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GOODMAN SCHOOL OF BUSINESS
BROCK UNIVERSITY
Department of Finance, Operations, and Information Systems (FOIS)
FNCE 2P91, Corporate Finance I
Fall 2015 Midterm Examination
October 31, 2015 (9:00a to 12:00p)
15 Pages

Name:_____ Student Number:_____

Please check the box next to your section:

☐ 1 – L. Stevenson (M/W 11:00-12:30)

☐ 3 – O. Ozocak (W 14:00-15:30 / F 12:30-14:00)

☐ 5 – J. Miele (M/W 11:00-12:30)

☐ 6 – G. Hoover (M 8:00-9:30 / R 11:00-12:30)

☐ 8 – O. Ozocak (W 15:30-17:00 / F 14:00-15:30)

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	10	
2	10	
3	12	
4	6	
5	9	
6	10	
7	8	
8	17	
9	3	
10	15	
Total	**100**	

Question 1 (10 Marks)

Circle the correct answer for each of the following questions.

A. A business formed by two or more individuals or entities is called a(n):

(a) corporation.
(b) sole proprietorship.
(c) partnership.
(d) closed receivership.
(e) open structure.

B. In order to compare different investment opportunities (each with the same risk) with interest rates reported in different manners you should:

(a) convert each interest rate to an annual nominal rate.
(b) convert each interest rate to a monthly nominal rate.
(c) convert each interest rate to an effective annual rate.
(d) compare them by using the published annual rates.
(e) convert each interest rate to an APR.

C. The interest rate which lenders must report to borrowers as required by law is the:

(a) monthly interest rate.
(b) simple rate.
(c) annual percentage rate.
(d) effective annual rate.
(e) periodic rate.

D. Which of the following is an advantage of ownership of a corporation compared to that of a sole proprietorship?

(a) The owners of the corporation have unlimited liability for the firm's debts.
(b) It is the simplest to start.
(c) The corporation has an unlimited life.
(d) Dividends received by the corporation's shareholders are tax-exempt.
(e) It is more difficult to transfer ownership in a corporation.

E. The rate at which the stock price is expected to appreciate (or depreciate) is the:

(a) current yield.
(b) total yield.
(c) dividend yield.
(d) capital gains yield.
(e) earnings yield.

F. Which one of the following actions best meets the goal of financial management?

(a) Deciding a firm should be 100% equity financed
(b) Delaying cash payments in order to increase the total cash on hand
(c) Easing the accounts receivable policies in order to increase current sales
(d) Accepting a project that enhances the current market value of the firm's stock
(e) Issuing additional shares of stock to increase the total cash on hand

G. Equity with priority for dividends and in the event of bankruptcy is called:

(a) dual class stock.
(b) cumulative stock.
(c) deferred stock.
(d) preferred stock.
(e) common stock.

H. 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.

I. A stock's next expected dividend divided by the current stock price is the:

(a) current yield.
(b) total yield.
(c) dividend yield.
(d) capital gains yield.
(e) earnings yield.

J. The use of which of the following could lead to incorrect decisions when comparing mutually exclusive investments?

I. Internal rate of return
II. Profitability index
III. Net present value

(a) I only
(b) II only
(c) III only
(d) I and II only
(e) I and III only

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 (10 Marks)

You applied for a $500,000 mortgage to a bank quoting 3%. You want a 25-year amortization period.

(a) How much will your weekly payment be? (5 marks)

$$EWR = \left(1 + \frac{.03}{2}\right)^{2/52} - 1 = .06\%$$

$$500{,}000 = C\left[\frac{1 - \frac{1}{(1 + .0006)^{25(52)}}}{.0006}\right]$$

$$C = \$545.53$$

(b) Prepare an amortization schedule for the first 3 weeks of the mortgage. (5 marks)

Week	Beginning Balance	Total Payment	Interest Payment	Ending Balance
1	$500,000	$545.53	$286.40	$499,740.87
2	$499,740.87	$545.53	$286.25	$499,481.59
3	$499,481.59	$545.53	$286.10	$499,222.16

Question 3 (12 Marks)

On September 1, 2015, parents made an initial deposit of $300 into a savings account they opened to begin saving for their daughter's university tuition fees as well as the purchase of a car to give to her as a graduation gift. The parents plan to continue depositing the same amount of $300 on the first day of each month for ten years (i.e. final deposit will occur on August 1, 2025). The daughter plans to begin university September 1, 2025. Her first year tuition fees are expected to be $10,000. Tuition fees are paid at the end of each year and are expected to increase 3% per year. Upon graduating after four years, the parents plan to spend $20,000 to purchase a car to give to their daughter as a graduation gift (assume purchase date is August 31, 2029). The grandparents have committed to making a deposit into the savings account five years from today. The family's goal is for the four years of tuition fees as well as the purchase of the car upon graduation to be completely funded by the savings account with no additional deposits made to the account once the daughter begins university. The savings account pays a 4% EAR. What is the minimum amount the grandparents will need to deposit in five years to help the family achieve their goal?

$$EMR = (1 + .04)^{1/12} - 1 = .33\%$$

$$Tuition\ PV_{10} = \frac{10{,}000}{.04 - .03}\left[1 - \left(\frac{1 + .03}{1 + .04}\right)^{4}\right] = \$37{,}910.35$$

$$Car\ Purchase\ PV_{10} = \frac{20{,}000}{(1 + .04)^{4}} = \$17{,}096.08$$

$$Savings\ FV_{10} = 300\left[\frac{(1 + .0033)^{10(12)} - 1}{.0033}\right](1 + .0033) = \$44{,}152.85$$

$$Shortfall_{10} = (37{,}910.35 + 17{,}096.08) - 4{,}152.85 = \$10{,}853.59$$

$$Shortfall\ PV_{5} = \frac{10{,}853.59}{(1 + .04)^{5}} = \$8{,}920.86$$

Question 4 (6 Marks)

Investment Plan A will make annual payments forever beginning one year from today. The first payment from Plan A will be for $5,000 and each payment thereafter will increase by 3%. Investment Plan B is a $15,000 annual perpetuity that will make its first payment ten years from today. If the relevant discount rate is 8%, which investment plan has the highest present value today?

$$PV^A = \frac{5{,}000}{.08 - .03} = \$100{,}000$$

$$PV_9^B = \frac{15{,}000}{.08} = \$187{,}500$$

$$PV^B = \frac{187{,}500}{(1 + .08)^9} = \$93{,}796.68$$

$Investment\ Plan\ A\ has\ the\ highest\ PV.$

Question 5 (9 Marks)

A company has decided to raise $15 million by issuing 30-year bonds with a YTM of 8% and face value of $1,000.

For parts (a) and (b), assume the company decides to issue annual coupon bonds at face value (i.e. bond is selling at par).

(a) How many bonds would the company need to issue? (2 marks)

$$N = \frac{15{,}000{,}000}{1{,}000} = 15{,}000$$

(b) At maturity, how much will the company's repayment be (remember to include the final coupon payment)? (2 marks)

$$C = .08(1{,}000) = \$80$$

$$Repayment_{30} = 15{,}000(1{,}000 + 80) = \$16{,}200{,}000$$

For parts (c) and (d), assume the company decides to issue a zero coupon bond.

(c) How many bonds would the company need to issue? (3 marks)

$$P = \frac{1{,}000}{(1 + .08)^{30}} = \$99.38$$

$$N = \frac{15{,}000{,}000}{99.38} = 150{,}939.85$$

(d) At maturity, how much will the company's repayment be? (2 marks)

$$Repayment_{30} = 150{,}939.85(1{,}000) = \$150{,}939{,}853.34$$

Question 6 (10 Marks)

You need a $10,000 loan from your bank and are considering different lending arrangements.

(a) If your bank charges an APR of 12% with weekly compounding and you make monthly payments of $400 beginning one month from today, how many months will it take you to pay off your loan? (3 marks)

$$EMR = \left(1 + \frac{.12}{52}\right)^{52/12} - 1 = 1.00\%$$

$$10{,}000 = 400\left[\frac{1 - \frac{1}{(1+.01)^t}}{.01}\right]$$

$$t = \frac{ln\ 1.33}{ln\ 1.01} = 28.93\ months$$

(b) If your bank charges an APR of 7% with quarterly compounding and you make monthly payments of $500 beginning one month from today, how many months will it take you to pay off your loan? (5 marks)

$$EMR = \left(1 + \frac{.07}{4}\right)^{4/12} - 1 = .58\%$$

$$10{,}000 = 500\left[\frac{1 - \frac{1}{(1+.0058)^t}}{.0058}\right]$$

$$t = \frac{ln\ 1.13}{ln\ 1.01} = 21.32\ months$$

(c) If your bank requires you to make a single lump sum repayment in the amount of $11,500 two years from today, what is the effective annual rate of the loan? (2 marks)

$$10{,}000 = \frac{11{,}500}{(1+EAR)^2}$$

$$EAR = 7.24\%$$

Question 7 (8 Marks)

Today, you purchased a bond for $771.90. The bond pays a 5% coupon annually and has thirteen years to maturity. If five years from now the yield to maturity on your bond is 6% and you decide to sell it at the end of year five, what will be the holding period yield (HPY) on your investment?

$$P_8 = 50\left[\frac{1-\frac{1}{(1+.06)^{(13-5)}}}{.06}\right]+\frac{1{,}000}{(1+.06)^{(13-5)}} = \$937.90$$

$$771.90 = 50\left[\frac{1-\frac{1}{(1+HPY)^5}}{HPY}\right]+\frac{937.90}{(1+HPY)^5}$$

$Use\ trial\ and\ error\ to\ solve\ for\ HPY = 10\%$

Question 8 (17 Marks)

A company is considering Project A and Project B, which are mutually exclusive. Project A has the following cash flows:

Year	Cash Flow
0	($80,347)
1	$25,000
2	$40,000
3	$50,000

The company requires a 15% return on investment.

(a) Assume the discounted payback period for Project B is 2.58 years. If the company evaluates projects using the discounted payback rule, which project would be accepted? (4 marks)

Year	Remaining at Beginning	PV of Cash Flow	Remaining at End
1	$85,347.00	$21,739.13	$58,607.87
2	$58,607.87	$30,245.75	$28,362.12
3	$28,362.12	$32,875.81	($4,513.69)

$$DPP^A = 2 + \frac{28{,}362.12}{32{,}875.81} = 2.86\ years$$

$$DPP^A = 2.86 > 2.58 \rightarrow Accept\ Project\ B$$

(b) Assume the NPV for Project B is $2,776. If the company evaluates projects using the NPV analysis, which project would be accepted? (4 marks)

$$NPV^A = -80{,}347 + \frac{25{,}000}{(1+.15)} + \frac{40{,}000}{(1+.15)^2} + \frac{50{,}000}{(1+.15)^3} = \$4{,}513.69$$

$$NPV^A = \$4{,}513.69 > \$2{,}776 \rightarrow Accept\ Project\ A$$

(c) Assume the profitability index for Project B is 1.03. If the company evaluates projects using the profitability index rule, which project would be accepted? (4 marks)

$$PV\ of\ Cash\ Inflows^A = \frac{25{,}000}{(1+.15)} + \frac{40{,}000}{(1+.15)^2} + \frac{50{,}000}{(1+.15)^3} = \$84{,}860.69$$

$$PI^A = \frac{84{,}860.69}{80{,}347} = 1.06$$

$$PI^A = 1.06 > 1.03 \rightarrow Accept\ Project\ A$$

(d) What is the IRR for Project A? (4 marks)

$$NPV^A = 0 = -80{,}347 + \frac{25{,}000}{(1+IRR)} + \frac{40{,}000}{(1+IRR)^2} + \frac{50{,}000}{(1+.IRR)^3}$$

$Use\ trial\ and\ error\ to\ solve\ for\ IRR^A = 18\%$

(e) Which of the above is the preferred decision criteria? (1 mark)

NPV

Question 9 (3 Marks)

An asset had a total return last year of 12%. The inflation rate last year was 4%. What was the real return on the asset?

$1 + .12 = (1 + r)(1 + .04)$

$r = 7.69\%$

Question 10 (15 Marks)

A company just paid a dividend of $3 per share. Future dividends are expected to grow by 20% annually for the next 5 years, 10% annually for years 6 to 10, and then level off at a 5% annual growth rate thereafter.

(a) Assume you require a 12% return on this stock. How much would you be willing to pay for a share of this company's stock? (13 marks)

$$D_{11} = 3(1 + .2)^5(1 + .1)^5(1 + .05) = \$12.62$$

$$P_{10} = \frac{12.62}{.12 - .05} = \$180.34$$

$$D_6 = 3(1 + .2)^5(1 + .1) = \$8.21$$

$$P_5 = \frac{8.21}{.12 - .1}\left[1 - \left(\frac{1 + .1}{1 + .12}\right)^5\right] + \frac{180.34}{(1 + .12)^5} = \$137.70$$

$$D_1 = 3(1 + .2) = \$3.60$$

$$P = \frac{3.60}{.12 - .2}\left[1 - \left(\frac{1 + .2}{1 + .12}\right)^5\right] + \frac{137.70}{(1 + .12)^5} = \$96.67$$

(b) Assume the current market price of this company's stock is $100 per share. What is the dividend yield for this stock? (2 marks)

$$D_1 = 3(1 + .2) = \$3.60$$

$$DY = \frac{3.60}{100} = 3.6\%$$