**Yara Inc is listed on the NYSE with a stock price of $40 - the company is not known to pay dividends. We need to price a call option with a strike of $45 maturing in 4 months. The continuously-compounded risk-free rate is 3%/year, the mean return on the stock is 7%/year, and the standard deviation of the stock return is 40%/year. What is the Black-Scholes call price?**

***SOLUTION***

, the price of the underlying asset at time t.; *$40*

, the price of the option as a function of the underlying asset S, at time t;

, the price of a European call option; *?*

, the strike price of the option, also known as the exercise price; *$45*

, the annualized risk-free interest rate, continuously compounded Also known as the force of interest; *3%/year*

, the drift rate of S, annualized; *7%/year*

, the standard deviation of the stock's returns; this is the square root of the quadratic variation of the stock's log price process; *40%/year*

, a time in years; we generally use: now = 0, expiry = T, *4 months*};

to denote the standard normal cumulative distribution function,

will denote the standard normal probability density function,

The price of a corresponding put option based on put–call parity is: