Solutions

Print Last Name: ➔	Print First Name: ➔	ID Number: ➔	
COURSE FINANCE	**NUMBER** COMM 308/2	**SECTIONS:** AA BB	
EXAMINATION Mid Term Exam	**DATE** October 16, 2011	**TIME** 2 hours	**# OF PAGES 12** including cover

READ THESE INSTRUCTIONS CAREFULLY

- **This exam is composed of 23 multiple choice questions and 3 multi-part problems. Some of the sub-questions rely on information calculated in other parts of the question. Carry through errors will not be penalized**

- **For Multiple Choice Questions,**
  All answers must be recorded IN PENCIL on the computer sheet.

- **For Problems:**
  All answers must be recorded within this exam.
  Show all work. Credit will not be given for answers without supporting information. Use the back of the pages for scratch.

- **Cell phones must be turned off, programmable calculators, PDAs, Lap Tops are not allowed.**

- **Please ensure you have 12 pages (including cover) in this exam.**

- **Fill in your name and other required information IN PENCIL on the Computer Answer sheet as well as on this cover sheet.**

SCORES (FOR INSTRUCTORS USE ONLY)

Multiple Choice Questions (Max: 69 Points)	**Long Answer Questions**			**Total (100 Points)**
	Question 1 (Max: 10 Points)	Question 2 (Max: 10 Points)	Question 3 (Max: 11 Points)	

Part 1 Multiple Choice: Please write the letter of the correct answer in the space provided **AND** circle your choice in the list of possible answers. Students choosing more than one correct answer will get no credit for that question! **(3 points each)**

1. Which bond's price would be the least sensitive to an unexpected change in the interest rate?

   a. A discount (or zero coupon) bond with 10 years to maturity.
   b. A bond with a 10% coupon rate and 10 years to maturity.
   c. A bond with a 5% coupon rate and 10 years to maturity.
   d. A bond with 5% coupon rate and 12 years to maturity.
   e. A discount (or zero coupon) bond with 15 years to maturity

2. The Money Shoppe will loan you cold hard cash until your next paycheck. You will write a $1,050 cheque post-dated by two weeks and you will receive $1,000 right now. What is the biweekly[1] compounded APR of this loan (assuming a year is exactly 52 weeks long)? **Note:** By handing over the post-dated cheque you are effectively paying Money Shoppe $1,050 two weeks after you received the $1,000.

   a. 255.6%
   b. 360.0%
   c. 260.0%
   d. 230.0%
   e. 130.0%

   $1000 = \frac{1050}{1+k} \Rightarrow k = 1.050 - 1 = 5\%$.

   $\therefore$ APR Biweekly $= 0.05 * 26 = 1.3 = 130\%$.

3. Alberta Energy Co. (AECO) has just paid $2 in dividends and its dividends are expected to grow at a rate of 5% forever. If AECO's current stock price is $30, then what will be its share price one year from now?

   a. 30
   b. 31.5
   c. 32.1
   d. 33.6
   e. 28.13

   $P_1 = P_0 * (1+g) = \$30 * 1.05 = \$31.5$

5. Which of the following is an advantage of ownership of a partnership <u>compared</u> to that of a corporation?

   a. The general partners have unlimited liability for the partnership's debts.
   b. A limited partner's liability is limited to the amount contributed to the partnership.
   c. Partnerships have unlimited life.
   d. All income is taxed as personal income to the partners (i.e. there is no partnership income tax).
   e. It is easier to transfer ownership than in the case of a corporation.

[1] Biweekly = happening every two weeks.

6. Which of the following is TRUE: _____

   a. When comparing investments, it is best to rely on the quoted rates.
   b. Compounding will not typically lead to differences between quoted and effective rates.
   c. The interest rate per period is the APR divided by the number of compounding periods per year
   d. The APR on a loan requiring monthly payments is the annual interest rate you actually pay
   e. With monthly compounding, the EAR will be smaller than the APR.

7. Everything else held constant, the yield-to-maturity (YTM) of a bond _____.

   a. will equal the coupon rate if the bond sells at par value
   b. will increase if the price of the bond increases
   c. will be lower than the coupon rate if the bond sells below par value
   d. a. and b. are both correct
   e. a and c. are both correct

8. You are considering two perpetuities which are identical in every way, except that perpetuity A will begin making annual payments of $1,000 to you one year from today while the first $1,000 dollar payment for perpetuity B will take place eleven years from today. It must be true that the present value of perpetuity A minus that of perpetuity B:

   a. is equal to $1,000 × 10 = 10,000.
   b. is equal to the present value of an annuity paying $1,000 dollars each year for 11 years.
   c. is equal to the present value of an annuity DUE paying $1,000 dollars each year for ten years.
   d. is greater than the present value of perpetuity B.
   e. is equal to the present value of an ordinary annuity paying $1,000 dollars each year for ten years.

9. Common shares include which of the following characteristics:

Fall 2007

   I. The right to vote for the board of directors
   II. Right to receive income before any creditors
   III. Company has no legal obligation to pay dividend

   a. I and II only
   b. I and III only
   c. I only
   d. II and III only
   e. III only

10. Which of the following features of a bond are determined by the issuer following the advice of the underwriter:

Fall 2007

I. price
II. coupon
III. time to maturity
IV. yield to maturity

a. I and IV only
b. II and III only
c. II and IV only
d. III only
e. I and II only

11. Eight percent compounded semi-annually is equivalent to what percentage compounded monthly?

Fall 2007

a. 7.87%
b. 8.00%
c. 8.16%
d. 24.00%
e. 1.333%

$$\text{Monthly rate} = \left(1 + \frac{0.08}{2}\right)^{2/12} - 1 = 0.65558\%$$

$$\text{APR. Compounded monthly} = 12 \times 0.65558\% = 7.8698\%$$

12. Never-On-Time Transportation Inc. has issued $2.5 million in preferred shares with a par value of $20 each and an annual dividend rate of 8.25 percent. The market value of the preferred shares is _____ if the required rate of return is 12 percent.

Fall 2007

a. $1.72 million
b. $17.19 million
c. $3.64 million
d. $34.38 million
e. Non of the above

$$P_s = \frac{D}{K_s} = \frac{0.0825 * 20}{0.12} = \$13.75 \text{ per share}$$

$$\text{Market value} = \frac{\$2.5\text{-mill}}{20} * 13.75 = \$1,718,750$$

13. The Excello Company currently has a policy of paying out 30% of its earning in dividends. Currently the market is expecting a return on equity if 10%. The firm has just paid a dividend of $1 and the current stock price is $10. The required rate of return on Excello stock is:

Fall 2007

a. 17.7%
b. 17.0%
c. 13.3%
d. 13.0%
e. 10.0%

$$g = b * ROE = (1 - 0.3) * 0.1 = 7\%$$

$$\$10 = \frac{1 * 1.07}{k - 0.07}$$

$$k = \frac{1 * 1.07}{\$10} + 0.07 = 17.7\%$$

Summer 2, 2011

14. You deposit $1000 in an account today. You will deposit $600 at the end of each month for the next 12 months and $800 each month for the following 12 months. How much interest will you have earned in two years if the account pays 5.5% compounded monthly?

EMR = $\frac{0.055}{12} = 0.0045833$

a. 795.42
b. 827.65
c. 849.42
(d.) 962.57
e. 979.00

$FV = FV_{24}(1000) + FV_{24}(600\ \text{Annuity}) + FV_{24}(800\ \text{Annuity})$

$= \$18,762.57$

Total deposit $= 1000 + 12 \times 600 + 12 \times 800 = \$17,800$

$\Rightarrow$ Int $= 18,762.57 - 17,800 = \$962.57$

Fall 2010

15. At a 3% rate of interest, you will quadruple[2] your money in approximately ____ years.

a. 3
b. 6
c. 12
d. 24
(e.) 48

$4x = (1.03)^n * x$

$n \ln 1.03 = \ln 4$

$n = \frac{\ln 4}{\ln 1.03} = 46.899 \approx 47$ years.

Closest answer: approx. 48 years.

Summer 2011

16. XYZ Co. zero-coupon bonds have a face value of $1,000 and mature in 18 years. They currently sell for $179.86 today. By what percentage will the market price rise if the market's required return falls by half?

$k = \left(\frac{1000}{179.86}\right)^{1/18} - 1 = 10\%$

a. 99%
(b.) 131%
c. 137%
d. 175%
e. 231%

$P_0 = \frac{1000}{1.05^{18}} = \$415.52$

$\Rightarrow \Delta = \frac{415.52 - 179.86}{179.86} = 131.02\%$

Summer 2 2011

17. Healthy Smokes, Inc. manufactures nicotine free cigarettes. As their target customers age and pass on, sales of the product are expected to decline. Thus, demographics suggest that earnings and dividends will decrease at a rate of 8% annually forever. The firm just paid a dividend of $4.00; given a required return of 12%, the stock should sell for

a. $94.98
b. $72.00
c. $48.22
d. $35.00
(e.) $18.40

$P_0 = \frac{4 \times 0.92}{0.12 + 0.08} = \$18.4$

[2] Quadruple means increasing 4 times.

Summer 2011

18. Today, Bruce and Brenda each have $150,000 in an investment account. No other contributions will be made to their investment accounts. Both have the same goal: They each want their account to reach $1 million, at which time each will retire. Bruce has his money invested in riskfree securities with an expected annual return of 5 percent. Brenda has her money invested in a stock fund with an expected annual return of 10 percent. How many years after Brenda retires will Bruce retire?

a. 12.6
b. 19.0
c. 19.9
d. 29.4
e. 38.9

$150,000 \times 1.05^{n_1} = 1,000,000$

$150,000 * 1.1^{n_2} = 1,000,000$

$n_1 - n_2 = 18.98 \cong 19$ years.

Fall 2010

19. An account was opened with $1,000 ten years ago. Today, the account balance is $1,500. If the account paid interest compounded annually, how much interest on interest was earned?

a. $86.20
b. $93.10
c. $102.39
d. $130.28
e. $500.00

$1000 * (1+k)^{10} = \$1,500$

$k = (1.5)^{1/10} - 1 = 0.04137974$

Simple Interest $= 1000 * (0.04137974 * 10) = 1,413.79$

Int on Int $= 1500 - 1413.79 = 86.20$

Fall 2010

20. Your broker offers you the opportunity to purchase a bond with coupon payments of $90 per year and a face value of $1,000. If the yield to maturity on similar bonds is 8%, this bond should:

a. Sell for the same price as the similar bond regardless of their respective maturities.
b. Sell at a premium.
c. Sell at a discount.
d. Sell for either a premium or a discount but it's impossible to tell which.
e. Sell for par value.

Fall 2010

21. Jamie owes $21,750 at a 5% APR comp. monthly rate of interest. The minimum amount that she must pay monthly is $230.69. How much faster can she pay off this loan if she makes monthly payments of $300.00?

a. 1.68 years sooner
b. 2.54 years sooner
c. 2.79 years sooner
d. 2.93 years sooner
e. 3.01 years sooner

$n_1 = 120$ months

$n_2 = 86.4970$ months

$n_1 - n_2 = 33.5029$ months

$= \frac{33.5029}{12} = 2.79$ years sooner.

Fall 2010

22. Your banker quotes you two different loan payments on a $12,000 car loan, one calling for 36 monthly payments and the other calling for 24 monthly payments. Both loans have the same APR and EAR. She then tells you that the shorter loan is a better deal because the total payments you would make over the life of the loan would be lower. What is she ignoring?

a. The payment would be lower on the 24-month loan.
b. The 24-month contract will actually cost you more in total payments, not less.
c. The interest you could earn by saving the difference between the two loan payments.
d. The fact that you must make 12 more payments on the longer-term loan.
e. The APR and EAR for the two loans are irrelevant.

Assignment-1

23. Two years ago you bought a bond with two years to maturity, a face value of $1,000, semi-annual coupons, a coupon rate of 5% and yield-to-maturity of 2.5%. The government of Canada is retiring this bond today, when the yield-to-maturity on 2-year bonds equals 4%. What cash payment will you receive on the day the bond matures?

a. $1,025.00
b. $1,020.00
c. $1,050.00
d. $1,040.00
e. $1,030.00

$1000 + $25 = F + Coupon

Assignment 1

Part 2: Word Problems: Please answer the questions below. Be sure to show all work.

1. (10 Points) Your Aunt Tillie is planning to setup a scholarship fund, which will start paying monthly stipend of $1,000 per month to the recipient, starting January 1, 2012. Monthly cheques will be mailed out on the 1st of every month. She wants the annual payments to increase by 5% every year (all payments made in 2012 are $1000, all payments made in 2013 are $1000*(1.05), and so on). Assume that today is 1st of October 2011. Also assume that Aunt Tillie's fund will earn 12% APR compounded monthly on all deposited funds. How much should Aunt Tillie deposit in the fund today such that the above scholarship can be paid out in perpetuity?

— standard annuity due embeded in a growing perpetuity.

$EMR = \frac{12\%}{12} = 1\%$

FV_{12} of year 1 annuity due $= \frac{1000}{0.01} * \left[1 - \frac{1}{1.01^{12}}\right] * 1.01^{13}$

$= \$12809.328$

Using the above FV as the first payment in a growing perpetuity: (with annual payments)

$EAR = (1.01)^{12} - 1 = 12.6825\%$

$PV(\text{Jan 1, 2012}) = \frac{12809.328}{0.126825 - 0.05} = \$166,733.785$

$PV(\text{Oct 1, 2011}) = \frac{PV(\text{Jan 1, 2012})}{(1+EMR)^3} = \frac{\$166,733.785}{1.01^3}$

$= \$161,830.228$

2. (10 Points) A bond originally sold at par for $1,000. The coupon rate on the bond is 9% while the current discount rate (market rate of interest) for the bond is 7% (APR, compounded semiannually).

(2) a. Assuming no change in risk, would this bond sell for more or less than its original issue price? Why?

More ∵ $YTM < k_c$

(2) b. Suppose the bond in the example above has 4 years left to maturity and the coupons are paid semiannually. What is the current price of the bond?

$$P_0 = \frac{45}{0.035} * \left[1 - \frac{1}{1.035^8}\right] + \frac{1000}{1.035^8}$$

$$= \$1,068.74$$

c. Given the current market rate of interest of 7% (APR, compounded semiannually):

(3) i. Would a $1000 face value, 9% coupon bond with 4 years left to maturity and *annual coupons* be priced higher or lower than the 4-year bond in (b) above? Why? There is no calculation required, just briefly state your argument.

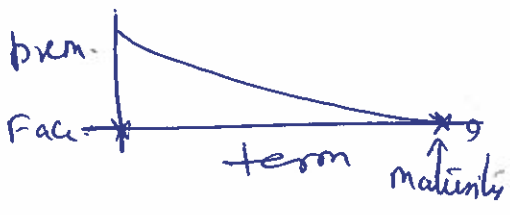
Annual Coupon bond will be priced lower.

One year cash flow from annual coupon < One year Cash-flow from sem-annual coupon bond.

(3) ii. Would a $1000 face value, 9% coupon bond with 8 years left to maturity and semi-annual coupons be priced higher or lower than the 4-year bond in (b) above? Why? Again, there is no calculation required, just briefly state your argument.

priced higher. $YTM < k_c$ => bond trades at premium.

=> As the bond reaches maturity, premium reduces

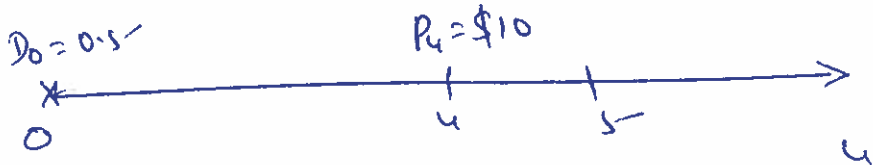


longer term => higher premium (holding all else equal)

Chapter 7 Q42

3. (~~11~~ points) XYZ stock is expected to sell for $10 per share four years from now. XYZ has just paid a dividend of 50 cents per share. Dividends are expected to grow at a rate of 5% per year for the next 4 years. Assume that the required rate of return for XYZ stock is 15%.

   a. (5 Points) What is the expected constant growth rate beginning in year five?



$$P_4 = \frac{D_5}{k - g_2} = \frac{D_0 * (1+g_1)^4 * (1+g_2)}{k - g_2}$$

$$\therefore \quad 10 = \frac{0.5 * 1.05^4 * (1+g_2)}{k - g_2}$$

$$1.5 - 10 g_2 = 0.6078 + 0.6078 g_2$$

$$\therefore g_2 = \frac{0.8922}{10.6078} = 0.0841 = 8.41\%$$

b. (2 Points) What will the price of XYZ stock be five years from now?

$$P_5 = P_4 * (1+g_2) = 10 * 1.0841$$

$$\therefore P_5 = \$10.841$$

Alternatively:

$$P_5 = \frac{D_6}{k_c - g_2} = \frac{D_0 * (1+g_1)^4 * (1+g_2)^2}{0.15 - 0.0841}$$

c. (4 Points) What is the current price of XYZ?

$$P_0 = \frac{D_1}{k_c - g_1} * \left[1 - \left(\frac{1+g_1}{1+k_c}\right)^4\right] + \frac{P_4}{(1+k_c)^4}$$

$$= \frac{0.5 \times 1.05}{0.15 - 0.05} \times \left[1 - \left(\frac{1.05}{1.15}\right)^4\right] + \frac{10}{(1+0.15)^4}$$

$$= \$7.32$$

Equation List - Comm 308 - Booth-Cleary Text

5.3	Present Value of FV_n : $PV_0 = \frac{FV_n}{(1+k)^n}$
5.4	Future value of an annuity: $FV_n = \frac{PMT}{k}\left[(1+k)^n - 1\right]$
5.5	Present Value of an annuity: $PV_n = \frac{PMT}{k}\left[1 - \frac{1}{(1+k)^n}\right]$
5.8	Present value of perpetuity: $PV_0 = \frac{PMT}{k}$
5.10	Effective rate with continuous compounding: $k = e^{QR} - 1$
5.11	Effective rate: $k = \left(1 + \frac{QR}{m}\right)^{\frac{m}{f}} - 1$
5A-2	Present value of growing perpetuity: $PV_0 = \frac{PMT_0(1+g)}{k-g} = \frac{PMT_1}{k-g}$
5A-4	Present value of growing annuity: $PV_0 = \frac{PMT_1}{k-g}\left[1 - \left(\frac{1+g}{1+k}\right)^n\right]$
6.3	Current Yield: $CY = \frac{Annual\ Interest}{B}$
6.6	Price of T-Bill given BEY: $P = \frac{F}{\left(1 + k_{BEY} \times \frac{n}{365}\right)}$
7.10	Share price with growth opportunities: $P_0 = \frac{EPS_1}{k_c} + PVGO$
7.11	Growth rate: $g = b * ROE$