Finance 3310 Midterm Exam
July 23, 2015

Student Name: _____SOLUTIONS_____

- You are not permitted to use any notes or books during the exam.
- You may use a financial calculator for numerical problems.
- Round answers for numeric questions to two significant digits to the right of the decimal point.
- The exam is worth 100 points. Be sure to allocate your time efficiently. Unless otherwise noted, each question is worth 5 points.
- You will have until 9:30 a.m. to complete the exam.

1-Which of the following should a financial manager consider when analyzing a capital budgeting project?
    I. project start up costs
    II. timing of all projected cash flows
    III. dependability of future cash flows
    IV. dollar amount of each projected cash flow
    a.   I and IV only
    b.   I, II, and IV only
    c.   I, II, and III only
    d.   II, III, and IV only
    e.   I, II, III, and IV

2-Which one of the following terms is defined as the mixture of a firm's debt and equity financing?
    a.   working capital management
    b.   cash management
    c.   cost analysis
    d.   capital budgeting
    e.   capital structure

3-Shareholder A sold shares of Maplewood Cabinets stock to Shareholder B. The stock is listed on the NYSE. This trade occurred in which one of the following?
    a. primary, dealer market
    b. secondary, dealer market
    c. primary, auction market
    d. secondary, auction market
    e. secondary, OTC market

4-Which one of the following is a capital budgeting decision?
    a. determining how many shares of stock to issue

b. <u>deciding whether or not to purchase a new machine for the production line</u>
c. deciding how to refinance a debt issue that is maturing
d. determining how much inventory to keep on hand
e. determining how much money should be kept in the checking account

5-Which form of business structure is most associated with agency problems?
  a. sole proprietorship
  b. general partnership
  c. limited partnership
  d. <u>corporation</u>
  e. limited liability company

6-Which one of the following is least likely to be an agency problem?
  a. increasing the size of a firm
  b. concentrating on maximizing current profits
  c. closing a division with net losses
  d. <u>increasing the market value of the firm's shares</u>
  e. obtaining a patent for a new product

7-Which of the following individuals have unlimited liability based on their ownership interest?
  I. general partner
  II. sole proprietor
  III. stockholder
  IV. limited partner
  a. II only
  b. <u>I and II only</u>
  c. II and IV only
  d. I, II, and III only
  e. I, II, and IV only

8- Three $1,000 face value, 10-year bonds are equally risky; hence, their yields to maturity are equal. Bond 8 has an 8% annual coupon, Bond 10 has a 10% annual coupon, and Bond 12 has a 12% annual coupon. Bond 10 sells at par. Assuming that interest rates remain constant for the next 10 years, what can you say about the relative prices of Bond 8 and Bond 12? That is, indicate whether each bond should sell at par, discount or premium, and explain why.

SOLUTION: Since Bond 10 sells at par, this implies that Bond 10's yield to maturity is equal to its coupon rate of 10% (note that the value for r that solves the following pricing

equation is $r = 10\%$):

$$P_{\text{Bond 10}} = \$100(PVFA_{r,10}) + \$1,000(PFV_{r,10}) = PVFA_{r,n} = \$100\left(\frac{1-(1+r)^{-10}}{r}\right) + \frac{\$1,000}{(1+r)^{10}} = \$1,000.$$

Applying $r = 10\%$ to pricing Bond 8 and Bond 12, we obtain:

$$P_{\text{Bond 8}} = \$80\left(\frac{1-(1+.1)^{-10}}{.1}\right) + \frac{\$1,000}{1.1^{10}} = \$877.11, \text{ and}$$

$$P_{\text{Bond 12}} = \$120\left(\frac{1-(1+.1)^{-10}}{.1}\right) + \frac{\$1,000}{1.1^{10}} = \$1,122.89.$$

The general principle here is that if the coupon rate is less than/equal to/greater than the yield to maturity, then the bond price is greater than/equal to/less than the bond's par value.

9-At 7 percent interest, how long does it take to triple your money? (Round your answer to 2 decimal places. (e.g., 32.16))

SOLUTION: Since $FV = PV(1+r)^n$, solving for n we obtain $n = \ln(FV / PV) / \ln(1+r)$. Therefore, the length of time to triple your money is:

$$n = \ln(3) / \ln(1.07) = 16.24 \text{ years.}$$

10- You expect to receive $14,000 at graduation in two years. You plan on investing it at 8 percent until you have $103,000. How long will you wait from now? (Do not round your intermediate calculations.)

SOLUTION: Since (as shown in problem 8) $n = \ln(FV / PV) / \ln(1+r)$, here $n = \ln(103,000 / 14,000) / \ln(1.08) = 25.93$. So, the money must be invested for 25.93 years. However, you will not receive the money for another two years. From now, you'll wait: 2 years + 25.93 years = 27.93 years.

11- In 1895, the first Putting Green Championship was held. The winner's prize money was $290. In 2010, the winner's check was $1,310,000.
What was the percentage increase per year in the winner's check over this period?

SOLUTION: Since $FV = PV(1+r)^n$, solving for r we obtain we obtain:
$r = (FV / PV)^{1/n} - 1$; thus $r = (1,310,000 / 290)^{1/115} - 1 = 0.0759$, or 7.59%.

12- Imprudential, Inc. has an unfunded pension liability of $571 million that must be paid in 15 years. To assess the value of the firm's stock, financial analysts want to discount this liability back to the present. If the relevant discount rate is 6.4 percent, what is the present value of this liability?

SOLUTION: To find the PV of a lump sum, we use:

$PV = FV / (1+r)^n$; thus, $PV = FV / (1+r)^n = \$571,000,000 / 1.064^{15} = \$225,170,601.97$.

13- First City Bank pays 8 percent interest compounded annually on its savings account balances, whereas Second City Bank pays 8 percent interest compounded quarterly. If you made a $55,000 deposit in each bank, how much more money would you earn from your Second City Bank account at the end of 8 years?

SOLUTION: First City Bank $FV = \$55,000(1.08)^8 = \$55,000(1.8509) = \$101,801.16$, whereas Second City Bank $FV = \$55,000(1.02)^{32} = \$55,000(1.8845) = \$103,649.73$. The difference is $103,649.73 - $101,801.16 = $1,848.57.

14- Live Forever Life Insurance Co. is selling a <u>perpetuity</u> contract that pays $1,550 monthly. The contract currently sells for $116,000. What is the monthly return on this investment vehicle?

SOLUTION: We know that the present value factor for a finite-lived ordinary annuity is

$PVFA_{r,n} = \left(\dfrac{1-(1+r)^{-n}}{r} \right)$. However, since this annuity lasts forever, this implies that

$PVFA_{r,n} = 1/r$. Thus, $PV = C/r$ ➔ $116,000 = $1,550/r$. Solving for r, we obtain $r =$ $1,550/$116,000 = 1.336%.

Problem statement for problems 14 and 15: A check-cashing store is in the business of making personal loans to walk-up customers. The store makes only one-week loans at 6.6 percent interest per week.

15- What APR must the store report to its customers?

SOLUTION: The APR is the interest rate per week times 52 weeks in a year, so:
 APR = 52(6.6%) = 343.2%,

16- What EAR are customers actually paying?

SOLUTION: EAR = $(1 + 0.066)^{52} - 1 = 26.7571$, or 2,675.71%

17- What is the value today of $3,500 per year, at a discount rate of 10 percent, if the first payment is received 6 years from today and the last payment is received 20 years from today? [Tip: We want to find the value of the cash flows today, so we will find the PV of the annuity, and then bring the lump sum PV back to today.]

SOLUTION: We want to find the value of the cash flows today, so we will find the PV of the annuity, and then bring the lump sum PV back to today. The annuity has 15 payments, so the PV of the annuity 5 years from now is:

$$PV_5 = \$3,500\left(\frac{1-(1.1)^{-15}}{.1}\right) = \$3,500(7.6061) = \$26,621.28,$$

To find the value today, we find the *PV* of this lump sum. The value today is

$$PV = PV_5 / (1+r)^5 = \$26,621.28 / .620921 = \$16,529.72.$$

18- Wainright Co. has identified an investment project with the following cash flows. C_1 =$880, and C_2 =$1,250. If the discount rate is 8 percent, what is the present value of these cash flows?

SOLUTION: $PV = \$880 / 1.08 + \$1,250 / 1.08^2 = \$1,886.49.$

19- You want to purchase a new car. After reviewing your budget, you determine that you are able to afford payments of up to $300 per month and wish to take out a loan for 5 years (60 months). You currently have a trade-in vehicle worth $10,000. You look at average rates for different credit scores and find that if your credit score is above 720, you will be able to get a rate of 3.5%. However, if your credit score is below 600, you end up paying a rate of 14.5%.

a. (5 points) Since auto loans are paid monthly, determine the most expensive car you can afford with a high credit score and a low credit score. Don't forget about the value of your trade-in!

SOLUTION: The determination of the maximum loan for either credit score involves finding the present value of $300 paid monthly for 60 months at the monthly APR. For the good credit score, monthly APR is 3.5%/12, and for the bad credit score, monthly APR is 14.5%/12.

$$PVFA_{.035/12,60} = \left(\frac{1-(1.00292)^{-60}}{.00292}\right) = 54.97; \text{ and}$$

$$PVFA_{.145/12,60} = \left(\frac{1-(1.012083)^{-60}}{.012083}\right) = 42.502.$$

Thus, if you have a good credit score, you can borrow $300 x 54.97 = $16,491 and end up with a $300 monthly payment over 5 years for a car worth $16,491 + $10,000 = $26,491. However, if you have a bad credit score, the maximum loan you can obtain and still have a $300 monthly payment is $300 x 42.502, you can only borrow $12,750.61; thus you can buy a car worth $12,750.61 + $10,000 = $22,750.61.

b. (5 points) How much does a bad credit score cost you in buying power? That is, how much less car can you afford as a result of bad credit?

SOLUTION: Bad credit limits your car buying opportunities; with a bad credit score, you are able to purchase a car worth $22,750.61, whereas with a good credit score, you can afford a more expensive car worth $26,491. Thus, you get $26,491 - $22,750.61 = $3,740.38 in less car with the bad credit score.