11.431J/15.426J Real Estate Finance & Investments I, Fall 2006, Practice Final Exam
There are five parts to this exam, plus an extra-credit question. The entire exam is designed to be finished in 2 hours, but you may take up to 3 hours. No open books or notes are permitted, but some possibly useful formulas are given at the end.

Your name:_____ _____ ID#_____

Part I: Multiple Choice (36 points, 3 points each). Select the ***single best*** alternative answer, based on what was taught in the course. Clearly indicate your selection by circling the letter. If it is not clear to the TA which your choice is, you will receive no credit. ***Read the question carefully before answering***.

1. A property has a McDonalds restaurant on it, which can earn $50,000 per year. In any other use (including another brand of restaurant), the most it can earn is $40,000 per year. Assuming a discount rate of 10% and constant cash flow in perpetuity, what is the "investment value" of this property to McDonalds, and what is its "market value"?
   a) Both investment value and market value are $400,000.
   b) Both investment value and market value are $500,000.
   c) Investment value is $400,000 and market value is $500,000.
   d) Investment value is $500,000 and market value is $400,000.

2. Suppose the riskfree rate of return is 3%, and the expected total return on the property free & clear is 7%, and you have a target total expected return of 11%. Assuming you can borrow at the riskfree rate, what Loan/Value ratio must you obtain for this real estate investment to meet your target expected return?
   a) 0%
   b) 25%
   c) 50%
   d) 75%
   e) 80%

3. An investor believes that a certain property is worth $10,000,000. The seller refuses to sell it for that amount, but has offered to provide a 5-year interest-only loan for $5,000,000 at 4% interest (annual payments at the ends of the years, first payment due in one year). Market interest rates on such a loan are currently 6.5%. How much should the investor be willing to pay for the property from an investment value perspective (taking the loan deal) if the investor faces a 30% marginal income tax rate? (Ch15)
   a) $10,000,000
   b) $10,383,588
   c) $10,403,023
   d) $10,519,460
   e) Insufficient information to answer the question.

4. Consider a 20-year (monthly-payment), 8%, $80,000 mortgage with 2 points prepaid interest up front. What is the yield to maturity?
   a) 8.00%
   b) 8.12%
   c) 8.20%
   d) 8.27%

5. Consider an 8.5% loan amortizing at a 25-year rate with monthly payments. What is the maximum amount that can be loaned on a property whose net operating income (NOI) is $500,000 per year, if the underwriting criteria specify a debt service coverage ratio (DCR) no less than 125%?
   a) $2,789,406
   b) $3,409,091
   c) $3,844,614
   d) $4,000,000
   e) $4,139,619

6. For the same property as above, suppose the underwriting criteria is a maximum loan/value ratio (LTV) of 75%, and we estimate property value by direct capitalization using a rate of 11% on the stated NOI. By this criterion what is the maximum loan amount?

a) $2,789,406
b) $3,409,091
c) $3,844,614
d) $4,000,000
e) $4,139,619

7. Suppose a construction project anticipates end-of-month draws of $400,000, $300,000, and $600,000 consecutively. What will be the balance owed at the end of the third month if the interest on the loan is 7% per annum (nominal annual rate, compounded monthly), and no payments of either principal or interest are required during the construction period?

a) $1,306,430.
b) $1,314,051.
c) $1,378,960.
d) Cannot be computed with the information given.

8. Consider the investment evaluation of a real estate development in which the property to be built is projected to reach stabilized occupancy at the end of Year 2 (two years from the time the investment decision must be made and construction will begin). The project is speculative in that there are no leases signed as of Time Zero (the present, when the investment decision must be made). The property level opportunity cost of capital is considered to be 9% for stabilized investments, and 10% for assets not yet stabilized (lease-up investments). Which of the following is true?

a) Property level before-tax cash flows beyond Year 2 should be discounted back to the end of Year 2 at 9%, and the projected stabilized asset value as of the end of Year 2 should be discounted two years to Time Zero at 10%.
b) Property level before-tax cash flows beyond Year 2 should be discounted back to the end of Year 2 at 10%, and the projected stabilized asset value as of the end of Year 2 should be discounted two years to Time Zero at 9%.
c) Property level before-tax cash flows beyond Year 2 should be discounted all the way back to Time Zero at the 10% rate.
d) Property level before-tax cash flows beyond Year 2 should be discounted all the way back to Time Zero at the 9% rate.

9. The opportunity cost of capital (discount rate) applicable on an unlevered basis to assets that are not yet leased up ("speculative built properties") is best described as:

a) Usually about 50 to 200 basis-points above the OCC for the same property with stabilized occupancy, based in part on analysis of the "interlease" discount rate implied in the property market.
b) Usually about 300 to 500 basis-points above the OCC for the same property with stabilized occupancy, based in part on analysis of the "interlease" discount rate implied in the property market.
c) Usually about 50 to 200 basis-points below the OCC for the same property with stabilized occupancy, based on the typical upward slope of the yield curve in the bond market, because lease-up is near term.
d) Usually about 300 to 500 basis-points below the OCC for the same property with stabilized occupancy, based on the typical upward slope of the yield curve in the bond market, because lease-up is near term.

10. All of the following are typical types of real options found in development projects or developable land ownership, except:

a) The wait option
b) The phasing option
c) The switch option
d) The refinance option

11. All of the following must be known (or assumed) in order to rigorously derive the real option value of a land parcel or development option, except:

a) The current value of the underlying asset (the built property value, V_0)
b) The opportunity cost of capital (OCC) of the underlying asset (r_V)
c) The volatility of the underlying asset (σ)
d) The payout rate (or current income yield rate) of the underlying asset (y_V)

12. The replicating portfolio of a development option (land) consists of:

a) A long position in an asset like the stabilized building to be built and a short position (borrowing) in a riskless bond.
b) A short position in an asset like the stabilized building to be built and a long position (lending) in a riskless bond.
c) Long positions in both the stabilized building and a bond.
d) Short positions in both the stabilized building and a bond.

Part II: Definitions (12 points, 4 points each). Provide a complete definition of each term or phrase in the space below each. Answer in a single, clear sentence. (You may provide a single example or formula to clarify your answer if necessary.) Only define the subject term; do not add extraneous material in your answer. Write legibly; no credit will be given for writing we cannot decipher.

1. Phased risk regimes (in development projects):

2. Back-door feasibility analysis:

3. Promote (hurdle and preferred return):

Part III: Short Answer Questions (20 points, 10 points each question): Choose 2 out of the 3 questions below, and answer each question in the space provided below that question. Please be sure it is clear to us which question you DON'T want to be graded. If the TA cannot figure it out, we will grade only the first four.

1. What are the major line items in the operating budget of a development project, and why might it make sense for such a budget to consider only a single year's operation of the building?

2. Why is it that construction loans are almost always used to finance all or most of the construction costs in a development investment, even when the investor has plenty of cash that could be used to pay for construction?

3. Is it appropriate, and if so, why is it appropriate, to apply a riskless or nearly riskless OCC to construction cost cash flows in the typical development project?

Part IV: Longer Problems (20 points, 10 points each) Choose 2 out of the following three questions and answer in the space provided on the page. Indicate clearly which questions we should grade or we will grade the first two.

1. Based on the following information, develop a front door "Simple Financial Feasibility Analysis" (SFFA) for this project estimating the required minimum market gross rent per SF that will support development.
   - 40,000 NRSF office building project.
   - Acquisition & construction cost = $1,500,000;
   - Estimated operating costs (to landlord) = $100,000/yr.
   - Projected stabilized occupancy = 95%.
   - Permanent loan available on completion @ 9% (interest-only loan) with 130% debt service coverage requirement on the net operating income, and 75% maximum loan-to-value ratio.

Show your work.

2. A lender and a developer combine to undertake a development with an expected 4-year holding period, and the following projected net cash flows (in thousands), including both land purchase and construction at time 0.

Year	0	1	2	3	4
Project net cash flows	($10,000)	$1,000	$1,000	$1,000	$11,000

Construction is instantaneous at time 0, and the lender will provide $8,000,000 to cover all construction costs at that time zero after the developer has purchased the land for $2,000,000 (assume both occur simultaneously at time 0). The loan is a "mini-perm" loan for four years at a 6% interest rate, with the loan's principal balance to be retired starting in year 1 based on priority access to all available project cash flow.

Set up the projected capital accounts for the lender and the developer with their projected cash flows each year, and compute the projected IRR for: (a) The underlying project as a whole; (b) The lender; and (c) The developer.

Please use the following template to help you organize and present your answer. (You may use the back of the page for computations.)

Period	0	1	2	3	4	IRR
Project net cash flows	($10,000)	$1,000	$1,000	$1,000	$11,000	
Lender:						
Credit Line Ceiling						
Available						
Beginning Balance						
Draw						
Interest Earned						
Repayments to Lender						
Ending Loan Balance						
Lender CF						
Project CFs after loan CFs						
Developer:						
Beginning Balance						
Draw						
Repayments						
Ending Balance						
Developer CF						
Project CFs after Loan & Dvlpr CFs						

Part V. Required Problem (20 points)

In the following situation:

	Today (time 0)	Next Year (Yr.1)	
Probability	100%	50%	50%
Value of Developed Property	$1000	$700	$1300
Development Cost (exclu land)	$800	$800	$800

Suppose no further value after next year, construction is instantaneous, the riskfree interest rate is 4%, the expected return (OCC) on unlevered investments in developed property is 7.5%, what is the value today of the land? And should development be undertaken now or should you wait.

Part VI: Extra-credit question. Earn up to **5 points extra credit**. It can help you but not hurt you.

Describe the call option model of land value. What is the "underlying asset" in this model? What is the "exercise price"? What is the typical maturity of the land development option?

Formulas that may (or may not) be useful in this exam . . .

$a + da + d^2a + \ldots + d^{n-1}a = a(1-d^n)/(1-d)$.

$PMT/(1+r) + PMT/(1+r)^2 + \ldots + PMT/(1+r)^n = (PMT/r)[1 - 1/(1+r)^n]$.

$CF + CF/(1+r) + CF/(1+r)^2 + \ldots + CF/(1+r)^{n-1} = (1+r)(CF/r)[1 - 1/(1+r)^n]$.

$CF/(1+r) + (1+g)CF/(1+r)^2 + (1+g)^2CF/(1+r)^3 + \ldots$ (forever) $= CF/(r-g)$.

$EAY = (1+CEY/2)^2-1$; $MEY=((1+EAY)^{(1/12)}-1)*12$.

$PMT = PV*(i/m)/(1 - 1/(1 + i/m)^N)$; i=IntRate/Yr, m=Pmts/Yr.

N=(Cu-Cd)/(Vu-Vd)

B=(NVd-Cd)/(1+r_f).

$$C_0 = \left(E_0[C_1] - \left(C_{up} - C_{down}\right)\frac{E[r_V]-r_f}{V_{up}\%-V_{down}\%}\right)\Big/\left(1+r_f\right)$$

$$E[r_C] = \left[\frac{\left(V_T - L_T\right)\left(1+E[r_V]\right)^T\left(1+E[r_D]\right)^T}{\left(1+E[r_D]\right)^T V_T - \left(1+E[r_V]\right)^T L_T}\right]^{(1/T)} - 1$$