PROBLEM SET 13
ECO389 – SPRING 2017
Corporate Finance

Instructor: Ramiro Malaga
Due date: Friday 28th, April 2017 at 11:00 p.m.
You will have two attempts, only the last will be valid.

Problem 1
Why does a discounted cash-flow approach to options valuation not work?

A. It is impossible to estimate expected cash flows.
B. One cannot find the appropriate interest rate for an infinitely small interval.
C. Finding the opportunity cost of capital is impossible as the risk of options changes every time the stock price moves.
D. The strike price of options changes.

Problem 2
Relative to the underlying stock, a call option always has:

A. A higher beta and a higher standard deviation of return.
B. A lower beta and a higher standard deviation of return.
C. A higher beta and a lower standard deviation of return.
D. A lower beta and a lower standard deviation of return.

Problem 3
A call option has an exercise price of $100. At the exercise date, the stock price could be either $50 or $150. Which investment strategy provides the same payoff as the stock?

A. Lend PV of $50 and buy two calls.
B. Lend PV of $50 and sell two calls.
C. Borrow $50 and buy two calls.
D. Borrow $50 and sell two calls.

Problem 4
Suppose Ralph's stock price is currently $50. In the next six months it will either fall to $30 or rise to $80. What is the option delta of a call option with an exercise price of $50?

A. 0.375
B. 0.500
C. 0.600
D. 0.750

Problem 5
A put option on ABC stock currently sells for $4.00. The exercise price and the stock price is $60. The put option has a delta of 0.5. If within a short period of time the stock price increases to $60.10, what would be the change in the price of the put option?

A. Increases by $0.05
B. Decreases by $0.05
C. Increases by $0.10
D. Decreases by $0.10

Problem 6
A call option on ABCD stock, with an exercise price of $50, will either be worth $12 or worthless. The call option has a delta of 0.3. What is the binomial spread of possible stock prices?

A. Low of $22 and high of $62
B. Low of $50 and high of $62
C. Low of $58 and high of $62
D. Low of $38 and high of $62

Problem 7
What does an equity option's delta reflect?

A. The volatility of the underlying stock price
B. The dividends paid to the underlying stockholders
C. The number of shares needed to replicate one call option
D. The time to expiration

Problem 8
Suppose ABCD's stock price is currently $50. In the next six months it will either fall to $40 or rise to $60. What is the current value of a six-month call option with an exercise price of $50? The six-month risk-free interest rate is 2% (periodic rate).

A. $5.39
B. $15.00
C. $8.25
D. $8.09

Problem 9
Suppose Carol's stock price is currently $20. In the next six months it will either fall to $10 or rise to $40.
What is the current value of a six-month call option with an exercise price of $12? The six-month risk-free interest rate is 5% per six-month period. [Use the risk-neutral valuation method.]

A. $9.78
B. $10.28
C. $16.88
D. $13.33

Problem 10
Suppose Carol's stock price is currently $20. In the next six months it will either fall to $10 or rise to $40.
What is the current value of a six-month call option with an exercise price of $15? The six-month risk-free interest rate is 5% per six-month period. [Use the replicating portfolio method.]

A. $8.73
B. $10.28
C. $16.88
D. $13.33

Problem 11
The delta of a put option always equals:

A. The delta of an equivalent call option.
B. The delta of an equivalent call option with a negative sign.
C. The delta of an equivalent call option minus one.
D. The delta of an equivalent call option plus one.

Problem 12
If the delta of a call option is 0.4, calculate the delta of an equivalent put option:

A. 0.6.
B. 0.4.
C. -0.4.
D. -0.6.

Problem 13
Suppose VS's stock price is currently $20. A six-month call option on VS's stock with an exercise price of $15 has a value of $7.14. What is the price of an equivalent put option? The six-month risk-free interest rate is 5% per six-month period.

A. $1.43
B. $9.43
C. $8.00
D. $12.00

Problem 14
If e is the base of natural logarithms, (σ) is the standard deviation of the continuously compounded annual returns on the asset, and h is the time to expiration, expressed as a fraction of a year, then the quantity (1 + upside change) is equal to:

A. e^[(σ) × SQRT(h)].
B. e^[h × SQRT(σ)].
C. (σ) × e^[SQRT(h)].
D. 1/(σ) × e^[SQRT(h)].

Problem 15
If the standard deviation of the continuously compounded returns (σ) on a stock is 40%, and the time interval is a year, then the upside change equals:

A. 88.2%.
B. 8.7%.
C. 63.2%.
D. 49.2%.

Problem 16
The Black-Scholes formula represents the option delta as:

A. d1
B. N(d1)
C. d2
D. N(d2)

Problem 17
A European call option with an exercise price of $50 expires in six months has a stock price of $54 and a continuously compounded standard deviation of 80%. The risk-free rate is 9.2% per year.
Calculate the value of d2.

A. +0.0657
B. -0.0657
C. +0.5657
D. -0.5657

Problem 18
All else equal, if an option's strike price increases then the:

A. Value of a put option increases and that of a call option decrease.
B. Value of a put option decreases and that of a call option increase.
C. Value of both a put option and a call option increase.
D. Value of both a put option and a call option decrease.

Problem 19
The Black-Scholes option pricing model employs which five parameters?

A. Stock price, exercise price, risk-free rate, beta, and time to maturity
B. Stock price, risk-free rate, beta, time to maturity, and variance
C. Stock price, risk-free rate, probability of bankruptcy, variance, and exercise price
D. Stock price, exercise price, risk-free rate, variance, and time to maturity

Problem 20
The term [N(d2) × PV(EX)] in the Black-Scholes model represents the:

A. Call option delta.
B. Bank loan.
C. Put option delta.
D. Present value of a bank loan.