Carleton UNIVERSITY

MIDTERM EXAMINATION

Fall 2012

Student Last Name: _____

Student First Name: _____

Student Number:_____

DURATION: 2 HOURS **No. of Students: 330**
Department Name & Course Number: BUSI 2504 **Section: C, D, E, F**
Course Instructor(s) : Yuriy Zabolotnyuk

AUTHORIZED MEMORANDA

Calculator
Hand-written notes on one side of 8.5" x 11" sheet

Students MUST count the number of pages in this examination question paper before beginning to write, and report any discrepancy to a proctor.

This question paper has 6 (six) pages.

This examination question paper may not be taken from the examination room.

In addition to this question paper, students require: an examination booklet yes
Scantron sheet yes

		Received
Multiple choice questions (50 marks):	1 - 20 – 50 marks	_____
Problems (50 marks):	Q1 –22 marks	_____
	Q2 –14 marks	_____
	Q3 –14 marks	_____
	Total – 100 marks	_____

Do ALL 20 multiple choice problems: 2.5 marks per question for a total of 50 marks.

1. Last week, N&M Railroad paid its annual dividend of $1.50 per share. The company has been *reducing* the dividends by 10 percent each year. How much are you willing to pay to purchase stock in this company if your required rate of return is 15 percent?
   A) $30.30
   B) $27.00
   C) $5.40
   D) $15.60
   E) $6.00

2. Jeanette needs $15,000 as a down payment for a house six years from now. She earns 3.5 percent on her savings. Jeanette can either deposit one lump sum today for this purpose or she can wait a year and deposit a lump sum. How much additional money must Jeanette deposit if she waits for one year rather than making the deposit today?
   A) $307.00
   B) $333.33
   C) $427.09
   D) $121.03
   E) $166.67

3. A bond indenture is likely to include which of the following?
   I. Maturity date
   II. Sinking fund provision
   III. Protective covenants
   IV. Security or collateral
   A) I and II only
   B) I, II, and III only
   C) I, II, and IV only
   D) II, III, and IV only
   E) I, II, III, and IV

4. You have $500 that you would like to invest. You have two choices: Savings account A which earns 8% compounded annually, or savings account B which earns 7.75% compounded semi-annually. Which would you choose and why?
   A) A because it has a higher effective annual rate.
   B) A because the future value in one year is lower.
   C) B because it has a higher effective annual rate.
   D) B because the future value in one year is lower.
   E) B because it has the higher quoted rate.

5. You borrowed $1,500 at 6% compounded annually. Your payments are $90 at the end of each year. How many years will you make payments on the loan?
   A) 9 years
   B) 10 years
   C) 11 years
   D) 12 years
   E) forever

6. If you deposit $2,500 at the end of each six months into an account which earns 5.5% interest compounded quarterly, how much will be in the account in five years?
   A) $13,953
   B) $16,931
   C) $26,605
   D) $28,357
   E) $32,188

7. A given rate is quoted as 8% APR, but has an EAR of 8.33%. What is the rate of compounding during the year?
   A) Annually
   B) Semiannually
   C) Quarterly
   D) Monthly
   E) Continuously

8. A sole proprietorship is best defined as a business owned by:
   A) a single individual who has limited liability for the firm's debts.
   B) a single individual who has unlimited liability for the firm's debts.
   C) individuals who enjoy limited liability.
   D) one or more individuals who have agreed to accept unlimited liability for the firm.
   E) an individual for less than ten years.

9. All Constructions, Inc. is planning on constructing a new $20 million facility. The company plans to pay 20% of the cost in cash and finance the balance. How much will each monthly loan payment be if they can borrow the necessary funds for 30 years at 9% compounded monthly?
   A) $128,740
   B) $133,667
   C) $141,982
   D) $148,016
   E) $160,925

10. At a 6% rate of return you will quadruple your original investment in approximately ___ years.
   A) 3
   B) 6
   C) 12
   D) 24
   E) 48

11. The agency problem is best defined as a conflict of interest between a firm's:
   A) various employees.
   B) various managers.
   C) managers and the firm's employees.
   D) stockholders and the firm's managers.
   E) stockholders and the firm's debtors.

12. Julia owns a 7% coupon bond that has 13 years to maturity. The bond has a face value of $1000, pays interest annually and is currently selling for $1,034.50. What is the yield to maturity on this bond?
    A) 6.50%
    B) 6.60%
    C) 6.66%
    D) 6.77%
    E) 6.88%

13. This morning Tim purchased a 15-year, $1,000 face value zero coupon bond for $394.34. Assume the yield-to-maturity remains constant over the life of the bond. What price should Tim receive for his bond if he wants to sell it 4 years from today?
    A) $505.40
    B) $515.60
    C) $544.44
    D) $555.85
    E) $561.33

14. Sue just signed a contract wherein she will receive the following payments. What is the contract worth to her today if she can earn 7% on her investments?

Year	0	1	2	3
Cash Flow	$1,200	$3,500	$2,500	$2,500

    A) $6,168.67
    B) $6,282.53
    C) $6,295.37
    D) $7,139.87
    E) $8,695.37

15. Which one of the following statements is correct?
    A) Both partnerships and corporations incur double taxation.
    B) Both sole proprietorships and partnerships are taxed in a similar fashion.
    C) Partnerships are the most complicated type of business to form.
    D) Both partnerships and corporations have bylaws.
    E) All types of business formations have limited lives.

16. Shares of common stock of the Timken Co. offer an expected total return of 16 percent. The dividend is increasing at a constant 6 percent per year. What is the dividend yield?
    A) 6%
    B) 6.6%
    C) 10%
    D) 10.6%
    E) 16.0%

17. It is more difficult to value a stock than it is to value a bond because:
    A) The future cash flows of a stock are known
    B) The life of an equity security is limited
    C) The required market rate of return on a stock is known in advance
    D) The maturity value of a stock is known
    E) None of the statements are correct

18. Dale invests $500 in an account that pays 6 percent simple interest. How much more could he have earned over a thirty year period if the interest had compounded annually?
    A) $1,471.75
    B) $1,532.50
    C) $1,621.25
    D) $1,804.25
    E) $2,371.75

19. The outstanding bonds of RTF, Inc., provide a real rate of return of 3.3 percent. The current rate of inflation is 2.85 percent. What is the exact nominal rate of return on these bonds?
    A) 6.12 percent
    B) 6.15 percent
    C) 6.20 percent
    D) 6.24 percent
    E) 6.27 percent

20. The interest rate charged per period multiplied by the number of periods per year is called the:
    A) Effective annual rate (EAR).
    B) Annual percentage rate (APR).
    C) Periodic interest rate.
    D) Compound interest rate.
    E) Daily interest rate.

Do ALL THREE problems.
Show how you arrived at your answer including (1) the general form of equation, (2) the equation with the correct numbers substituted in, and (3) the solution!

1) **(24 marks)** You are planning to buy a new townhouse in Orleans that costs $300,000. You plan to make a 20% down payment and finance the rest with a mortgage loan. Bank of Ottawa is offering you a 25-year mortgage at 10-year fixed rate of 4.2%. You have decided to pay your mortgage payments bi-weekly.

a) What will be your bi-weekly payment if you buy the townhouse using mortgage from Bank of Ottawa? (7 points)

$$\boldsymbol{Effective\ annual\ rate} = \left(1 + \frac{\boldsymbol{APR}}{\boldsymbol{2}}\right)\text{^}\boldsymbol{2} = (\boldsymbol{1} + \frac{\boldsymbol{4.2\%}}{\boldsymbol{2}})\text{^}\boldsymbol{2} = \boldsymbol{4.24\%}$$

Then $\boldsymbol{Effective\ bi-weekly\ rate} = (\boldsymbol{1 + 0.0424})^{1/26} - \boldsymbol{1} = \boldsymbol{0.15999939\%} \approx \boldsymbol{0.16\%}$

We have $\boldsymbol{PV = 300,000 * (1 - 0.2) = 240,000},\ \boldsymbol{N = 25\ years = 25 \times 26 = 650\ bi-weekly\ periods}\ \boldsymbol{r = 0.16\%}$

$$\boldsymbol{PV = C \times \left(\frac{1 - \frac{1}{(1+r)^n}}{r}\right)}$$

$$\boldsymbol{240,000 = C \times \left(\frac{1 - \frac{1}{(1+0.16\%)^{650}}}{0.16\%}\right)}$$

$$\boldsymbol{C = \$594.20}$$

So the bi-weekly payment is $594.20.

b) How much money would you still owe to the bank after paying your mortgage payments for 10 years? (6 points)

After 10 years' payment, assuming that the interest rate does not change, you still need to pay for 15 years with the same payment of $594.20.
We have $\boldsymbol{PMT = 594.20}$
$\boldsymbol{N = 15\ years = 15 \times 26 = 390\ bi-weekly\ periods}$
$\boldsymbol{r = 0.16\%}$

$$\boldsymbol{PV = C \times \left(\frac{1 - \frac{1}{(1+r)^n}}{r}\right)}$$

$$\boldsymbol{PV = 594.20 \times \left(\frac{1 - \frac{1}{(1+0.16\%)^{390}}}{0.16\%}\right)}$$

$PV = \$\,172,294.15$ **So we still owe \$=** $\$\,172,294.15$ **to the bank after 10 years of bi-weekly payment.**

c) How much money would still owe to the bank in 10 years from now if you decided to make payments monthly instead of bi-weekly? (5 points)

$Effective\ monthly\ rate = (1 + 0.0424)^{1/12} - 1 = 0.0035\ or\ 0.35\%$

We have $PV = 240,000, N = 25\ years = 25 \times 12 = 300\ monthly\ periods, r = 0.35\%$

$$PV = C \times \left(\frac{1 - \frac{1}{(1+r)^n}}{r} \right)$$

$$240,000 = C \times \left(\frac{1 - \frac{1}{(1+0.35\%)^{300}}}{0.35\%} \right)$$

$$C = \$\,1293.46$$

So the monthly payment is \$1,293.46.

Now the monthly payment is \$1,293.46. After 10-year payment, we still have to pay 15 years with the same payment to bank at \$1,293.46

We have $PMT = 1,293.46, N = 15\ years = 15 \times 12 = 180\ monthly\ periods,$ $r = 0.35\%$

$$PV = C \times \left(\frac{1 - \frac{1}{(1+r)^n}}{r} \right)$$

$$PV = 1293.46 \times \left(\frac{1 - \frac{1}{(1+0.35\%)^{180}}}{0.35\%} \right)$$

$$PV = \$\,172,518.97$$

So we still owe \$172,518.97 after 10 years of bi-weekly payment.

NOTE: dollar amount will be slightly different depended on the decimals used for interest rate.

d) You plan to take a separate loan from the Bank of Labrador to cover the full amount of down payment. The bank offers you a 5-year loan at 10% compounded *quarterly*. What will be your monthly payment on this loan if you decide to make monthly payments with your first payment starting today? (6 points)

Down payment is 300,000*0,2=$60,000, so PV=60,000
The payments are monthly, so we have to use an effective monthly rate:

$$\boldsymbol{Effective\ annual\ rate = \left(1 + \frac{APR}{4}\right)\text{^}4 = (1 + \frac{0.10}{4})\text{^}4 = 10.38\%}$$

Then $\boldsymbol{Effective\ monthly\ rate = (1 + 0.1038)^{1/12} - 1 = 0.0.008165 \approx 0.83\%}$
Therefore,

Using the BEGINNING mode on a calculator:

PV=60,000
I/Y=0.83%
N=5*12=60

PMT=> $1,273.64, so the monthly payment on a down payment loan is $1,273.64

2) **(12 marks)** Bond of Nobel Inc. has face value of $1000, pays 6% coupon semiannually, and has 20 years to maturity. Its quoted price is 102.

a) What is the yield to maturity on Nobel's bond? (4 points)

A $1,000 face value bond quoted price is 102, so the bond sells for $102 \times 1000 = \$1,020$

$$PMT = 6\% \times 1,000 \times \frac{1}{2} = \$30, N = 20\ years = 40\ semi-annual\ periods$$

$$PV = C \times \left(\frac{1-\frac{1}{(1+r)^n}}{r}\right) + \frac{FV}{(1+r)^n}$$

$$1,020 = 30 \times \left(\frac{1-\frac{1}{(1+r)^{40}}}{r}\right) + \frac{1,000}{(1+r)^{40}}$$

$$I/Y = 2.9147\%$$

$$YTM = 2 \times I/Y = 2 \times 2.9147\% = 5.83\%$$

b) By how many percent the price of Nobel's bond would change if market interest rates suddenly increase by 1%? (4 points)

$$PMT = 6\% \times 1,000 \times \frac{1}{2} = \$30, N = 20\ years = 40\ semi-annual\ periods,$$

$$YTM = 5.83\% + 1\% = 6.83\%, \qquad I/Y = \frac{1}{2} \times 6.83\% = 3.4147\%$$

$$PV = C \times \left(\frac{1-\frac{1}{(1+r)^n}}{r}\right) + \frac{FV}{(1+r)^n}$$

$$PV = 30 \times \left(\frac{1-\frac{1}{(1+3.4147\%)^{40}}}{3.4147\%}\right) + \frac{1,000}{(1+3.4147\%)^{40}}$$

PV **=$910.26**

The price for this bond will decrease to $910.26 after YTM increased by 1%

Change in the price is 910.26 – 1020 = -109.74 or -109.74/1020=-.1076 (-10.76%)

c) What will the market price of this bond be one year from now if the required yield on similar bonds falls to 2% in one year? What will be your realized rate of return on this bond if you buy it today and sell it in one year? (4 points)

Next year this bond will have only 19 years left to maturity.

N = 19*2=38

PMT = 30

I/Y=2%/2=1%

$$PV = C \times \left(\frac{1 - \frac{1}{(1+r)^n}}{r} \right) + \frac{FV}{(1+r)^n}$$

$$PV_1 = 1,629.69$$

The bonds will be sold at $1,629.69; you bought it for $1,020.00 and received $60 dollars of coupon over this year.

Realized rate of return:

(1,629.69-1,020+60)/1,020=669.29/1020=0.6562 or 65.62%
Your realized rate is 65.62%

3) **(14 marks)** Lululemming Inc. has just paid a dividend of $1.50 per share. The company will increase its dividend by 15 percent in coming year and will then reduce its dividend growth rate by 5 percentage points per year until it reaches the industry average of 5 percent dividend growth, after which the company will keep a constant growth rate, forever. The required rate of return on Lululemming's stock is 13 percent.

a) What will be the price of Lululemming's stock 4 years from now? (4 points)

Growth rates in year 1 equals to 15%, in year 2 equals to 10%, in year 3 and after equals to 5%.

D1=1.50(1+0.15)= 1.73
D2=1.73(1+0.10)=1.90
D3=1.90(1+0.05) =1.99
D4=1.99(1+0.05)=2.09
D5=2.09(1+0.05)=2.19

P4=D5/(r-g)=2.19/(0.13-0.05)=27.38

b) What is the current stock price? (5 points)

P2=D3/(r-g)=1.99/(0.13-0.05)=24.88

$P0=D1/(1+0.13)+(D2+P2)/(1+0.13)^2= 1.73/(1+0.13)+(1.90+24.88)/(1+0.13)^2=1.53+20.97=22.50$

c) What would be the current stock price if the company decided to stop paying dividends after year 5 forever (the last dividend would be paid exactly 5 years from now)? (5 points)

The value of this stock in this case is just the present value of the 5 dividends:

$P0=D1/(1+0.13)+D2/(1+0.13)^2+D3/(1+0.13)^3+D4/(1+0.13)^4+D5/(1+0.13)^5$

$P_0=1.73/(1+0.13)+1.90/(1+0.13)^2+1.99/(1+0.13)^3+D2.09/(1+0.13)^4+2.19/(1+0.13)^5$ => $\underline{P_0=6.87}$