



# Hull OFOD9e Multiple Choice Questions and Answers Ch11

Investment Analysis (The American University in Cairo)

**Hull: Options, Futures, and Other Derivatives, Ninth Edition**  
**Chapter 11: Properties of Stock Options**  
**Multiple Choice Test Bank: Questions with Answers**

1. When the stock price increases with all else remaining the same, which of the following is true?
- A. Both calls and puts increase in value
  - B. Both calls and puts decrease in value
  - C. Calls increase in value while puts decrease in value
  - D. Puts increase in value while calls decrease in value

Answer: C

Stock price increases cause the values of calls to increase and the values of puts to decline.

2. When the strike price increases with all else remaining the same, which of the following is true?
- A. Both calls and puts increase in value
  - B. Both calls and puts decrease in value
  - C. Calls increase in value while puts decrease in value
  - D. Puts increase in value while calls decrease in value

Answer: D

Strike price increases cause the values of puts to increase and the values of calls to decline.

3. When volatility increases with all else remaining the same, which of the following is true?
- A. Both calls and puts increase in value
  - B. Both calls and puts decrease in value
  - C. Calls increase in value while puts decrease in value
  - D. Puts increase in value while calls decrease in value

Answer: A

Volatility increases the likelihood of a high payoff from either a call or a put option. The payoff can never be negative. It follows that as volatility increases the value of all options increase.

4. When dividends increase with all else remaining the same, which of the following is true?
- A. Both calls and puts increase in value
  - B. Both calls and puts decrease in value
  - C. Calls increase in value while puts decrease in value
  - D. Puts increase in value while calls decrease in value

Answer: D

Dividends during the life of an option reduce the final stock price. As a result dividend increases cause puts to increase in value and calls to decrease in value.

5. When interest rates increase with all else remaining the same, which of the following is true?
- A. Both calls and puts increase in value
  - B. Both calls and puts decrease in value
  - C. Calls increase in value while puts decrease in value
  - D. Puts increase in value while calls decrease in value

Answer: C

Calls increase and puts decrease in value. As explained in the text an increase in interest rates causes the growth rate of the stock price to increase and the discount rate to increase. An increase in interest rates therefore reduces the value of puts because puts are hurt by both a discount rate increase and a growth rate increase. For calls it turns out that the growth rate increase is more important than the discount rate increase so that their values increase when interest rates increase. (Note that we are assuming all else equal and so the asset price does not change.)

6. When the time to maturity increases with all else remaining the same, which of the following is true?
- A. European options always increase in value
  - B. The value of European options either stays the same or increases
  - C. There is no effect on European option values
  - D. European options are liable to increase or decrease in value

Answer: D

When the time to maturity increases from X to Y, European options usually increase in value. But this is not always the case. For example, European call options can decrease in value if a big dividend is expected between X and Y.

7. The price of a stock, which pays no dividends, is \$30 and the strike price of a one year European call option on the stock is \$25. The risk-free rate is 4% (continuously compounded). Which of the following is a lower bound for the option such that there are arbitrage opportunities if the price is below the lower bound and no arbitrage opportunities if it is above the lower bound?
- A. \$5.00
  - B. \$5.98
  - C. \$4.98
  - D. \$3.98

Answer: B

The lower bound is  $S_0 - Ke^{-rT}$ . In this case it is  $30 - 25e^{-0.04 \times 1} = \$5.98$ .

8. A stock price (which pays no dividends) is \$50 and the strike price of a two year European put option is \$54. The risk-free rate is 3% (continuously compounded). Which of the following is a lower bound for the option such that there are arbitrage opportunities if the price is below the

lower bound and no arbitrage opportunities if it is above the lower bound?

- A. \$4.00
- B. \$3.86
- C. \$2.86
- D. \$0.86

Answer: D

The lower bound is  $Ke^{-rT} - S_0$ . In this case it is  $54e^{-0.03 \times 2} - 50 = \$0.86$ .

9. Which of the following is NOT true? (Present values are calculated from the end of the life of the option to the beginning.)

- A. An American put option is always worth less than the present value of the strike price
- B. A European put option is always worth less than the present value of the strike price
- C. A European call option is always worth less than the stock price
- D. An American call option is always worth less than the stock price

Answer: A

If it is optimal to exercise an American option today and the stock price is very low the option will be worth more than the present value of the strike price

10. Which of the following best describes the intrinsic value of an option?

- A. The value it would have if the owner had to exercise it immediately or not at all
- B. The Black-Scholes-Merton price of the option
- C. The lower bound for the option's price
- D. The amount paid for the option

Answer: A

The intrinsic value of an option is the value it would have if it were about the expire which is the same as the value in A.

11. Which of the following describes a situation where an American put option on a stock becomes more likely to be exercised early?

- A. Expected dividends increase
- B. Interest rates decrease
- C. The stock price volatility decreases
- D. All of the above

Answer: C

As the volatility of the option decreases the time value declines and the option becomes

more likely to be exercised early. In the case of A and B, time value increases and the option is less likely to be exercised early.

12. Which of the following is true?

- A. An American call option on a stock should never be exercised early
- B. An American call option on a stock should never be exercised early when no dividends are expected
- C. There is always some chance that an American call option on a stock will be exercised early
- D. There is always some chance that an American call option on a stock will be exercised early when no dividends are expected

Answer: B

An American call option should never be exercised early when the underlying stock does not pay dividends. There are two reasons. First, it is best to delay paying the strike price. Second the insurance provided by the option (that the stock price will fall below the strike price) is lost.

13. Which of the following is the put-call parity result for a non-dividend-paying stock?

- A. The European put price plus the European call price must equal the stock price plus the present value of the strike price
- B. The European put price plus the present value of the strike price must equal the European call price plus the stock price
- C. The European put price plus the stock price must equal the European call price plus the strike price
- D. The European put price plus the stock price must equal the European call price plus the present value of the strike price

Answer: D

The put-call parity result is  $c + Ke^{-rT} = p + S_0$ .

14. Which of the following is true when dividends are expected?

- A. Put-call parity does not hold
- B. The basic put-call parity formula can be adjusted by subtracting the present value of expected dividends from the stock price
- C. The basic put-call parity formula can be adjusted by adding the present value of expected dividends to the stock price
- D. The basic put-call parity formula can be adjusted by subtracting the dividend yield from the interest rate

Answer: B

Put call parity still holds for European options providing the present value of the dividends is

subtracted from the stock price.

15. The price of a European call option on a non-dividend-paying stock with a strike price of \$50 is \$6. The stock price is \$51, the continuously compounded risk-free rate (all maturities) is 6% and the time to maturity is one year. What is the price of a one-year European put option on the stock with a strike price of \$50?
- A. \$9.91
  - B. \$7.00
  - C. \$6.00
  - D. \$2.09

Answer: D

Put-call parity is  $c + Ke^{-rT} = p + S_0$ . In this case  $K=50$ ,  $S_0=51$ ,  $r=0.06$ ,  $T=1$ , and  $c=6$ . It follows that  $p = 6 + 50e^{-0.06 \times 1} - 51 = 2.09$ .

16. The price of a European call option on a stock with a strike price of \$50 is \$6. The stock price is \$51, the continuously compounded risk-free rate (all maturities) is 6% and the time to maturity is one year. A dividend of \$1 is expected in six months. What is the price of a one-year European put option on the stock with a strike price of \$50?
- A. \$8.97
  - B. \$6.97
  - C. \$3.06
  - D. \$1.12

Answer: C

Put-call parity is  $c + Ke^{-rT} = p + S_0 - D$ . In this case  $K=50$ ,  $S_0=51$ ,  $r=0.06$ ,  $T=1$ , and  $c=6$ . The present value of the dividend,  $D$ , is  $1 \times e^{-0.06 \times 0.5} = 0.97$ . It follows that  $p = 6 + 50e^{-0.06 \times 1} - (51 - 0.97) = 3.06$ .

17. A European call and a European put on a stock have the same strike price and time to maturity. At 10:00am on a certain day, the price of the call is \$3 and the price of the put is \$4. At 10:01am news reaches the market that has no effect on the stock price or interest rates, but increases volatilities. As a result the price of the call changes to \$4.50. Which of the following is correct?
- A. The put price increases to \$6.00
  - B. The put price decreases to \$2.00
  - C. The put price increases to \$5.50
  - D. It is possible that there is no effect on the put price

Answer: C

The price of the call has increased by \$1.50. From put-call parity the price of the put must increase by the same amount. Hence the put price will become  $4.00 + 1.50 = \$5.50$ .

18. Interest rates are zero. A European call with a strike price of \$50 and a maturity of one year is worth \$6. A European put with a strike price of \$50 and a maturity of one year is worth \$7. The current stock price is \$49. Which of the following is true?
- A. The call price is high relative to the put price
  - B. The put price is high relative to the call price
  - C. Both the call and put must be mispriced
  - D. None of the above

Answer: D

In this case because interest rates are zero  $c + K = p + S_0$ . The left side of this equation is  $50 + 6 = 56$ . The right side is  $49 + 7 = 56$ . There is no mispricing.

19. Which of the following is true for American options?
- A. Put-call parity provides an upper and a lower bound for the difference between call and put prices
  - B. Put call parity provides an upper bound but no lower bound for the difference between call and put prices
  - C. Put call parity provides a lower bound but no upper bound for the difference between call and put prices
  - D. There are no put-call parity results

Answer: A

Put call parity provides both an upper and a lower bound for the difference between call and put prices. See equation (11.11).

20. Which of the following can be used to create a long position in a European put option on a stock?
- A. Buy a call option on the stock and buy the stock
  - B. Buy a call on the stock and short the stock
  - C. Sell a call option on the stock and buy the stock
  - D. Sell a call option on the stock and sell the stock

Answer: B

As payoff diagrams show a call on a stock combined with a short position in the stock gives a payoff similar to a put option. Alternatively we can use put-call parity, which shows that a call minus the stock equals the put minus the present value of the strike price.