MBA 8622: Corporation Finance
Take-Home Problem Set

Instructors:
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Directions:
This take-home problem set (THPS) is due at the begin of the regular class in week 12, Nov 11-17, 2003, and has to be turned in physically (i.e. do not send your answers via e-mail, an electronically turned in THPS will not be graded).

Though you may use your book, notes, etc., all work on this THPS is to be yours alone - any discussion of either the questions on the assignment or your answers with anyone other than the instructor will be considered as cheating and, thus, as a violation of the GSU honor code. You have to confirm your adherence to those rules by signing the attached academic honesty statement.

For the multiple choice questions (Part I), record the letter of the correct multiple choice answer directly on the answer sheet on the last page (do not show any intermediate steps, no partial credit will be assigned for multiple choice questions). For the problems with no answer choices (Part II), record your final numeric answer including relevant calculations and intermediate steps on separate sheets of paper (partial credit may be assigned for the problems with no answer choices, if appropriate).

The grade on any assignment turned in after the beginning of class on the relevant date listed above will be reduced at a daily compounded rate of 10% per day (begin mode). For grading purposes, each multiple choice question (Part I) has a grading weight of 1 (one), each question of Part II has a grading weight of 2 (two).

Following:
- Part I: Multiple choice questions (pp. 2-5)
- Part II: Problems and Calculations (pp. 6-8)
- Statement of academic honesty (to be signed and turned in together with the solutions)
- Cover Sheet with answers to Part I (p. 11, to turn in together with the solutions to Part II)
1. What would you pay for a stock expected to pay a $2.50 dividend in one year if the expected dividend growth rate is zero and you require a 10% return on your investment?
   a. $18.75
   b. $21.50
   c. $25.00
   d. $28.50
   e. $32.00

2. Southern Credit Corp wants to earn an Effective Annual Return (EAR) on its consumer loans of 14% per year. Southern uses daily compounding on its loans. What interest rate (APR = Annual Percentage Rate, based on 365 days in a year) are they required by law to report to potential borrowers?
   a. 14.00%
   b. 15.02%
   c. 11.50%
   d. 13.11%
   e. not enough information to determine

3. Assume you are indifferent between receiving a payment of $100,000 today and receiving $4,707.34 every month for the next 2 years (first payment to be received 1 month from today). What must be your required annual rate of return (in nominal terms)?
   a. 1.0%
   b. 1.1%
   c. 12.0%
   d. 12.7%
   e. 13.1%

4. If interest rates fall from 8 percent to 7 percent, which of the following bonds will have the largest percentage increase in its value?
   a. A 10-year zero coupon bond
   b. A 10-year bond with a 10 percent semiannual coupon
   c. A 10-year bond with a 10 percent annual coupon
   d. A 5-year zero coupon bond
   e. A 5-year bond with a 12 percent annual coupon
5. You are currently investing your money in an account that has a nominal annual interest rate of 6%, compounded monthly. How many years will it take for you to double your money?
   a. 8.67 years
   b. 9.15 years
   c. 11.58 years
   d. 11.90 years
   e. 138.9 years

6. If its yield to maturity is less than its coupon rate, a bond will sell at a ________, and increases in market interest rates will ________.
   a. discount (i.e., less than par value), decrease this discount.
   b. discount (i.e., less than par value), increase this discount.
   c. premium (i.e., greater than par value), decrease this premium.
   d. premium (i.e., greater than par value), increase this premium.
   e. none of the above.

7. Modata Inc. is planning on raising $10,000,000 in funds by issuing zero coupon, $1,000 par value bonds with a 20 year maturity. Assuming that Modata is able to issue these bonds at cost of debt of 10%, how many bonds must they issue?
   a. 10,000
   b. 28,291
   c. 67,275
   d. 8,291
   e. none of the above is within 10 bonds of the correct answer

8. A $10,000 loan is to be amortized over 5 years, with annual end-of-year payments. Given the following facts, which of these statements is most correct?
   a. The annual payments would be larger if the interest rate were lower
   b. If the loan were amortized over 10 years rather than 5 years, and if the interest rate were the same in either case, the first payment would include more dollars of interest under the 5-year amortization plan
   c. The last payment would have a higher proportion of interest than the first payment
   d. The proportion of interest versus principal repayment would be the same for each of the 5 payments
   e. The proportion of each payment that represents interest as opposed to repayment of principal would be higher if the interest rate were higher
9. A bond with ARS 1,000 par value (ARS = Argentinean Pesos), has a coupon rate of 54% (Argentina is facing very high inflation rates) and the coupon is paid semi-annually. Currently the bond is trading at ARS 670 per bond and the market interest rate is 80.6%. About how many years does this bond have until it matures (round to the next whole number of years)?
   a. 14
   b. 16
   c. 28
   d. 32
   e. 42

10. Assume you are indifferent between two securities A and B (i.e., both have the same expected returns). Security A pays you $1,300 at the end of each year for the next 5 years. Security B pays $1,450 at the end of each year for the next 5 years. If you were willing to pay $4,463 to buy security A, how much would you be willing to pay to buy security B (rounded off to the nearest $5)?
   a. $4,463
   b. $4,978
   c. $4,905
   d. $5,450
   e. $5,497

11. You plan to retire exactly 20 years from today. You estimate that you will need $25,000 at the end of each year after retirement (assume you will make the first withdrawal at the end of year 20). You plan to save $25,000 a year at the end of each year for the next 2 years (with the first payment made at the end of year 1) to make sure you have sufficient money in your account for your retirement. If you make 9% per year return on your money, for how many years will you be able to make withdrawals of $25,000 after retirement?
   a. 2 years
   b. 4 years
   c. 19.5 years
   d. 25.3 years
   e. 30 years

12. Quadra Corp. faces the following probability distribution:

<table>
<thead>
<tr>
<th>State of the Economy</th>
<th>Probability of State Occurring</th>
<th>Stock’s Expected Return if this State Occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom</td>
<td>0.25</td>
<td>25%</td>
</tr>
<tr>
<td>Normal</td>
<td>0.50</td>
<td>15</td>
</tr>
<tr>
<td>Recession</td>
<td>0.25</td>
<td>5</td>
</tr>
</tbody>
</table>

What is the coefficient of variation on the company’s stock?
   a. 0.06
   b. 0.47
   c. 0.54
   d. 0.67
   e. 0.71
13. Which of the following statements is most correct?

a. The market risk premium cannot be higher than the risk-free interest rate.
b. The required return on the market cannot be higher than the risk-free interest rate.
c. If the risk-free rate is positive, then the market risk premium must be less than the required return on the market.
d. If the risk-free rate is zero, then the market risk premium must be more than the required return on the market.
e. If a stock has a beta equal to 1 (one), its required rate of return will be equal to the market risk premium.

14. You have developed the following data on three stocks:

<table>
<thead>
<tr>
<th>Stock</th>
<th>Standard Deviation</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.15</td>
<td>0.79</td>
</tr>
<tr>
<td>B</td>
<td>0.25</td>
<td>0.61</td>
</tr>
<tr>
<td>C</td>
<td>0.20</td>
<td>1.29</td>
</tr>
</tbody>
</table>

If you are a risk minimizer, you should choose Stock ______ if it is to be held in isolation, and Stock ______ if it is to be held as part of a well-diversified portfolio.

a. A; A
b. A; B
c. B; A
d. C; A
e. C; B

15. For an investment of $100 today, both Bank A and Bank B offer you $125 at the end of 3 years. If bank A pays you interest compounded annually and bank B pays you interest compounded monthly, what are the nominal annual rates offered by the two banks?

a. 7.72%, 8.03%
b. 7.72%, 7.46%
c. 8.03%, 8.03%
d. 8.03%, 7.46%
e. 7.72%, 7.72%

16. Your portfolio consists of $100,000 invested in a stock which has a beta = 0.8, $150,000 invested in a stock which has a beta = 1.2, and $50,000 invested in a stock which has a beta = 1.8. The risk-free rate is 7 percent. Last year this portfolio had a required rate of return of 13 percent. This year nothing has changed except for the fact that the market risk premium has increased by 2 percent (two percentage points). What is the portfolio's current required rate of return?

a. 5.14%
b. 7.14%
c. 11.45%
d. 15.33%
e. 16.25%
Part II: Problems & Calculations
Record your final numeric answer including relevant calculations and intermediate steps (partial credit may be assigned, if appropriate)

17. A 20-year ordinary annuity has a present value of $2,000,000 (monthly compounded). What is the amount of each annuity payment under the following assumptions:
   a) Interest rate = 3% p.a.
   b) Interest rate = 6% p.a.
   c) Interest rate = 12% p.a.

18. Arthur invests a lump sum of $10,000 in an account that guarantees 4% (compounded annually) and Buster invests $10,000 in an account guaranteeing 8% (compounded semiannually).
   a) How long will it take the value of Buster’s investment to be twice as much as Arthur’s (rounded to the next whole number of years)?
   b) How long will it take the value of Buster’s investment to be three times as much as Arthur’s (rounded to the next whole number of years)?
   c) How long will it take the value of Buster’s investment to be four times as much as Arthur’s (rounded to the next whole number of years)?

(The problem can be solved either mathematically [using logarithms], with Excel [using goal seek], or by trial-and-error)

19. The future value of a 20-year annuity due in Euro is Euro 1,000,000. Which is the underlying annual interest rate (2 decimal places) under the following assumptions:
   a) The annuity pays an annual amount of Euro 10,000
   b) The annuity pays an annual amount of Euro 20,000

20. You invest today $100,000 in a bank account that pays a certain constant nominal annual interest rate of i%, annually compounded. You know that, based on this interest rate, the future value exactly 10 years from today will be $859,442.55. What would the future value be if interest was compounded …… instead of annually (everything else remains constant)?
   a) quarterly
   b) monthly
21. Tired Folks Inc has a project which has the following cash flows:
   Year 0  -300.00
   Year 1  100.00
   Year 2  125.00
   Year 3  ?
   Year 4  ?
   What are the missing cash flows in the last two years of the project? Assume the two missing cash flows are equal. Also, assume the interest rate is 10% per year, and that the present value of all the cash flows is $109.

22. You are thinking of buying a security that will produce cash flows for the next 15 years, with the first cash flow of $45,000 at the end of the current year (=end of year 1). The cash flows from the security are thereafter expected to grow with inflation. If the expected inflation rate is 3%, and your required rate of return is 10%, how much would you be willing to pay to buy this security today? (Hint: This is a “growing annuity” type of problem. See the explanations in the textbook on p. 82/83)

23. Octavia Inc. Inc. is expected to experience a 40% annual growth rate for the next 3 years (years 1-3) and a 25% annual growth rate for the two following years (years 4 and 5). By the end of 5 years, Octavia Inc.’s growth rate will slow to 10% percent per year indefinitely. Stockholder require a return of 14% on Octavia Inc. Inc.’s stock. The most recent annual dividend (D₀), which was just paid yesterday, was $8.00 per share.
   a) Calculate the value of the stock today, based on the assumptions above.
   b) Calculate the value of the stock today under the following assumptions:
      Growth rate next three years = 20%, growth rate years 4 and 5 = 15%, growth rate after year 5 = 5%, required return on the stock = 18%

24. Exactly five years ago you have purchased a Zerobond (i.e. a bond with a coupon of 0%) with a principal value of $1,000 and a remaining maturity of 25 years. At the time of the purchase the YTM of the Zerobond was 6%. Today you are selling the Zerobond, and today’s YTM of the Zerobond is ………..%. How much did you win/lose during the 5 years (amount in $)?
   a) 5%
   b) 7%

25. Calculate
   a) the present value, and  b) the future value at the end of year 10
   of the following cash flow stream (interest rate = 6% p.a., annually compounded):

<table>
<thead>
<tr>
<th>End of Year</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>…….</th>
<th>10</th>
</tr>
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<tbody>
<tr>
<td>Cash Flow</td>
<td>$200</td>
<td>$600</td>
<td>$1,800</td>
<td>$5,400</td>
<td>…….</td>
<td>$3,936,600</td>
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   In other words: The cash flow in each single year n (from n = 2 to n = 10) is three times greater than the cash flow in the corresponding preceding year (n-1).
26. An entrepreneur offers you the following deal. You pay him $1,000 per year for 10 years and he will then pay you ............ for ................. At what interest rate will this deal be fair?
   a) $1000, 30 years
   b) $2000, 15 years

27. You have financed a penthouse in Midtown Atlanta with a 15-year, monthly payable mortgage in the amount of $300,000 at a fixed rate of 5.0% p.a. Since you wanted/want to pay off your mortgage sooner than scheduled, you have paid
   - an additional amount of USD 100 above the required amount on the first payment,
   - an additional amount of USD 150 above the required amount on the 2nd payment,
   - an additional amount of USD 200 above the required amount on the 3rd payment,
   - etc. (with every payment you have paid/will pay an additional amount of USD 50 more than you paid in addition to the required amount one month ago)

   With which payment will you completely pay off the mortgage (indicate the number of the payment)?
   (It is highly recommended to set up a spreadsheet for this problem)

28. A pessimistic drug manufacturer expects that earnings and dividends will decline at a rate of ............ annually for the foreseeable future. The firm just paid a dividend of $ 4.00; the expected return is 12%. Given these parameters, what will the price of the stock in 5 years be?
   a) 4%
   b) 8%
Statement of Academic Honesty
(to be turned in together with the answer sheet)

I understand that

a) the GSU Graduate Catalog contains the policy on “Academic Honesty” on pages 53-57, which contains, among other things, statements regarding unauthorized collaboration, falsification, and multiple submissions. (A pdf-version of the GSU Academic Honesty Policy can be found at http://www.gsu.edu/~wwwreg/013grad/008gc-acad%20regs.pdf)

b) the instructions for this Take-Home-Problem Set (THPS) read, in part:

Though you may use your book, notes, etc., all work on this THPS is to be yours alone - any discussion of either the questions on the assignment or your answers with anyone other than the instructor will be considered as cheating and, thus, as a violation of the GSU honor code.

I acknowledge that I have read and that I understand the above statements and I confirm my adherence to those rules.

Student Name (please print): .................................................................

SSN: .................................................................

Instructor: .................................................................

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Signature of Student Date
### MBA 8622: Corporation Finance
#### Fall 2003

**Take-Home Problem Set - Answer Sheet**

Instructors:
Lalitha Ananthanarayanan, Genna Brown, C.Hodges, A. Mettler, R. Morin,
M. Shrikhande, A Venkateswaran

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Name: …………………………………………………………………………………

Total: …… / 40

Grade: ………… of 100

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**Part I: Multiple Choice**

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