University of Texas at Austin

Quiz #10

European calls.

Provide your **final answer only** to the following problem(s):

Problem 10.1. (5 points) Which of the following constitutes a one-year, \$100-strike **covered call**?

(a) Write a one-year, \$100-strike call and short the underlying asset.
(b) Write a one-year, \$100-strike call and buy the underlying asset.
(c) Buy a one-year, \$100-strike call and short the underlying asset.
(d) Buy a one-year, \$100-strike call and buy the underlying asset.
(e) None of the above.

Solution: **(b)**

Please, provide the **complete** solution to the following problem(s):

Problem 10.2. (5 points) The premium on a 1000-strike, 2-month European call option on the market index is \$20. After 2 months the market index spot price is 1075. If the risk-free interest rate equals 0.5% effective per month, what is the long-call profit?

Solution: In our usual notation, the profit is

$$(S(T)-K)_+ - FV_{0,T}[V_C(0)] = (1075-1000)_+ - 20(1.005)^2 = 54.80.$$

Problem 10.3. (5 points) The fair price today of a zero-coupon bond with redemption amount of \$100 and which comes to maturity in a year is equal to \$78.

You purchase an at-the-money European call option on a non-dividend paying stock whose price today is $S(0) = \$100$. The premium of this call was \$10.

Write the expression for this call's payoff, and for its profit (valued at its expiration date T) as a function of $S(T)$ (the stock price at time T) and the time of maturity T.

Solution: From the bond price, denoting by r the annual continuously compounded interest rate, we get $e^r = 100/78$.

So, the expression for the call's profit is

$$(S(T)-100)^+ - 10e^{rT} = (S(T)-100)^+ - 10\left(\tfrac{100}{78}\right)^T.$$