UNIVERSITY OF TEXAS AT AUSTIN

Quiz #25

Barrier options.

Provide your **complete solution** to the following problems. Final answers only, without appropriate justification, will receive zero points even if correct.

Problem 25.1. (2 points) The price of a **up-and-in** option is increasing as a function of its barrier (with every other input held fixed). *True or false?*

Problem 25.2. (5 points) The current price of a certain stock is denoted by $S(0)$. Let the price of an **up-and-out** call option on that stock with barrier H be denoted by $V_C(0, H)$. Let the price of an otherwise identical vanilla call option be denoted by $V_C(0)$. With the limit is taken while all the other parameters are held the same, what is

$$\lim_{H \to \infty} V_C(0, H)$$

equal to?

(a) 0
(b) $V_C(0)$
(c) $S(0)$
(d) ∞
(e) None of the above.

Problem 25.3. (8 points) Consider a non-dividend paying stock whose current price is \$100 per share. Its volatility is given to be 0.30. You model the evolution of the stock price over the following year using a two-period forward binomial tree.

The continuously-compounded, risk-free interest rate is 0.05.

Consider a \$100-strike, one-year **knock-in** call option with a barrier of \$110 on the above stock. What is the price of this option consistent with the above stock-price model?

(a) About 11.55
(b) About 12.75
(c) About 13.96
(d) About 66.05
(e) None of the above.