**Finance 5360 Quiz B: 8/4/15** Name Key

Note: Answer the following on a per-share basis.

Assume you want to value a call with a strike price of $18 that expires two years from today. The price of the stock on which the put will be written is $20, but the price will either rise 20% or fall by 10% each of the next two years. Assume that the risk-free interest rate equals 4% per year.

a. What is the value today of the call?
b. If you create a portfolio today that is equivalent to the call, what will be the makeup of the portfolio?
c. Assume the stock price falls next year. What trades would you have to make a year from today to rebalance your portfolio?
d. What trades will be required two years from today to close out you portfolio? What cash flows will occur?

if stock rises both years

a. $S_U = 20(1.2) = 24$; $S_D = 20(.9) = 18$; $S_{UU} = 24(1.2) = 28.8$; $S_{UD} = S_{DU} = 24(.9) = 21.6$; $S_{DD} = 18(.9) = 16.2$

$C_{UU} = 10.8$; $C_{UD} = C_{DU} = 3.6$; $C_{DD} = 0$

$\Delta_U = \frac{10.8 - 3.6}{28.8 - 21.6} = +1$; $B_U = \frac{3.6 - 1(21.6)}{1.04} = -17.3077$; $C_U = 24(1) - 17.3077 = 6.6923$

$\Delta_D = \frac{3.6 - 0}{21.6 - 16.2} = +0.667$; $B_D = \frac{0 - (.67)(16.2)}{1.04} = -10.3846$; $r_d = 18(.667) - 10.3846 = 1.6154$

$\Delta = \frac{6.6923 - 1.6154}{24 - 18} = .84615$; $B = \frac{1.6154 - .84615(18)}{1.04} = -13.0917$;

$C = 20(.84615) - 13.0917 = 3.8314$

b. Buy 0.84615 shares + short sell 13.0917 bonds

c. sell .1795 shares(.84615 − .66667); Buy to cover 3.2308 bonds (−10.3846 − (−13.0917)(1.04))

d. Sell 1 share @ 28.8; Buy to cover 18 of bonds (17.3077)(1.04)