QUESTION 1

A stock pays continuous dividends proportional to its price at rate δ. You are given:
(i) The stock price is 40.
(ii) The continuously compounded risk-free interest rate is 4%.
(iii) A 3-month European call option on the stock with strike 40 costs 4.10.
(iv) A 3-month European put option on the stock with strike 40 costs 3.91 .
Determine δ.

○ 0.017

○ 0.028

○ 0.021

○ 0.013

○ 0.024

QUESTION 2

Consider European options on a stock expiring at time t. Let $P(K)$ be a put option with strike price K, and $C(K)$ be a call option with strike price K. You are given
(i) $P(50) - C(55) = -2$
(ii) $P(55) - C(60) = 3$
(iii) $P(60) - C(50) = 14$
Determine $C(60) - P(50)$.

○ -3

○ 3

○ -5

○ 4

○ 5

QUESTION 3

You are given:
(i) The price of a stock is 100.
(ii) The stock pays discrete dividends of 2 per quarter, with the first dividend 3 months from now.
(iii) The continuously compounded risk-free interest rate is 4%.
You wish to create a synthetic 182-day Treasury bill with maturity value 10,000, using a combination of the stock and 6-month European put and call options on the stock with strike price 65.
Determine the number of shares of the stock you should purchase.

○ 115

○ 145

○ 127

○ 101

○ 130

QUESTION 4

For each ton of a certain type of rice commodity, the
four-year forward price is 300. A four-year 400-strike European call option costs 200.
The annual risk-free force of interest is a constant 6.5%.
Calculate the cost of a four-year 400-strike European put option for this rice commodity.

- ○ 10
- ○ 277.11
- ○ 187.43
- ○ 32.89
- ○ 117.20

QUESTION 5

You are given:
(i) The price of a stock is 35.
(ii) The stock pays continuous dividends proportional to its price at an annual rate of 0.04.
(iii) The continuously compounded risk free interest rate is 0.06.
(iv) A one-year American call option on the stock has a strike price of 30.
Determine the lowest possible price for this call option.

- ○ 5.37
- ○ 3.47
- ○ 4.54
- ○ 3
- ○ 5

QUESTION 6

Prices of a stock are modeled with a 1 period binomial tree having a period of 6 months.
You are given:
(i) The stock's initial price is 40.
(ii) The continuously compounded risk free interest rate is 5%.
(iii) The stock pays continuous dividends at a rate of 2%.
(iv) The risk neutral probability of an increase in stock price is 0.55.
(v) In the binomial tree, u and d are selected so that their arithmetic average is 1.
A European call option on the stock expiring in 6 months has strike price 45.
Determine the option premium.

- ○ 0.60673
- ○ 0.56068
- ○ 0.43333
- ○ 0.47912
- ○ 0.39901

The price of a nondividend-paying stock is modeled by the following 1-period binomial tree, with each period being one year:

40

30

25

A European put option expiring in one year has strike price 35.
The continuously compounded risk-free interest rate is 4%.
Determine the amount of money borrowed in the replicating portfolio for the put option.

- ○ -19.61
- ○ 19.61
- ○ 21.05
- ○ 25.62
- ○ -25.62

A European call option expiring in one year with strike price 50 has premium 5.00. The underlying stock pays continuous dividends proportional to its price at a rate of 2%. The continuously compounded risk-free interest rate is 6%.
The underlying stock's price is modeled with the following binomial tree having one period of one year:

65

50

40
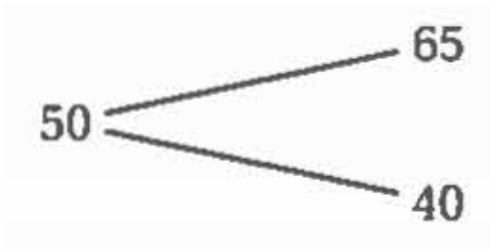
You will construct an arbitrage using only the stock and call options.
Determine the amount to borrow or lend in order to immediately gain 10.00 through a combination of transactions that cannot lead to a future loss .

- ○ lend 155.092
- ○ lend 125.317
- ○ borrow 201.367
- ○ borrow 111.301
- ○ lend 136.799