École de gestion TELFER School of Management

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ADM 2350M | Quiz #2 Examination | Name: _____
March 29, 2011 | Revised Version #1 Solutions | Student ID #: _____

Statement of Academic Integrity
The Telfer School of Management does not condone academic fraud, an act by a student that may result in a false academic evaluation of that student or of another student. Without limiting the generality of this definition, academic fraud occurs when a student commits any of the following offences: plagiarism or cheating of any kind, use of books, notes, mathematical tables, dictionaries or other study aid unless an explicit written note to the contrary appears on the exam, to have in his/her possession cameras, radios (radios with head sets), tape recorders, pagers, cell phones, or any other communication device which has not been previously authorized in writing.

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.

Signed:_____

Note: an examination copy or booklet without that signed statement will not be graded and will receive a quiz grade of zero.

General Instructions:

1. Please **SIGN** the academic integrity statement above.
2. Please put your **Name and Student ID# on ALL NINE pages** of this exam.
3. 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.
4. The use of **scientific and financial calculators is encouraged**.
5. **Laptop computers or any other devices that can be used for communication are NOT permitted**.
6. Please **do NOT take apart the pages** of this exam.
7. You have **1 hour and 10 minutes** to work this exam.
8. Good Luck!

Part I - Multiple Choice Questions (4 Marks)

There are four multiple-choice questions in this part. Each question counts 1 mark. Circle the **ONE** answer that is the **BEST** answer to each question. No credit is given for (a) no answer, (b) more than one answer, or (c) an answer other than the best answer to a question.

1. Which of the following technique(s) is (are) useful capital budgeting techniques under capital rationing when projects are independent?

   a. Equivalent annual NPV
   b. Chain replication
   c. Profitability index
   d. Both a. and b. above
   e. Both a. and c. above
   f. Both b. and c. above
   g. All of the above

2. A firm is considering undertaking an investment project. What costs should be included in the initial after-tax incremental cash outlay CF_0?

   a. Reduction due to the project on the revenues net of operating costs of the firm's existing projects
   b. Cost of hiring a consultant to analyze the project before the investment decision is made
   c. Opportunity cost of a previously acquired asset used in the investment project
   d. Current book value of a previously acquired asset
   e. Both a. and c. above
   f. Both b. and c. above
   g. Both a. and d. above

Answer a. affects CF_1 through CF_n, NOT CF_0.

3. Which of the following statements is (are) **TRUE**?

   a. The investment opportunity schedule is **UPWNWARD** sloping to the right.
   b. The investment opportunity schedule is **DOWNWARD** sloping to the right.
   c. The marginal cost of capital schedule is **UPWARD** sloping to the right.
   d. The marginal cost of capital schedule is **DOWNWARD** sloping to the right.
   e. Both a. and d. above
   f. Both b. and c. above
   g. None of the above

4. Use the following three concepts to answer this question:

   I. Risk aversion.

   II. Mental accounting.

   III. Anchoring.

   Among the concepts provided above, which answer below best describes the relevant concepts for the behavourial theory of finance?

   a. I is **correct**; II and III are **incorrect**.
   b. II is **correct**; I and III are **incorrect**.
   c. III is **correct**; I and II are **incorrect**.
   d. I and II are **correct**; III is **incorrect**.
   e. I and III are **correct**; II is **incorrect**.
   f. II and III are correct; I is incorrect.
   g. I, II, and III are **correct**.
   h. I, II, and III are **incorrect**.

Part II - Multiple Choice Problems (6 Marks)

There are three multiple-choice problems in this part. Each problem is worth 2 marks. ***To receive credit, you must show your work*.** Each problem is on a separate page and an additional blank work page is provided for each problem. If you are using a financial calculator, **show what you are entering into the financial registers and show significant keystrokes.** Please also **specify the brand and model number**.

5. CKR Consultants is purchasing $300 million in office equipment to expand operations to every major city in Canada. This equipment will be placed in CCA class 8 with a 20 percent CCA rate. The firm's marginal income tax rate is 40 percent. What are the tax shields or savings generated in year 2 from CCA? Be sure to follow the half-year convention as required by the Income Tax Act.

a. $54,000,000
b. $21,600,000
c. $48,000,000
d. $19,200,000
e. $60,000,000
f. $30,000,000
g. $24,000,000
h. $12,000000
i. None of the above

Year	CCA	CCA Tax Shields	UCC
1	$30,000,000	$12,000,000	$270,000,000
2	$54,000,000	$21,600,000	$216,000,000

Apply the ½ year convention, the CCA in the first year will be ½ x 0.20 x $300M = $30,000,000. The tax savings generated by this CCA will be 0.40 x $30,000,000 = $12,000,000 in year 1. The question asks for the CCA tax shields in year 2, which are $21,600,000.

Marking Scheme:

½ mark for remembering the ½ year convention
½ mark for correctly calculating the CCA for the first year
½ mark for correctly calculating the CCA for the second year
½ mark for correctly calculating the tax savings for the second year

NB. If a student forgot the ½ year convention, then the student can earn 1 mark if the student was otherwise correct. This means that the student would calculate the CCA for the first year as $60,000,000, the CCA for the second year as $48,000,000, and the tax savings for the second year as $19,200,000.

ADDITIONAL SPACE IS PROVIDED FOR WORKING PROBLEM 5

6. Sam's Hardware is a chain of stores in Eastern Ontario catering to the do it yourselfers. The firm's depreciation-generated funds were $150,000 for fiscal 2010 and its additions to retained earnings were $120,000. The firm has a 0.25 debt-to-equity ratio based on the market value of its debt and common shares. Its best estimate of the cost of internal equity is 20%. Frank has been offered a 12 percent interest-only term loan for 15 years from the Hospitable Insurance Company (HIC), assuming that Frank maintains its current debt-to-equity ratio. The firm's marginal income tax rate is 30 percent. How much can the firm invest before it needs to raise external equity if it maintains its current debt-to-equity ratio, and what is the firm's weighted average cost of capital?

a. $300,000, 17.68%
b. $310,000, 17.10%
c. $150,000, 17.68%
d. $160,000, 17.10%
e. $300,000, 18.40%
f. $310,000, 18.00%
g. None of the above

$$\frac{D}{S} = 0.25 \rightarrow D = 0.25S \rightarrow w_d = \frac{0.25S}{S + 0.25S} = 0.20 \rightarrow w_e = 0.80$$

Equity breakpoint = Dep. generated funds + Add. to R.E./w_e

Equity breakpoint = $150,000 + $120,000/(0.80) = $150,000 + $150,000 = $300,000

$$k_a = w_e k_e + w_d k_d (1 - T) = (0.80 \times 20\%) + [0.20 \times 12\% \times (1 - 0.3))]$$
$$k_a = 16\% + 1.68\% = 17.68\%$$

Marking Scheme:

½ mark for correctly calculating the debt weight
½ mark for the values of the weights summing to one
½ mark for correctly calculating the equity breakpoint GIVEN the student's weights
½ mark for correctly calculating weighted average cost of capital GIVEN student's weights

Answer b. – student used 0.25 weight for debt and 0.75 weight for equity for loss of ½ mark
Answer c. – student forgot depreciation-generated funds for loss of ½ mark
Answer d. – student forgot depreciation-generated funds & used 0.25 & 0.75 weights for loss of 1 mark
Answer e. – student used before-tax cost of debt k_d for loss of ½ mark
Answer f. – student used before-tax cost of debt & used 0.25 & 0.75 weights for loss of 1 mark

ADDITIONAL SPACE IS PROVIDED FOR WORKING PROBLEM 6

7. 3-D Action is a newly formed firm that plans to make 3-D action games for the forthcoming MII, YBox, and 3-DStation 3-D gaming machines. It needs to invest in a high-powered computer server to link its different programmers. A type S server will last for 4 years, cost $40,000, and will generate after-tax cash flows of $21,000 per year. It can be replaced with an identical machine every 4 years that also will cost $40,000 and will generate after-tax cash flows of $21,000 per year. Alternatively, 3-D Action can invest in a type L server that will last 5 years, cost $50,000, and will generate after-tax cash flows of $22,000. Which of these 2 mutually exclusive alternatives should 3-D Action pursue if the cost of capital for a server is 20 percent and the firm plans to replace the selected server with an identical server as required?

a. Invest in type L because its NPV is $15,793.47, whereas type S has an NPV of $14,363.43.
b. Invest in type L because its NPV is $65,793.47, whereas type S has an NPV of $54,363.43.
c. Invest in type S because its PI is 1.36, whereas the type L has a PI of 1.32.
d. Invest in type S because its IRR is 38.04 percent, whereas the type L has an IRR of 33.70 percent
e. Invest in type S because its EANPV is $5,548.44, whereas type L has an EANPV of $5,281.02.
f. The firm would be indifferent as each type of server has an EANPV of $5,414.73.
g. None of the above

$$PV_S\left(future\ cash\ \ flows\right)=\$21,000\left[\frac{1-\frac{1}{1.20^4}}{0.20}\right]=\$54,363.43\ NPV_S=\$54,363.43-\$40,000=\$14,363.43$$

$$PV_L\left(future\ cash\ \ flows\right)=\$22,000\left[\frac{1-\frac{1}{1.20^5}}{0.20}\right]=\$65,793.47\ NPV_L=\$65,793.47-\$50,000=\$15,793.47$$

$$EANPV_S=\frac{NPV_S}{PVIFA_{20\%,4}}=\frac{\$14,363.43\times 0.20}{\left[1-\frac{1}{1.20^4}\right]}=\$5,548.44$$

$$EANPV_L=\frac{NPV_L}{PVIFA_{20\%,5}}=\frac{\$15,793.47\times 0.20}{\left[1-\frac{1}{1.20^5}\right]}=\$5,281.02$$

Choose the type S server as the type S server has higher EANPV and hence, higher replacement replication NPV over a common life of twenty years or in perpetuity.

The PI of S is $54,363.43/$40,000 = 1.36, and the PI of L is $65,793.47/$0,000 = 1.32. The IRR of S can easily be found on the BA II+ financial calculator by setting P/Y = C/Y = 1, N = 4, PV = - 40,000, PMT = 21,000, FV = 0 and then CPT I/Y = 38.04. The IRR of L can be found on the BA II+ by setting P/Y = C/Y = 1, N = 5, PV = - 50,000, PMT = 22,000, FV = 0 and then CPT I/Y = 33.70. Although the correct PIs and IRRs appear in answers c. and d. respectively, **neither the PI or the IRR is the proper criterion for selecting which mutually exclusive project should be done**. To see this, suppose that the initial outlay and annual net cash inflows were cut in half the type S server. The PI and IRR would be unaffected but the NPV and hence the EANPV would be cut in half. Thus, type L would now be preferred.

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