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BROCK UNIVERSITY
GOODMAN SCHOOL OF BUSINESS

Department of Finance, Operations, and Information Systems (FOIS)
FNCE 2P91, Corporate Finance I
Winter 2016 Midterm Examination
February 27, 2016 (9:00 am to 12:00 noon)
12 Pages

Name:_____

Student Number:_____

Please check the box next to your section:

☐ 2 – T. Sokolyk (M / W 9:30-11:00)

☐ 3 – A. Malik (M / W 9:30-11:00)

☐ 4 - C. Melville (TH 19:00-22:00)

☐ 5 - T. Sokolyk (W 8:00-9:30 / F 11:00-12:30)

☐ 6 - T. Sokolyk (M 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	20	
2	10	
3	16	
4	8	
5	15	
6	14	
7	14	
8	3	
Total	100	

Question 1 (20 Marks)

Circle the correct answer for each of the following questions.

A. "Double taxation" refers to:
(a) all partners paying equal taxes on profits.
(b) corporations paying taxes on both dividends and retained earnings.
(c) paying taxes on profits at the corporate level and on dividends at the personal level.
(d) the fact that marginal tax rates are doubled for corporations.

B. Which of the following can cause a project to have multiple IRRs?
(a) The project has a large initial outlay.
(b) A ten-year project has an initial cash outlay and a negative cash flow in the last year of the project's life.
(c) A project has negative cash flows in the first three years, but positive cash flows thereafter.
(d) Whenever project cash flows are conventional.

C. The process of making regular payments that reduce the principal loan balance is called:
(a) annuitizing the loan.
(b) amortizing the loan.
(c) depleting the loan.
(d) discounting the loan.
(e) compounding the loan.

D. What is the present value of a five period annuity of $3,000 if the interest rate is 12% and the first payment is made today?
(a) $9,655.65
(b) $10,814.33
(c) $12,112.05
(d) $13,200.00

Answer: C Difficulty: Medium

$$PV = 3{,}000\left[\frac{1}{.12} - \frac{1}{.12(1.12)^4}\right] + 3000$$

$= 3{,}000\ [8.33 - 5.296) + 3{,}000$

$= \$12{,}112.05$

E. The interest rate which lenders must report to borrower as required by law is the:
(a) monthly interest rate.
(b) simple rate.

(c) annual percentage rate.
(d) effective annual rate.

F. A bond's yield to maturity takes into consideration:
(a) coupon payment but not price changes of a bond.
(b) price changes but not coupon payment of a bond.
(c) both coupon payment and price changes of a bond.
(d) neither coupon payment nor price changes of a bond.

G. The profitability index (PI) rule can be best stated as:
(a) An investment is acceptable if its PI is greater than one.
(b) An investment is acceptable if its PI is less than one.
(c) An investment is acceptable if its PI is greater than the internal rate of return (IRR).
(d) An investment is acceptable if its PI is less than the net present value (NPV).

H. The net present value (NPV) rule can be best stated as:
(a) An investment should be accepted if, and only if, the NPV is exactly equal to zero.
(b) An investment should be rejected if the NPV is positive and accepted if it is negative.
(c) An investment should be accepted if the NPV is positive and rejected if it is negative.
(d) An investment with greater cash inflows than cash outflows, regardless of when the cash flows occur, will always have a positive NPV and therefore should always be accepted.

I. The primary goal of financial management is to:
(a) maximize current sales.
(b) maximize the current value per share of the existing stock.
(c) avoid financial distress.
(d) minimize operational costs.

J. Which of the following is true about bonds?
(a) When the market interest rate exceeds the coupon rate, bonds sell for less than face value.
(b) The current yield measures the bond's total rate of return.
(c) Short-term bonds are more sensitive to changes in interest rates than long-term bonds.
(d) A and B

Question 2 (10 Marks)

On his 35th birthday, Mr. Right sets aside $21,000 in a retirement savings account. He also plans to make annual payments of $6,000 at the beginning of each year (first deposit at t=35) for the next 30 years until his retirement age. He expects to earn 11% EAR for the next 30 years and 7% EAR during retirement years. It is expected that Mr. Right will live for 25 years after his retirement date. If the first of 25 equal annual withdrawals is made on his retirement date (65th birthday), how much can Mr. Right withdraw each year during his retirement?

Solution:

How much will he have at t=65 from the two cash flow streams?

i) **21,000 *(1.11)^30 = 480,738**
ii) **FVA = 6000 {(1.11)^30 -1 / .11} * (1.11) = 1,325,479**

So client will have 1,806,217 saved for retirement.

Last step is to find "C" value of annual income in retirement.

1,806,217 = C {(1-1/(1.07)^25) / .07} * (1.07)

C= 144,853

Question 3 (16 marks)

(a) Today, you purchased a 4% coupon bond with 20 years to maturity. The bond has a face value of $1,000 and makes semi-annual payments. If the yield to maturity on the bond is 6%, what is the current bond price? (4 marks)

$$Price = 20\left[\frac{1}{0.03} - \frac{1}{0.03(1.03)^{40}}\right] + \frac{1000}{(1.03)^{40}} = -768.85$$

(b) Five years from today, you expect to sell the bond you purchased in part (a). If the yield to maturity has increased by 1.64% during this five-year holding period, at what price will your bond sell? (4 marks)

$$Price = 20\left[\frac{1}{0.0382} - \frac{1}{0.0382(1.0382)^{30}}\right] + \frac{1000}{(1.0382)^{30}} = 678.29$$

(c) Assuming the transaction in parts (a) and (b), what will be the holding period yield on your investment? (4 marks)

HPY is r x 2 from the following equation:

$$768.85 = 20\left[\frac{1}{r} - \frac{1}{r(1+r)^{10}}\right] + \frac{678.29}{(1+r)^{10}}$$

r = 1.5%

HPY = 1.5 x 2 = 3%

(d) Now assume an 8% coupon bond is selling for $1,085.30 and has 5 years to maturity. The bond has a face value of $1,000 and makes semi-annual payments. What is the yield to maturity on this bond? (4 marks)

YTM = r x 2 from the following equation:

$$1{,}085.30 = 40\left[\frac{1}{r} - \frac{1}{r(1+r)^{10}}\right] + \frac{1{,}000}{(1+r)^{10}}$$

r = 3%

HPY = 3 x 2 = 6%

Question 4 (8 marks)

While vacationing in the United States, you purchased a state lottery ticket, and now you are the lucky winner of $2,080,000 prize. Upon reading the fine print, though, you find that you can take your prize money either as (a) $750,000 paid today, or (b) $1000 a week (first payment one week from today) for the next 40 years. Evaluate which option you would select if you could earn 6% APR compounding semi-annually.

Solution:

Compare PV of $1000 a week for 2080 weeks.

EAR = (1+.06/2)^2-1 = .0609

EWR = (1.0609)^(1/52)-1 = 0.001138

PVA = 1000 {(1-1/(1.001138)^2080)/0.001138}

PVA = $796,487

From a PV basis, the annuity of $1000 per week is a higher value that the PV of payout today ($750,000). So you should select to take the $1000 annuity.

Question 5 (15 marks)

You just purchased a house for $500,000 and made a $50,000 down payment. In negotiating you mortgage you opt for a 25 year amortization length and plan on making bi-weekly payments (26 payments per year). The bank offers you a 2.94% APR with semi-annual compounding.

(a) What will be your bi-weekly payment amount? (6 marks)

Solution:

EAR = (1+.0294/2)^2-1 = 0.029616

EBWR = (1.029616)^(1/26) -1 = 0.001123

Let "C" equal bi-weekly payment

$450,000 = C {(1-1/(1.001123)^650)/.001123}

C = $975.87

(b) Given your answer in part a, fill out the amortization table for the first 3 payments below: (5 marks)

Bi weekly Payment	Beginning Balance	Interest Payment	Principal payment	Total Bi weekly Payment	Ending Balance
1	450,000	505.43	470.45	975.87	449,529.55
2	449,529.55	504.90	470.97	975.87	449,058.58
3	449,058.58	504.37	471.50	975.87	448,587.08

(c) There is a balloon payment option in 10 years. How much will the balloon payment be? (4 marks)

$$PV = 975.87\left[\frac{1}{0.001123} - \frac{1}{0.001123(1.001123)^{15*26}}\right] = 308{,}042.45$$

Question 6 (14 marks)

a) Watch Me Whip (WMW) Corp will pay a dividend of $0.90 for each of the next 4 years, after which time the dividend is expected to grow by 5% for 5 years then level off at 3% forever. What is the price of WMW shares today? Assume 12% required return. (6 marks)

$$p_9 = \frac{Div_{10}}{r - g_2} = \frac{0.90(1.05)^5(1.03)}{0.12 - 0.03} = 13.15$$

$$p_4 = \frac{0.9(1.05)}{0.12 - 0.05}\left[1 - \left(\frac{1.05}{1.12}\right)^5 + \frac{13.15}{(1.12)^5} = 11.185\right.$$

$$p_0 = 0.9\left[\frac{1}{0.12} - \frac{1}{0.12(0.12)^4}\right] + \frac{11.185}{(1.12)^4} = 9.84$$

b) What is the dividend yield of WMW stock? (2 marks)

$$\boldsymbol{p_0 = \frac{Div_1}{p_0} = \frac{0.90}{9.84} = 0.0915 = 9.15\%}$$

c) What is the expected capital gains yield for WMW? (2 marks)

Cap. Gains yield = 12% - 9.15% = 2.85%

d) NoGrowth Corporation just paid an annual dividend of $1.50. If you expect its dividends to grow by 6% per year, what is the price per share if investors require 11% return? (4 marks)

$$\boldsymbol{p_0 = \frac{Div_1}{r-g} = \frac{1.05(1.06)}{0.11-0.06} = 31.80}$$

Question 7 (14 marks)

Gaga Inc is evaluating two mutually exclusive projects that differ in their projected after-tax cash flows:

	Project A	Project B
Year 0	-70,000	-80,000
Year 1	22,400	0
Year 2	22,400	0
Year 3	22,400	0
Year 4	22,400	0
Year 5	22,400	160,900

a) If Gaga's required return on investment is 10%, what is the NPV of these projects? Based on the NPV method, which project should the company invest in? (3 marks)

$$NPV_A = = 70{,}000 + 22{,}400\left[\frac{1}{0.1} - \frac{1}{0.1(1.1)^5}\right] = 14{,}913.62$$

$$NPV_B = -80{,}000 + \frac{160{,}900}{(1.1)_5} = 19{,}906.24$$

Accept Project B, $NPV_B > NPV_A$

b) What is the IRR of these projects? Based on the IRR investment criteria, which project should the company invest in? (3 marks)

IRR is r from NPV equation when NPV = 0

Project A:

$$0 = -70{,}000 + 22{,}400\left[\frac{1}{r} - \frac{1}{r(1+r)^5}\right]$$

$IRR_A = 18\%$

Project B:

$$0 = -80{,}000 + 160{,}900/(1+r)^5$$

r = 15%

Accept project A $IRR_A > IRR_B$

c) What is the discounted payback period for each project? Based on the discounted payback method, which project should the company invest in? (3 marks)

Project B: $\frac{160,900}{(1.1)^5} = 99,906.24$

Disc payback = $4 + \frac{80,000}{99,906.24} = 4.8yrs$

Project A: PV (CF_s)
-70,000, $\frac{22,400}{1.10} = 20,363.64$, $\frac{22,400}{(1.10)^2} = 18,512.40$, $\frac{22,400}{(1.10)^3} = 16,829.45$, $\frac{22,400}{(1.10)^4} = 15,299.50$

70,000 – 20,363.64 -18,512.40 – 16,829.45 = 14,294.51

$$\frac{14,294.51}{15,299.50} = 0.9343$$

3.93 yrs disc paypack for A

d) Ultimately which of the two mutually exclusive projects should the company invest in and why? (1 mark)

Project B because $NPV_B > NPV_A$

e) Assume again that the projects are mutually exclusive, how would you decide over what range of required return rates you would choose Project A and over what range you would choose Project B? How would you decide at what required return you would be indifferent between the two projects? (Note: the exact solution is not required, just show how to set up the formula and explain your conclusions). (4 marks)

$NPV_A – NPV_B = 0$

$NPV_{(projA-B)} = +10,000 + \frac{22,400}{1+r} + \frac{22,400}{(1+r)^2} + \frac{22,400}{(1+r)^3} + \frac{22,400}{(1+r)^4} - \frac{138,500}{(1+r)^5}$

Solve for r – at this rate you would be indifferent;
when required return > r choose A,
when required return < r choose B

r =12.27 (not required)

Question 8 (3 marks)

You just made 8% return on your investment. If the inflation rate was 3% during the year, what was your real rate of return?

$$real\ r = \frac{1.08}{1.03} - 1 = 4.85\%$$