills.**
 - c. Guaranteed investment certificates
 - d. Daily interest savings accounts.
 - e. All of the above.
 - f. Both a. and b. above.

2. The primary goal of the financial manager should be to:
 - a. Provide a stable dividend payout ratio.
 - b. Maximize the share price.**
 - c. Maximize earnings per share.
 - d. Minimize losses.
 - e. All of the above.
 - f. None of the above.

3. Annuity **DUE** calculations are especially important when dealing with
 - a. Insurance premiums.
 - b. Mortgages.
 - c. Lease contracts.
 - d. Term loans.
 - e. Both a. and c. above.**
 - f. Both b. and d. above.

4. Which of the following statements is (are) **FALSE** about a zero coupon bond?
 - a. Is structured similar to a long-term T-bill.
 - b. Has a duration that is **GREATER** than the term to maturity.
 - c. Is **LESS** sensitive to interest rates changes than a coupon bond with the same term to maturity.
 - d. Both a. and b. above.
 - e. Both b. and c. above.**
 - f. Both a. and c. above.

5. Which of the following is (are) workable assumption(s) for the valuation model, $P_0 = D_1 / (k_e - g)$ if it is to give the total present value?
 - a. Growth is **NEGATIVE**.
 - b. There will be **NO** growth.
 - c. The growth rate will **EXCEED** the required return.
 - d. The required return is **LOW** (8%).
 - e. Answers b., c., and d. are workable assumptions.
 - f. Answers a., b., and d. are workable assumptions.**

6. Which of the following statements is (are) **TRUE** concerning the arithmetic mean (**AM**) and geometric mean (**GM**)?
- a. The **AM** is **ALWAYS GREATER THAN** or **EQUAL** to the **GM**.
 - b. The **AM** usually provides a better estimate of **SHORT-RUN** investment performance than the **GM**.
 - c. The **GM** usually provides a better estimate of **LONG-RUN** investment performance than the **AM**.
 - d. All of the above.**
 - e. None of the above.
 - f. Both b. and c. above.
7. Which of the following are difficulties concerning beta and its estimation?
- a. During a period of transition of beta, the calculated beta **MAY** be drastically different than the true beta.
 - b. The beta of an "average stock," or "the market," changes over time.
 - c. A security or project may **NOT** have a past history as a basis for calculating beta.
 - d. Both a. and b. above.
 - e. Both b. and c. above.
 - f. Both a. and c. above.**
8. Clark Kent, Chief Investment Officer of Super Performance Hedge Fund, has the fund buy 10,000 shares of Boston Software immediately after Boston announces quarterly performance results that exceed consensus financial analyst expectations. Kent sells the shares the next day for a profit of \$1 million.
- a. This outcome **CONTRADICTS** the **Weak** Form of the Efficient Markets Hypothesis.
 - b. This outcome **CONTRADICTS** the **Semi-Strong** Form of the Efficient Markets Hypothesis.
 - c. This outcome **CONTRADICTS** the **Strong** Form of the Efficient Markets Hypothesis.
 - d. Both a. and b. above.
 - e. Both b. and c. above.**
 - f. Both a. and c. above.
9. Multiple positive internal rates of return may occur when there is (are):
- a. Large abandonment costs at the end of a project's life.
 - b. A major shutdown and rebuilding of a facility sometime during its life.
 - c. A normal project has an extremely large initial outlay of \$1 billion or more.
 - d. Both a. and b. above.**
 - e. Both b. and c. above.
 - f. Both a. and c. above.
10. Which of the following activities is (are) **NOT** an example(s) of the erosion or cannibalization effect?
- a. Minto includes the impact of a new apartment building on the rents from its existing buildings.
 - b. Honda Motors invests in a flexible production line to permit rapid change of model production.
 - c. Goldcorp temporarily shuts down a mine because the unit variable cost exceeds the price of gold.
 - d. In the NPV calculation of its Fusion project, Gillette includes the impact on its Mach 3 product.
 - e. Both a. and d. above.
 - f. Both b. and c. above.**

11. Which of the following is (are) an example(s) of an agency cost or problem.
- The bonuses for factory workers are based on the profitability of the firm.
 - During periods of financial distress, there can be a growing divergence between the interests of equity holders and debt holders.
 - AIG sells credit default swaps on GM bonds, declares the entire premiums received as profit, and pays bonuses to executives based on this profit.
 - Stock options for the chief executive officer.
 - All of the above are examples of an agency cost or problem.**
 - All of the above are examples of an agency cost or problem **EXCEPT** for a.
12. Which of the following statement(s) about a **PROJECT'S** cost of capital is (are) **TRUE**?
- It is the appropriate discount rate to use to calculate the NPV of a project.
 - It is the appropriate hurdle rate to use for the IRR method for a project.
 - It is equal to the firm's weighted average cost of capital when the project is of average risk.
 - It is used in calculating the profitability index for a project.
 - All of the above are TRUE.**
 - Only a., b., and d. above are **TRUE**.
13. Firms choose to finance current assets with short-term debt because
- The yield curve has traditionally been **UPWARD** sloping.
 - SHORT-TERM** interest rates have traditionally been more stable than **LONG-TERM** interest rates.
 - A firm that borrows heavily **LONG-TERM** is more apt to be unable to repay the debt than the firm that borrows heavily **SHORT-TERM**.
 - Matching the maturities of assets and liabilities **REDUCES** risk.
 - Sales remain constant over the year, and financing requirements also remain constant.
 - Both a. and d. above.**
14. A credit manager is maximizing shareholder wealth:
- If the firm **NEVER** has any bad debt loss.
 - Carefully analyzes the costs and benefits of extending credit to different risk classes of customers.
 - Closely monitors any changes in the payment patterns of customers
 - Both a. and b. above.
 - Both b. and c. above.**
 - Both a. and c. above.

Part II: (80 minutes) There are **EIGHT multiple-choice problems** in this part. Each question counts 2 marks for a total of 16 marks for this part. **To receive credit for each of the eight problems, you must show your work.**

15. Blue Brick (BB) just paid a dividend D_0 of \$1,000.00. In seven years BB expects to pay a dividend D_7 of \$1,605.78. **To the nearest 1/100 of a percent (i.e. x.xx%),** what is the compound rate of growth expected for BB's dividends?

- a. 5%
- b. 7%**
- c. 11%
- d. 10%
- e. 9%
- f. 8%
- g. None of the above is correct.

Scientific Calculator Approach:

$$\$1,000 \times (1 + g)^7 = \$1,605.78 \Rightarrow 1 + g = \left[\frac{\$1,605.78}{\$1,000} \right]^{1/7} \Rightarrow g = 0.0700 \text{ or } 7.00\%$$

Scientific Calculator Marking Scheme:

- ½ mark for correct original expression for growth rate
- ½ mark for correct expression solving for the growth rate
- ½ mark for correctly substituting into the growth rate expression
- ½ mark for correctly calculating the growth rate

Financial Calculator Approach:

$$P/Y = C/Y = 1, N = 7, PV = -1,000, PMT = 0, FV = 1,605.78, CPT I/Y = 7.00$$

Financial Calculator Marking Scheme:

- ½ mark for recognizing that compound growth is equivalent to compound interest
- ½ mark for $P/Y = C/Y = 1$ and $N = 7$
- ½ mark for recognizing that PV and FV must have opposite signs
- ½ mark for correctly calculating the growth rate

16. What is the present value of a monthly perpetuity if payments of \$240 occur at the **BEGINNING** of every month and the nominal annual interest rate is 24% with monthly compounding.

- a. \$1,000
- b. \$1,240
- c. \$24,000
- d. \$24,240
- e. \$12,240**
- f. \$12,000
- g. None of the above.

PV of perpetuity = (periodic payment)/(effective periodic interest rate)

Effective periodic interest rate = $24\%/12 = 2\%$

PV of perpetuity = $\$240/0.02 = \$12,000$

We are asked, however, to find the PV of a perpetuity due. In the case of a perpetuity we can simply add the “extra” payment.

PV of perpetuity due = PV of perpetuity + “extra” payment @ $t = 0 = \$12,000 + \$240 = \$12,240$

Alternatively, one can find the PV of a perpetuity due in the same fashion as the PV of an annuity due.

PV of perpetuity due = $(1 + \text{effective periodic interest rate}) \times \text{PV of perpetuity} = 1.02 \times \$12,000 = \$12,240$

Marking Scheme:

½ mark for correct calculation of effective periodic interest rate

½ mark for correct calculation of PV of perpetuity

½ mark for correct formulation of PV of perpetuity due

½ mark for correct calculation of PV of perpetuity due

17. A firm borrows \$10,000 under a five-year loan agreement at an interest rate of 10 percent. The repayment schedule calls for 5 annual repayments, the first occurring at the end of the first year. All payments will be equal **except** that the last payment may vary slightly to **exactly** amortize the loan. **To the nearest penny**, what is the **OUTSTANDING BALANCE** of the loan after the second year payment is made?
- a. \$8,362.03
 - b. \$4,724.06
 - c. \$2,637.97
 - d. \$1,801.77
 - e. \$6,560.26**
 - f. \$7,362.03
 - g. None of the above.

Scientific Calculator Approach:

$$\text{Loan payment} = (\text{Amt. borrowed}) / \text{PVIFA}_{i,n} = \$10,000 / \text{PVIFA}_{10\%,5} = \$10,000 / 3.790786769 = \$2,637.97$$

Period	Total Payment	Interest Payment	Principal Payment	Outstanding Balance
				\$10,000.00
1	\$2,637.97	\$1,000.00	\$1,637.97	\$ 8,362.03
2	\$2,637.97	\$ 836.20	\$1,801.77	\$ 6,560.26

Financial Calculator:

Set calculator in **END** mode, P/Y = C/Y = 1, N = 5, I/Y = 10%, PV = \$10,000, FV = 0, and then CPT PMT = - \$2,637.97. Then go [2nd] [Amort] to enter the amortization schedule. One can skip the first year by entering P1 = P2 = 2 and finding BAL = -\$6,560.26.

- ½ mark for correctly setting up the loan calculation
- ½ mark for correctly calculating the loan payment
- ½ mark for correctly setting up the loan amortization schedule
- ½ mark for correctly calculating the outstanding balance at the end of year 2

18. Barry's Metal Works, Inc., has an annual pay bond issue outstanding with a coupon rate of 8%, a maturity value of \$1,000, and a term to maturity of 10 years. **To the nearest penny**, what is the most that an investor would be willing to pay today for this bond if the investor wants to earn at least an 10% yield to maturity?
- a. \$1,201.30
 - b. \$1,000.00
 - c. \$1,053.35
 - d. \$870.10
 - e. \$948.54
 - f. \$877.11**
 - g. None of the above.

Scientific Calculator Approach:

$$B = I \times PVIFA_{k_d, n} + F \times PVIF_{k_d, n} = \$80 \times PVIFA_{10\%, 10} + \$1,000 \times PVIF_{10\%, 10}$$

$$B = \$80 \times 6.144567106 + \$1,000 \times 0.385543289 = \$491.57 + \$385.54 = \$877.11$$

Scientific Calculator Marking Scheme:

- ½ mark for correct expression for bond valuation
- ½ mark for correctly substituting for interest payments annuity
- ½ mark for correctly substituting for PV of face value
- ½ mark for correct calculation of bond value

Financial Calculator Approach:

Set P/Y = C/Y = 1, N = 10, I/Y = 10, PMT = 80, FV = 1,000 and CPT PV = - 877.11.

Financial Calculator Marking Scheme:

- ½ mark for P/Y = C/Y = 1 and N = 10
- ½ mark for I/Y = 10
- ½ mark for PMT = 80 and FV = 1000
- ½ mark for bond value = - 877.11

ADDITIONAL SPACE PROVIDED FOR PROBLEM 18

19. The Dwindling Reserves Oil Company (DROC) expects to pay a \$12 per share dividend for fiscal 2012 and a \$14.40 dividend for fiscal 2013. Thereafter, dividends are expected to **DECLINE** by 5% per year thereafter. If investor's require a 20% rate of return, what is a fair market price per share **to the nearest penny** for DROC's stock at the **BEGINNING** of fiscal 2012.

- a. \$20.00
- b. \$13.68
- c. \$54.72
- d. \$38.00
- e. \$58.00**
- f. Cannot compute this price with the information that is given.
- g. None of the above.

For this particular problem, both the fiscal 2012 dividend and the fiscal 2013 dividend have the same PV of \$10. The price P_2 is calculated as follows:

$$P_2 = \frac{D_3}{k_C - g} = \frac{\$14.40 \times (1 - 0.05)}{0.20 - (-0.05)} = \frac{\$13.68}{0.25} = \$54.72$$

The price P_0 is calculated as follows:

$$P_0 = \frac{D_1}{(1+k_C)} + \frac{D_2}{(1+k_C)^2} + \frac{P_2}{(1+k_C)^2} = 2 \times \$10 + \frac{\$54.72}{1.20^2} = \$20 + \$38 = \$58$$

An even simpler calculation is to start the steady state growth with the fiscal 2013 dividend as every dividend thereafter declines by 5%.

$$P_1 = \frac{D_2}{k_C - g} = \frac{\$14.40}{0.20 - (-0.05)} = \frac{\$14.40}{0.25} = \$57.60$$

$$P_0 = \frac{D_1 + P_2}{(1+k_C)} = \frac{\$12 + \$57.60}{1.20} = \frac{\$69.60}{1.20} = \$58$$

Marking Scheme:

- ½ mark for correct expression for P_2 or P_1
- ½ mark for correct value for P_2 or P_1
- ½ mark for correct expression for PV of dividends
- ½ mark for correct value for P_0

20. Harry's Law is considering extending its legal practice into family law. In talking to colleagues at other law firms, Harry determines that most of these firms have purchased specialized software such as DIVORCEmate™. Harry's account tells her that software must be placed in CCA Class 12 with a 100% CCA rate that is subject to the ½ year convention required by law. The estimated life of the DIVORCEmate™ software is two years. Then the software will be worthless due to forthcoming changes in family law. Harry estimates that the software will save the practice \$156.75 in labour costs **BEFORE** taxes for each client processed. Harry's cost of capital is 10%, and Harry's marginal income tax rate is 40%. What is the break even number of clients that must be served in **EACH** year for two years to justify purchasing the software if the software costs \$100,000?

- a. 400
- b. 500
- c. 600
- d. 100
- e. 200
- f. 300
- g. None of the above

NPV = 0 = PV of after-tax operating income + PV of CCA tax shields – CF₀

$$PV \text{ operating income} = N \times \$156.75 \times (1 - 0.40) \times PVIFA_{10\%,2}$$

$$PV \text{ operating income} = N \times \$156.75 \times 0.60 \times 1.73553719 = N \times \$163.23$$

Using the cash flow analysis approach, a 100% CCA rate subject to the ½ year convention is identical to straight-line depreciation over 2 years. Since the asset is fully depreciated over 2 years and there is no salvage value, the PV of CCA tax shields is simply the following:

$$PV \text{ CCA tax shields} = \frac{T \times C_0}{2} \times PVIFA_{10\%,2} = \frac{0.40 \times \$100,000}{2} \times 1.73553719 = \$34,710.74$$

Using Step 2A of the CCA formula method would give an identical result.

$$PV \text{ CCA tax shields} = \left[\frac{1 + 0.5k}{1 + k} \right] \left[\frac{TdC_0}{k + d} \right] = \left[\frac{1.05}{1.10} \right] \left[\frac{0.40 \times 1.00 \times \$100,000}{0.10 + 1.00} \right] = \$34,710.74$$

Putting this all together, we have the following:

$$0 = N \times \$163.23 + \$34,710.74 - \$100,000 \rightarrow N = (\$100,000 - \$34,710.74) / \$163.23 = 399.98 \approx 400$$

Marking Scheme:

½ mark for correct expression for PV of after-tax operating income

½ mark for correct value for PV of CCA tax shields

½ mark for correct realizing that NPV must equal zero

½ mark for correct value for N

ADDITIONAL SPACE PROVIDED FOR PROBLEM 20

21. Gamma Products maintains a capital structure of 25 percent debt and 75 percent common equity. To finance its capital budget for next year, the firm will sell \$80 million of 12 percent debentures at par and finance the balance of its \$320 million capital budget with additions to retained earnings. Gamma expects dividends D_1 at the **END** of fiscal 2012 to be \$2.00 per share and to grow at 6 percent per year for the foreseeable future. The current market price P_0 of a Gamma share at the **BEGINNING** of fiscal 2012 is \$20. The firm has a marginal tax rate of 40 percent. To the nearest 1/10 of a percent (i.e. x.x%), what is its weighted average cost of capital for the coming year?
- a. 1.8%
 - b. 7.2%
 - c. 3.0%
 - d. 13.8%**
 - e. 16.0%
 - f. 15.0%
 - g. None of the above.

$$k_i = k_d(1 - T) = 12\%(1 - 0.40) = 7.2\%$$

$$k_c = \frac{D_1}{P_0} + g = \frac{\$2.00}{\$20} + 0.06 = 0.16 \text{ or } 16\%$$

$$k_a = \left(\frac{D}{V}\right)k_i + \left(\frac{S}{V}\right)k_c = (0.25)(7.2\%) + (0.75)(16\%) = 1.8\% + 12\% = 13.8\%$$

Marking Scheme:

- ½ mark for correct value for after-tax cost of debt
- ½ mark for correct value for cost of equity
- ½ mark for correct weighted average cost of capital expression
- ½ mark for everything correct

22. Databank Electronics expects sales this year of \$40 million under its current credit policy. The present terms are net 30; the ACP is 50 days; and the bad debt loss percentage is 4%. The firm is considering a proposal that the credit period be shortened to 20 days. This change would reduce expected sales by \$2 million, but shorten the collection period on the remaining sales to 30 days. Expected bad debt losses on remaining sales would fall to 3%. The variable cost percentage is 60%, and any funds released can earn a pre-tax rate of 10% elsewhere in the firm. Collection expenses under the existing policy are \$2 million and will drop to \$1.8 million under the new policy. Investment in inventories will drop from \$5 million to \$4 million. No discounts are offered under either policy. What are the proposal's incremental pre-tax profits **to the nearest ten thousand dollars**?

- a. \$800,000
- b. \$1,000,000
- c. \$460,000
- d. \$240,000
- e. **\$200,000**
- f. Cannot determine from the information provided.
- g. None of the above.

$BD_0 = (0.04)(\$40M) = \$1,600,000$
 $BD_1 = (0.03)(\$38M) = \$1,140,000$
 $\text{Cost of carrying receivables}_0 = (0.10)(50)(\$40M/365) = \$547,945$
 $\text{Cost of carrying receivables}_1 = (0.10)(30)(\$38M/365) = \$312,329$

	Old Policy	New Policy	Incremental Policy
Sales	\$40,000,000	\$38,000,000	-\$2,000,000
Less: CGS	<u>24,000,000</u>	<u>22,800,000</u>	- 1,200,000
Π BT & CC	\$16,000,000	\$15,200,000	-\$ 800,000
Discounts	\$ 0	\$ 0	\$ 0
Bad Debts	1,600,000	1,140,000	- 460,000
Collection Expen.	2,000,000	1,800,000	- 200,000
Rec. Carry Costs	547,945	312,329	- 235,616
Inv. Carry Costs	<u>500,000</u>	<u>400,000</u>	- 100,000
Credit Costs	\$ 4,647,945	\$ 3,652,329	-\$ 995,616
Π BT & CC	\$16,000,000	\$15,200,000	-\$ 800,000
Less: Credit Costs	<u>\$ 4,647,945</u>	<u>\$ 3,652,329</u>	- 995,616
Π Before Taxes	\$11,352,055	\$11,547,671	\$ 195,616

Increase in Π before Taxes = \$11,547,671 - \$11,352,055 = \$195,616 ≈ \$200,000

Marking Scheme:

- ¼ mark for correctly calculating cost of goods sold
- ¼ mark for correctly calculating profits before taxes and carrying costs
- ¼ mark for correctly calculating bad debt losses
- ¼ mark for correctly calculating collection expenses
- ¼ mark for correctly calculating cost of carrying receivables
- ¼ mark for correctly calculating cost of carrying inventories
- ¼ mark for correctly calculating total credit costs
- ¼ mark for correctly calculating the increase in profits before taxes

Part III: (½ hour) There is **ONE multiple-choice problem** in this part of the exam. This problem counts 10 marks. **To receive credit for this problem, you must show your work.**

23. M&M, Inc., is considering the purchase of a new machine that will **INCREASE** revenues by \$80,000 annually **BEFORE** taxes and **REDUCE** manufacturing costs by \$40,000 annually **BEFORE** taxes. It will replace an existing machine in CCA Class 10 with a CCA rate of 30%. The current market value of the old machine is \$10,000, and if it is not replaced, it will have a salvage value of \$5,000 in three years. The new machine costs \$160,000 and will also be in the same CCA Class 10. The firm expects to sell the new machine at the end of its 3-year life for \$25,000. **No new equipment in the same CCA class will be bought at that time. However, Class 10 will remain open.** The firm will need to **INCREASE** net working capital by \$25,000 when the machine is installed. However, this net working capital will be released at the end of the machine's economic life. The firm's marginal tax rate is 40%, and it uses a 20% cost of capital to evaluate projects of this nature. What is the **incremental NPV** of this replacement project **to the nearest ten dollars?**

- a. \$151,670
- b. \$32,930**
- c. \$33,000
- d. \$11,570
- e. -\$2,780
- f. \$175,000
- g. None of the above.

CCA Formula Method:

Step 1: PV A-T Net Cash Rev. = $[\$80,000 - (-\$40,000)] \times (1 - 0.4) \times PVIFA_{20\%,3}$

PV A-T Net Cash Rev. = $\$120,000 \times 0.6 \times 2.106481481 = \$151,667$

Step 2A: PV CCA Tax Shields, initial capital cost = $\left[\frac{1.10}{1.20} \right] \left[\frac{(.4)(.3)(\$160,000 - \$10,000)}{(0.20 + 0.30)} \right] = \$33,000$

Step 2B: PV Tax Shields Lost, Salvage Value = $-\left[\frac{1}{1.20^3} \right] \left[\frac{(.4)(.3)(\$25,000 - \$5,000)}{(0.20 + 0.30)} \right] = -\$2,778$

NB. Combined Step 2A and Step 2B = $\$33,000 - \$2,778 = \$30,222$

Step 3: PV of Salvage Value = $\frac{(\$25,000 - \$5,000)}{1.20^3} = \$11,574$

Step 4: PV of NWC effects years 1-3 = $\left[\frac{\$25,000}{1.20^3} \right] = \$14,468$

NB. Combined Steps 3 and 4 = $\$11,574 + \$14,468 = \$26,042$

Step 5: - Initial Outlay = $- [(\$160,000 - \$10,000) + \$25,000] = \$175,000$

NPV = $\$151,667 + \$30,222 + \$26,042 - \$175,000 = \$32,931$

ADDITIONAL SPACE PROVIDED FOR PROBLEM 23

Cash Flow Analysis Method:

Initial Outlay = Initial Capital Cost + NWC = (\$160,000 - \$10,000) + \$25,000 = \$175,000

Year	Starting UCC	CCA	CCA Tax Shields	Ending UCC
1	\$150,000	\$22,500*	\$9,000	\$127,500
2	\$127,500	\$38,250	\$15,300	\$ 89,250
3	\$ 89,250	\$26,775	\$10,710	\$ 62,475

*1/2 year convention applies in first year.

	Cash Inflow Yr. 1	Cash Inflow Yr. 2	Cash Inflow Yr. 3
A-T Net Cash Revenues	\$ 72,000	\$ 72,000	\$ 72,000
CCA Tax Shields	\$ 9,000	\$ 15,300	\$ 10,710
NWC Effects	\$ 0	\$ 0	\$ 25,000
Salvage Value	\$ 0	\$ 0	\$ 20,000
PV of SV CCA effects	\$ 0	\$ 0	\$ 10,194
Total	\$ 81,000	\$ 87,300	\$137,904

$$** \frac{Td(UCC_n - S_n)}{(k + d)} = \frac{0.40 \times 0.30 \times (\$62,475 - \$20,000)}{(0.20 + 0.30)} = \$10,194$$

$$NPV = \frac{\$81,000}{1.2} + \frac{\$87,300}{1.44} + \frac{\$137,904}{1.728} - \$175,000$$

$$NPV = \$67,500 + \$60,625 + \$79,806 - \$175,000 = \$32,931$$

Marking Scheme:

- 1 mark for correct after-tax net cash revenues calculation of \$72,000
- 1 mark for correct Step 1 PV of A-T net cash revenues or correctly entering Yrs. 1-3 values
- 1 mark for correct CCA tax effects from initial capital cost (Step 2A or Yrs. 1-3 in table)
- 1 mark for correct CCA tax effects due to salvage value (Step 2B or \$10,194 table calculation)
- 1 mark for correct Step 3 PV of salvage value or correctly entering Yr. 3 table salvage value
- 1 mark for correct sign of NWC effects in Yr. 3
- 1 mark for correct Step 4 PV of NWC effects or correctly entering Yrs. 1 - 3 table values
- 1 mark for correct initial outlay of \$175,000
- 1 mark for correct NPV value GIVEN previous errors
- 1 mark for everything correct