

**DEPARTMENT OF FOIS - FACULTY OF BUSINESS  
BROCK UNIVERSITY  
SOLUTION MIDTERM EXAMINATION  
Course: FNCE 2P91 - Date of Examination: June 6, 2009  
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**Question 1. (8 marks)**

**Circle the correct answer.**

1. The process of planning and managing a firm's long-term investments is called:

- A) Working capital management.
- B) Financial depreciation.
- C) Agency cost analysis.

**D) Capital budgeting.**

- E) Capital structure.

2. A proprietorship is:

- A) A business formed by two or more individuals.
- B) A separate legal body formed by an individual who has limited personal liability.

**C) A business owned by an individual who has unlimited personal liability.**

- D) A business managed by a single general partner.
- E) A limited liability form of business ownership.

3. The secondary market is

- A) the market for the original sale of securities by governments and corporations
- B) the market in which dealers buy and sell for themselves, at their own risk
- C) the market in which purchasers are matched with those who wish to sell
- D) a market which has no central location

**E) the market in which securities are bought and sold after original sale**

4. The primary goal of financial management is to maximize the:

- A) Growth rate of a firm.
- B) Compensation of the corporate officers.

**C) Current value of each share of outstanding stock.**

- D) Number of shares of common stock outstanding.
- E) Book value of the firm.

5. Agency costs

- A) The total dividends paid to shareholders over the lifetime of the firm.
- B) The costs that result from default and bankruptcy of the firm.
- C) Corporate income subject to double taxation.

**D) The costs of the conflict of interest between stockholders and management.**

- E) The total interest paid to creditors over the lifetime of the firm.

6. Compound interest means that you earn:

- A) Interest only on the initial amount invested.
- B) Interest on the initial principal only.

**C) Interest on both the principal and prior reinvested interest.**

- D) A decreasing amount of interest each year.
- E) The same amount of interest each year.

7. The relationship between nominal rates, real rates, and inflation is known as the:

A) Miller and Modigliani theorem.

**B) Fisher effect.**

C) Gordon growth model.

D) Term structure of interest rates.

E) Interest rate risk premium.

8. The legal document that includes the basic terms and details of a bond is called the:

**A) Indenture agreement.**

B) Call provision.

C) Debenture agreement.

D) Registration form.

E) Marketing form.

### **Question 2. (12 marks)**

1. What rate, compounded quarterly, is equivalent to 10% compounded semi-annually?

(4 marks)

$$\left(1 + \frac{0.10}{2}\right)^2 = \left(1 + \frac{r}{4}\right)^4, \left(1 + \frac{r}{4}\right) = (1.05)^{1/2}, \text{ then } \frac{r}{4} = (1.05)^{1/2} - 1, \text{ so } r = 9.88\%$$

2. What rate, continuously compounded, is equivalent to 10% compounded semi-annually? (4 marks)

$$e^r = \left(1 + \frac{0.10}{2}\right)^2. \text{ Then } r = 2 \times \ln(1.05) = 9.76\%$$

3. What rate, compounded monthly, is equivalent to an effective rate of 21%? (4 marks)

$$1 + .21 = \left(1 + \frac{r}{12}\right)^{12}. \text{ Then } (1.21)^{1/12} = \frac{r}{12}. \text{ So } r = 19.21\%$$

### **Question 3. (10 marks)**

1. What is the present value of \$1,000 received at the end of each year for 8 years if the interest rate is 12% compounded every 3 months? (4 marks)

**APR = 12%**

$$\text{EAR} = \left(1 + \frac{0.12}{4}\right)^4 - 1 = 0.125509$$

$$PV = 1,000 \left[ \frac{1 - (1.125509)^{-8}}{0.125509} \right] = \$4,873.47$$

2. What is the future value if the \$1,000 is received at the beginning of each period for eight years? (3 marks)

$$FV = 1,000 \left[ \frac{(1.125509)^8 - 1}{0.125509} \right] \times (1 + 0.125509) = \$14,124.66$$

3. How many years will it take to save \$200,000 by depositing \$10,000 at the beginning of each year earning 8% interest compounded quarterly? (3 marks)

**APR = 8%**

$$\text{EAR} = \left(1 + \frac{0.08}{4}\right)^4 - 1 = 0.0824$$

$$200,000 = 10,000 \left[ \frac{(1.0824)^n - 1}{0.0824} \right] \times (1 + 0.0824), \text{ THEN } 20 = [(1.0824)^n - 1]13.13119$$

$$1.52309 = (1.0824)^n - 1; n = \ln(2.52309) / \ln(1.0824) = 11.684$$

**So n = 11.684 years**

**Question 4. (12 marks)**

Rob and Laura wish to buy a new home. The price is \$187,500 and they plan to put 20% down. New Rochelle Savings and Loan will lend them the remainder at a 10% fixed rate compounded semi-annually for 30 years, with monthly payments to begin in one month.

- 1. Calculate their MONTHLY payment. (6 marks)
- 2. Fill in the following amortization schedule. (4 marks)

Month	Balance	Payment	Interest	Principle	Ending Balance
1					
2					
3					

- 3. How much will you still owe on your house after 2 years? (2 marks)

**Question 5. (12 marks)**

Mr. Savvy is planning for his retirement. Niagara Dominion Bank has offered him a plan that requires him to deposit \$8,000 at the beginning of each of the next 25 years. The retirement plan guarantees a 12% annual compounding rate over the next 25-year time period. When he retires at the end of the 25th year, the interest earned on the savings in his account is guaranteed to increase at 15% annually. Mr. Savvy likes to make 30 equal withdrawals at the beginning of each year from the account after he retires. The first withdrawal will be made at the end of the 25th year. How much Mr. Savvy can withdraw each year after he retires?

(Draw a time line)

*Consider the values of the 2 CF streams at t=25.*

$$8000(1.12) + 8000(1.12)^2 + \dots + 8000(1.12)^{25} = c + c/(1.15) + \dots + c/(1.15)^{29}$$

$$8000\{1.12 + 1.12^2 + \dots + 1.12^{25}\} = c\left\{1 + \frac{1}{1.15} + \left(\frac{1}{1.15}\right)^2 + \dots + \left(\frac{1}{1.15}\right)^{29}\right\}$$

$$8000\left[\frac{1.12\{1.12^{25} - 1\}}{1.12 - 1}\right] = c\left[\frac{1 - \left(\frac{1}{1.15}\right)^{30}}{1 - \frac{1}{1.15}}\right]$$

$$1,194,671.48 = c[7.5509]$$

$$c = 158,216.26$$

**Question 6. (14 marks)**

6.1. Consider a bond with a face value of \$1,000 with 8 years to maturity and a coupon rate of 8% paid semi-annually and the yield to maturity is 6% compounded semi-annually.

- i. Find the market price of the bond. (4 marks)
- ii. If bond above had 20 years to maturity what would market price be and why has the price changed? Explain. (4 marks)

6.2. Suppose you purchase a zero-coupon bond with face value \$1,000, maturing in 15 years, for \$420.14.

- i. Calculate the yield to maturity on the bond. (3 marks)
- ii. If the yield to maturity on the bond remains unchanged, what will the price of the bond be five years from now? (3 marks)



4. Interpret your answers and make a decision. (2 marks)

**Question 9. (8 marks)**

Use Figure 1 that shows the net present value profile of two projects R and F to answer the following questions:

1. What is the internal rate of return on project F? (2 marks)

**There are three IRR: 9%, 15%, and 26%**

2. Determine the “approximate” discount rate at which you would be indifferent between the two projects? (1.5 marks)

**The crossover rate is close to 11.5% where the two NPV are equal and strictly positive.**

3. Find the “approximate” net present value of project R when the discount rate is 6% (1.5 marks)

**The NPV is close to \$2000 using figure 1.**

4. If the two projects are mutually exclusive, over what discount rate range(s) would project F be preferred to project R? Explain. (1.5 marks)

**F is preferred to R when its NPV is higher and strictly positive. This occurs when the discount rate  $\in ]11.5\%, 15\%[$  and  $]26\%, +\infty[$**

5. If the two projects are independent and the discount rate is 17%, what decision should the firm make? Why? (1.5 marks)

**In this case, the NPV of the two projects is strictly negative. Thus both are rejected.**