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GOODMAN SCHOOL OF BUSINESS
BROCK UNIVERSITY
Department of Finance, Operations, and Information Systems (FOIS)
FNCE 2P91, Corporate Finance I
Winter 2017 Midterm Examination
March 4, 2017 (5:00p to 8:00p)
16 Pages

Name:_____ Student Number:_____

Please check the box next to your section:

- ☐ 1 – G. Hoover (T 17:00-20:00)
- ☐ 2 – T. Sokolyk (M/W 9:30-11:00)
- ☐ 3 – T. Sokolyk (W 19:00-22:00)
- ☐ 4 – G. Hoover (M 14:00-15:30 / R 12:30-14:00)
- ☐ 5 – T. Sokolyk (W 19:00-22:00)

Answer all questions on the examination paper and hand it in at the completion of the examination. No examination aids other than those specified are permitted. Use or possession of unauthorized materials will automatically result in the award of a zero grade for this examination.

Question	Marks	Awarded
1	15	
2	14	
3	12	
4	4	
5	18	
6	4	
7	12	
8	17	
9	4	
Total	**100**	

Question 1 (15 Marks)

Circle the correct answer for each of the following questions.

A. 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.

B. Interest earned on both the initial principal and the interest reinvested from prior periods is called:

(a) free interest.
(b) annual interest.
(c) simple interest.
(d) interest on interest.
(e) compound interest.

C. The rate of return required by investors in the market for owning a bond is called the:

(a) coupon.
(b) face value.
(c) maturity.
(d) yield to maturity.
(e) coupon rate.

D. Which of the following is a disadvantage of a sole proprietorship?

(a) The owner receiving all the after-tax profit.
(b) Unlimited liability.
(c) Quick decision making.
(d) Can be created through a simple business license.
(e) Less reliance on partners.

E. A loan where the borrower receives money today and repays a single lump sum at some time in the future is called a(n) _____ loan.

(a) amortized
(b) continuous
(c) annuity
(d) pure discount
(e) interest-only

F. As the discount rate increases, the present value of an amount to be received in the future:

(a) remains constant.
(b) also increases.
(c) decreases.
(d) becomes negative.
(e) will vary but the direction of the change is unknown.

G. Graphing the crossover point helps explain:

(a) why one project is always superior to another project.
(b) how decisions concerning mutually exclusive projects are derived.
(c) how the duration of a project affects the decision as to which project to accept.
(d) how the net present value and the initial cash outflow of a project are related.
(e) how the profitability index and the net present value are related.

H. Which one of the following is correct concerning the annual percentage rate (APR)?

(a) The APR is greater than the effective annual rate.
(b) The APR formula for rate disclosure is [1 + (r/m)]m-1.
(c) The APR is the rate which lenders are required to disclose.
(d) The APR is best used to compare offers from various lenders.
(e) The APR considers all the effects of compounding.

I. A loan where the borrower pays interest each period and repays the entire principal of the loan at some point in the future is called a(n) _____ loan.

(a) amortized.
(b) continuous.
(c) balloon.
(d) pure discount.
(e) interest-only.

J. A perpetuity differs from an annuity because:

(a) perpetuity payments vary with the rate of inflation.
(b) perpetuity payments vary with the market rate of interest.
(c) perpetuity payments are variable while annuity payments are constant.
(d) perpetuity payments never cease.
(e) annuity payments never cease.

K. Agency costs are:

(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.

L. Which one of the following bonds tends to be the most interest rate sensitive?

(a) A 20-year, zero coupon bond.
(b) A 20-year, 9% coupon bond.
(c) A 5-year, zero coupon bond.
(d) A 1-year, zero coupon bond.
(e) A 1-year, 9% coupon bond.

M. A bond with face value $1,000 that sells for less than $1,000 in the market is called a:

(a) par bond.
(b) discount bond.
(c) premium bond.
(d) zero coupon bond.
(e) floating rate bond.

N. Interest rates or rates of return on investment that have been adjusted for the effects of inflation are called:

(a) real rates.
(b) nominal rates.
(c) effective rates.
(d) stripped rates.
(e) coupon rates.

O. 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.

Answer the following questions in the space provided. Show all your work. No credit will be given for answers obtained using a financial calculator without the supporting formula and steps leading to the final answer.

Question 2 (14 Marks)

You require a $175,000 mortgage and want a 25-year amortization period. A bank has agreed to lend to you at 6%.

For part (a), assume you would be required to make weekly payments in the amount of $257.89.

(a) How many years would it take for you to pay off the mortgage? (5 marks)

$$EWR = \left(1 + \frac{.06}{2}\right)^{2/52} - 1 = .11\%$$

$$175{,}000 = 257.89\left[\frac{1 - \frac{1}{(1 + .0011)^t}}{.0011}\right]$$

$$t = 1{,}300\ weeks = 25\ years$$

For parts (b) and (c), assume you would be required to make monthly payments in the amount of $1,000 over the next 25 years and then pay off the remaining balance in the form of a single balloon payment.

(b) Prepare an amortization schedule for the first three months of the mortgage. (5 marks)

$$EMR = \left(1 + \frac{.06}{2}\right)^{2/12} - 1 = .49\%$$

Month	Beginning Balance	Total Payment	Interest Payment	Ending Balance
1	$175,000.00	$1,000.00	$864.26	$174,864.26
2	$174,864.26	$1,000.00	$863.59	$174,727.85
3	$174,727.85	$1,000.00	$862.91	$174,590.76

(c) What amount would your balloon payment be at the end of the 25-year amortization period? (4 marks)

$$PV\ of\ Monthly\ Payments = 1{,}000\left[\frac{1-\frac{1}{(1+.0049)^{25(12)}}}{.0049}\right] = \$156{,}297.23$$

$$PV\ of\ Balloon\ Payment = 175{,}000 - 156{,}297.23 = \$18{,}702.77$$

$$FV\ of\ Balloon\ Payment_{25} = 18{,}702.77(1+.0049)^{25(12)} = \$81{,}991.21$$

Question 3 (12 Marks)

Today, you purchased a 4% coupon bond with 20 years to maturity. The bond makes semi-annual coupon payments.

(a) If the yield to maturity on this bond is 6%, what is the bond price today? (4 marks)

$$P = 20\left[\frac{1-\frac{1}{(1+.03)^{2(20)}}}{.03}\right]+\frac{1{,}000}{(1+.03)^{2(20)}} = \$768.85$$

(b) Five years from today, you expect to sell the bond. If the yield to maturity increases by 1.64% during this five-year holding period, what will be the holding period yield (HPY) on your investment? (8 marks)

Hint: The correct answer will round to ".00%" or ".50%".

$t = 2(20-5) = 30\ semiannual\ periods$

$$Semiannual\ YTM = \frac{.06+0164}{2} = 3.82\%$$

$$P_5 = 20\left[\frac{1-\frac{1}{(1+.0382)^{30}}}{.0382}\right]+\frac{1{,}000}{(1+.0382)^{30}} = \$678.29$$

$$768.85 = 20\left[\frac{1-\frac{1}{(1+HPY)^{2(5)}}}{HPY}\right]+\frac{678.29}{(1+HPY)^{2(5)}}$$

$Use\ trial\ and\ error\ to\ solve\ for\ HPY = 3\%\ (semiannual\ HPY = 1.5\%)$

Question 4 (4 Marks)

An investment offers a perpetual stream of $2,000 annual payments beginning ten years from today. Given an interest rate of 4%, what is the value of this investment five years from today?

$$PV_9 = \frac{2{,}000}{.04} = \$50{,}000$$

$$PV_5 = \frac{50{,}000}{(1+.04)^4} = \$42{,}740.21$$

Question 5 (18 Marks)

The required return is 12% for the stock of Company A, Company B, and Company C.

(a) Company A just paid a dividend of $0.50 per share. The company plans to increase its dividend by 20% next year and then reduce its dividend growth rate by 6% per year until it reaches the industry average of 8% dividend growth, after which it is expected the company will maintain a constant growth rate forever. What will a share of Company A stock sell for today? (6 marks)

$D_1 = .50(1 + .2) = \$0.60$

$g_2 = .2 - .06 = 14\%$

$D_2 = .60(1 + .14) = \$0.68$

$g_3 = .14 - .06 = 8\%$

$D_3 = .68(1 + .08) = \$0.74$

$P_2 = \frac{.74}{.12 - .08} = \$18.47$

$P = \frac{.60}{(1 + .12)} + \frac{.68 + 18.47}{(1 + .12)^2} = \$15.80$

(b) Company B just paid a dividend of $0.90 per share. The company plans to increase its dividend by 10% per year for the next five years before leveling off at 8% into perpetuity. What will a share of Company B stock sell for today? (6 marks)

$$P_5 = \frac{.90(1+.1)^5(1+.08)}{.12-.08} = \$39.14$$

$$P = \frac{.90(1+.1)}{.12-.1}\left[1-\left(\frac{1+.1}{1+.12}\right)^5\right] + \frac{39.14}{(1+.12)^5} = \$26.47$$

(c) Company C plans to pay the following dividends per share over the next three years: $0.25, $0.50, and $0.75. Afterward, it is expected the company will increase its dividend by 8% per year indefinitely. What is the dividend yield for Company C stock? (6 marks)

$$P_3 = \frac{.75(1.08)}{.12-.08} = \$20.25$$

$$P = \frac{.25}{(1+.12)} + \frac{.50}{(1+.12)^2} + \frac{.75+20.25}{(1+.12)^3} = \$15.57$$

$$DY = \frac{.25}{15.57} = 1.61\%$$

Question 6 (4 Marks)

An investment offers a 9% total return over the coming year.

(a) If an investor believes the total real return on this investment will only be 7%, what must the investor believe the inflation rate will be over the next year? (2 marks)

$1 + .09 = (1 + .07)(1 + h)$
$h = 1.87\%$

(b) If an investor believes the inflation rate over the next year will be 2%, what must the investor believe the total real return on this investment will be? (2 marks)

$1 + .09 = (1 + r)(1 + .02)$
$r = 6.86\%$

Question 7 (12 Marks)

On your friend's 25th birthday, she deposits $1,000 into a retirement savings account paying a 6% APR with quarterly compounding. She plans to continue depositing $1,000 on the first day of each month up until her planned retirement date 30 years from now. Her final deposit will be made one month before her planned retirement date. During her retirement years, she plans to make a one-time charitable donation on her 75th birthday and annual withdrawals beginning with a $40,000 withdrawal on her 56th birthday. She believes the amount of the annual withdrawals will need to increase by 3% each year. If she wants to be able to make the annual withdrawals for 35 years (i.e. her final withdrawal will be made on her 90th birthday), what is the most she will be able to donate to charity on her 75th birthday?

$$EMR = \left(1 + \frac{.06}{4}\right)^{4/12} - 1 = .5\%$$

$$FV\ of\ Savings\ Account_{30} = 1{,}000\left[\frac{(1 + .005)^{30(12)} - 1}{.005}\right](1 + .005) = \$1{,}003{,}786.78$$

$$EAR = \left(1 + \frac{.06}{4}\right)^{4} - 1 = 6.14\%$$

$$PV\ of\ Annual\ Withdrawals_{30} = \frac{40{,}000}{.0614 - .03}\left[1 - \left(\frac{1 + .03}{1 + .0614}\right)^{35}\right] = \$828{,}999.18$$

$$Surplus\ Savings_{30} = 1{,}003{,}786.78 - 828{,}999.18 = \$174{,}787.60$$

$$FV\ of\ Surplus\ Savings_{50} = 174{,}787.60(1 + .0614)^{20} = \$575{,}167.06$$

Question 8 (17 Marks)

A company is considering a project with the following expected cash flows:

Year	Cash Flow
0	-$85,000
1	$36,000
2	$36,000
3	$36,000

The company requires a 12% return on investment.

(a) Compute the discounted payback period for the project. The company will accept the project if it pays back within three years. Should the company accept or reject the project based on this decision rule? (4 marks)

Year	Remaining at Beginning	PV of Cash Flow	Remaining at End
1	$85,000.00	$32,142.86	$52,857.14
2	$52,857.14	$28,698.98	$24,158.16
3	$24,158.16	$25,624.09	($1,465.93)

$$DPP = 2 + \frac{24{,}158.16}{25{,}624.09} = 2.94\ years$$

$$DPP = 2.94 < 3 \rightarrow Accept$$

(b) Compute the NPV for the project. Should the company accept or reject the project based on this decision rule? (4 marks)

$$NPV = -85{,}000 + 36{,}000\left[\frac{1 - \frac{1}{(1+.12)^3}}{.12}\right] = \$1{,}465.93$$

$$NPV = \$1{,}465.93 > \$0 \rightarrow Accept$$

(c) Compute the profitability index for the project. Should the company accept or reject the project based on this decision rule? (4 marks)

$$PV\ of\ Cash\ Inflows = 36{,}000\left[\frac{1 - \frac{1}{(1+.12)^3}}{.12}\right] = \$86{,}465.93$$

$$PI = \frac{86{,}465.93}{85{,}000} = 1.02$$

$$PI = 1.02 > 1 \rightarrow Accept$$

(d) Compute the IRR for the project. Should the company accept or reject the project based on this decision rule? (4 marks)

Hint: The correct answer will round to ".00%" or ".50%".

$$NPV = 0 = -85{,}000 + 36{,}000\left[\frac{1 - \frac{1}{(1+IRR)^3}}{IRR}\right]$$

$Use\ trial\ and\ error\ to\ solve\ for\ IRR = 13\%$

$IRR = 13\% > 12\% \rightarrow Accept$

(e) Which of the above decision rules is the preferred approach to assess the profitability of a project? (1 mark)

NPV

Question 9 (4 Marks)

Bank A charges an interest rate of 6.00% compounded weekly. Bank B charges an interest rate of 6.05% compounded semiannually. Which bank charges the favourable lending rate?

$$EAR^A = \left(1 + \frac{.06}{52}\right)^{52} - 1 = 6.18\%$$

$$EAR^B = \left(1 + \frac{.0605}{2}\right)^{2} - 1 = 6.14\% \ (Favourable)$$