

Finance for AEO Exam

08 June 2009

Your Name: _____

Student Number: _____

Signature: _____

This is a closed-book exam. You are allowed to use a calculator and a dictionary. You have 2 hours for the exam. There are 35 multiple choice questions in total, equally weighted. There is no penalty for the wrong choice but you may circle only one choice for each question that you think is the best.

Be kindly reminded that you should rely on your own effort; no conversation is allowed during the exam. Please sign before you start.

When you finish, please return the multiple choice sheet together with this page.

Good Luck!

Question 1.

Your son is about to start kindergarten in a private school. Currently, the tuition is \$12,000 per year, payable at the start of the school year. You expect annual tuition increases to average 6% per year over the next 13 years. Assuming that your son remains in this private school through high school and that your current interest rate is 6%, then the present value of your son's private school education is closest to:

- A) \$106,230
- B) \$156,000
- C) \$137,900
- D) This problem cannot be solved

Answer: B

Explanation: A)

- B) This is a bit of a trick question. The PV of a growing annuity formula is undefined since $r = g$. But since $r = g$, the growth in the payments is exactly offset by the current interest rate. Therefore the answer is $12,000 \times 13 = \$156,000$. You could also individually discount each of the 13 payments and arrive at the same answer.

Question 2.

Suppose that a young couple has just had their first baby and they wish to insure that enough money will be available to pay for their child's college education. They decide to make deposits into an educational savings account on each of their daughter's birthdays, starting with her first birthday. Assume that the educational savings account will return a constant 7%. The parents deposit \$2000 on their daughter's first birthday and plan to increase the size of their deposits by 5% each year. Assuming that the parents have already made the deposit for their daughter's 18th birthday, then the amount available for the daughter's college expenses on her 18th birthday is closest to:

- A) \$42,825
- B) \$97,331
- C) \$67,998
- D) \$103,063

Answer: B

Explanation: A)

- B) FV of a growing annuity

$$\$2,000 \times \frac{1}{.07 - .05} \left(1 - \left(\frac{1 + .05}{1 + .07} \right)^{18} \right) (1.07)^{18} = \$97,331$$

Question 3

Which of the following statements regarding arbitrage and security prices is incorrect?

- A) We call the price of a security in a normal market the no-arbitrage price for the security.
- B) In financial markets it is possible to sell a security you do not own by doing a short sale.
- C) When a bond is underpriced, the arbitrage strategy involves selling the bond and investing some of the proceeds.
- D) The general formula for the no-arbitrage price of a security is $\text{Price}(\text{security}) = PV(\text{All cash flows paid by the security})$.

Answer: C

Question 4.

Look at the next 2 statements:

- I. Depreciation is not relevant when determining cash flows.
- II. Depreciation is not a cash flow.

- A. I and II are true
- B. I is true, II is false
- C. I is false, II is true
- D. I and II are false

Answer C. Depreciation is itself not a cash flow but by influencing taxes is important when calculating cash flows.

Question 5.

You are considering adding a micro brewery on to one of your firm's existing restaurants. This will entail an increase in inventory of \$8,000, an increase in accounts payables of \$2,500, and an increase in property, plant, and equipment of \$40,000. All other accounts will remain unchanged. The change in net working capital resulting from the addition of the micro brewery is:

- A) \$45,500
- B) \$10,500
- C) \$6,500
- D) \$5,500

Answer: D

- Explanation:
- A)
 - B)
 - C)
 - D) $NWC = CA - CL = \$8000 - \$2500 = \$5500$

Question 6.

The quick ratio of a firm is 0.9. Inventory of this firm is 15 and current liabilities are 30. What is the current ratio for this firm?

- A. smaller than 0.25
- B. between 0.25 and 0.75
- C. between 0.75 and 1.25
- D. none of above

Answer D. Quick ratio = (cash + debtors) / current liabilities

Current ratio = current assets / current liabilities = (cash + debtors + inventory) / current liabilities = quick ratio + inventory/current liabilities = $0.9 + 15/30 = 1.4$

Consider the following balance sheet:

Luther Corporation					
Consolidated Balance Sheet					
December 31, 2006 and 2005 (in \$ millions)					
		Liabilities and			
Assets	2006	2005	Stockholders' Equity	2006	2005
<i>Current Assets</i>			<i>Current Liabilities</i>		
Cash	63.6	58.5	Accounts payable	87.6	73.5
Accounts receivable	55.5	39.6	Notes payable / short-term debt	10.5	9.6
Inventories	45.9	42.9	Current maturities of long- term debt	39.9	36.9
Other current assets	6.0	3.0	Other current liabilities	6.0	12.0
Total current assets	171.0	144.0	Total current liabilities	144.0	132.0
<i>Long-Term Assets</i>			<i>Long-Term Liabilities</i>		
Land	66.6	62.1	Long-term debt	239.7	168.9
Buildings	109.5	91.5	Capital lease obligations	---	---
Equipment	119.1	99.6	Total Debt	239.7	168.9
Less accumulated depreciation	(56.1)	(52.5)	Deferred taxes	22.8	22.2
Net property, plant, and equipment	239.1	200.7	Other long-term liabilities	---	---
Goodwill	60.0	--	Total long-term liabilities	262.5	191.1
Other long-term assets	63.0	42.0	Total liabilities	406.5	323.1
Total long-term assets	362.1	242.7	Stockholders' Equity	126.6	63.6
		Total liabilities and			
Total Assets	533.1	386.7	Stockholders' Equity	533.1	386.7

Question 7.

If in 2006 Luther has 10.2 million shares outstanding and these shares are trading at \$16 per share, then Luther's Market-to-book ratio would be closest to:

- A) 0.39
- B) 0.76
- C) 1.29
- D) 2.57

Answer: C

Explanation:

- A)
- B)
- C) $MTB = \text{market cap} / \text{book value of equity} = (10.2 \text{ million} \times 16) / 126.6 = 163.2 / 126.6 = 1.289$
- D)

Question 8.

When using the book value of equity, the debt to equity ratio for Luther in 2006 is closest to:

- A) 2.21
- B) 2.29
- C) 2.98
- D) 3.03

Answer: B

Explanation: A)

B) $D/E = \text{Total Debt} / \text{Total Equity}$

Total Debt = (notes payable (10.5) + current maturities of long-term debt (39.9) + long-term debt (239.7) = 290.1 million

Total Equity = 126.6, so $D/E = 290.1 / 126.6 = 2.29$

Question 9.

Bubba Ho-Tep Company reported net income of \$300 million for the most recent fiscal year. The firm had depreciation expenses of \$125 million and capital expenditures of \$150 million. Although they had no interest expense, the firm did have an increase in net working capital of \$20 million. What is Bubba Ho-Tep's free cash flow?

- A) \$170 million
- B) \$255 million
- C) \$150 million
- D) \$5 million

Answer: B

Explanation: A)

B) $FCF = NI + \text{Dep} - \text{Capital Ex} - \text{chg NWC}$
 $= 300 + 125 - 150 - 20 = 255$

- C)
- D)

Question 10.

The effective annual rate (EAR) for a loan with a stated APR of 8% compounded monthly is closest to:

- A) 8.30%
- B) 8.33%
- C) 8.00%
- D) 8.24%

Answer: A

Explanation: A) $EAR = (1 + APR / k)^k - 1 = (1 + .08 / 12)^{12} - 1 = .083$ or 8.3%

Question 11.

Consider the following list of projects:

Project	Investment	NPV
A	135,000	6,000
B	200,000	30,000
C	125,000	20,000
D	150,000	2,000
E	175,000	10,000
F	75,000	10,000
G	80,000	9,000
H	200,000	20,000
I	50,000	4,000

Assume that your capital is constrained, so that you only have \$600,000 available to invest in projects. If you invest in the optimal combination of projects given your capital constraint, then the total NPV for all the projects you invest in will be closest to:

- A) \$65,000
- B) \$80,000
- C) \$69,000
- D) \$111,000

Answer: B

Explanation: A)
B)

Project	Investment	NPV	Profitability	
			Index	Rank
A	135,000	6,000	0.0444	8
B	200,000	30,000	0.1500	2
C	125,000	20,000	0.1600	1
D	150,000	2,000	0.0133	9
E	175,000	10,000	0.0571	7
F	75,000	10,000	0.1333	3
G	80,000	9,000	0.1125	4
H	200,000	20,000	0.1000	5
I	50,000	4,000	0.8000	6

This is a tricky problem in that by the rankings CBFG seem optimal, but this combination leaves \$120,000 on the table uninvested. By replacing G with H the full \$600,000 is invested and the NPV of the combination of projects is increased by \$11,000. Therefore you should invest in projects CBFH.

$$\text{The NPV} = \text{NPV}_C + \text{NPV}_B + \text{NPV}_F + \text{NPV}_H = 20000 + 30000 + 10000 + 20000 = \$80,000.$$

Question 12.

Glucose Scan Incorporated (GSI) currently sells its latest glucose monitor, the Glucoscan 3000, to diabetic patients for \$129. GSI plans on lowering their price next year to \$99 per unit. The cost of goods sold for each Glucoscan unit is \$50, and GSI expects to sell 100,000 units over the next year.

Suppose that if GSI drops the price on the Glucoscan 3000 immediately, it can increase sales over the next year by 30% to 130,000 units. The incremental impact of this price drop on the firms EBIT is closest to:

- A) a decline of 1.5 million
- B) an increase of 1.5 million
- C) a decline of 2.4 million
- D) an increase of 2.4 million

Answer: A

Explanation: A) Without price cut = 100,000 units \times (\$129 - 50) = \$7,900,000
With price cut = 130,000 units \times (\$99 - 50) = \$6,370,000
So, incremental = 6,370,000 - 7,900,000 = -1,530,000

Question 13.

Which of the following statements is false?

- A) Options also allow investors to speculate, or place a bet on the direction in which they believe the market is likely to move.
- B) Options where the strike price and the stock price are very far apart are referred to as deep in-the-money or deep out-of-the-money.
- C) Call options with strike prices above the current stock price are in-the money, as are put options with strike prices below the current stock price.
- D) European options allow their holders to exercise the option only on the expiration date—holders cannot exercise before the expiration date.

Answer: C

Explanation: A)
B)
C) Call options with strike prices below the current stock price are in-the money, as are put options with strike prices above the current stock price.

Question 14.

Rose Industries is currently trading for \$47 per share. The stock pays no dividends. A one-year European call option on Luther with a strike price of \$45 is currently trading for \$7.45. If the risk-free interest rate is 6% per year, then calculate the price of a one-year European put option on Luther with a strike price of \$45.

This price is closest to :

- A) \$1.90
- B) \$3.90
- C) \$2.90
- D) \$3.50

Answer: $C = P + S - PV(K) - PV(Div)$

$$\$7.45 = P + \$47 - \frac{\$45}{1.06} - \$0$$

$$P = \$7.45 - \$47 + \frac{\$45}{1.06} = \$2.90$$

Question 15.

The current price of Kinston Corporation stock is \$10. In each of the next two years, this stock price can either go up by \$3.00 or go down by \$2.00. Kinston stock pays no dividends. The one year risk-free interest rate is 5% and will remain constant.

Using the binomial pricing model, calculate the price of a two-year call option on Kinston stock with a strike price of \$9.

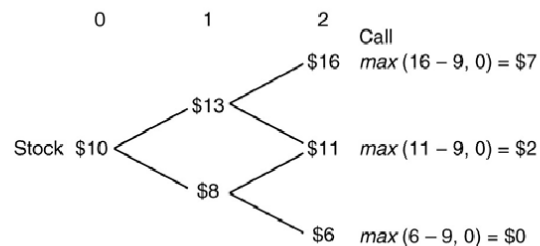
The call price is closest to :

- A) \$2
- B) \$2.5
- C) \$3.5
- D) \$3.2

Answer : B

Using the binomial pricing model, calculate the price of a two-year call option on Kinston stock with a strike price of \$9.

Answer: This problem requires a two period binomial tree. The solution will start by solving the value of the call option for the up and down branches as of year 1 and then solve for the final value of the option at year 0.



Up branch

$$\Delta = \frac{C_u - C_d}{S_u - S_d} = \frac{\$7 - \$2}{\$16 - \$11} = 1$$

$$B = \frac{C_d - S_d \Delta}{1 + r_f} = \frac{\$2 - \$11(1)}{1.05} = -8.571429$$

$$C = S\Delta + B = \$13(1) + (-8.571429) = \$4.43$$

Down Branch

$$\Delta = \frac{C_u - C_d}{S_u - S_d} = \frac{\$2 - \$0}{\$11 - \$6} = .4$$

$$B = \frac{C_d - S_d \Delta}{1 + r_f} = \frac{\$0 - \$6(.4)}{1.05} = -2.285714$$

$$C = S\Delta + B = \$8(.4) + (-2.285714) = \$0.91$$

Value at year 0

$$\Delta = \frac{C_u - C_d}{S_u - S_d} = \frac{\$4.43 - \$0.91}{\$13 - \$8} = .7040$$

$$B = \frac{C_d - S_d \Delta}{1 + r_f} = \frac{\$0.91 - \$8(.704)}{1.05} = -4.497143$$

$$C = S\Delta + B = \$10(.704) + (-4.497143) = \$2.54$$

Question 16.

Which of the following statements is false?

- A) In both the Binomial and Black-Scholes Pricing Models, we need to know the risk neutral probability of each possible future stock price to calculate the option price.
- B) In the real world, investors are risk averse. Thus, the expected return of a typical stock includes a positive risk premium to compensate investors for risk.
- C) Because no assumption on the risk preferences of investors is necessary to calculate the option price using either the Binomial Model or the Black-Scholes formula, the models must work for any set of preferences, including risk-neutral investors.
- D) If all market participants were risk neutral, then all financial assets (including options) would have the same cost of capital—the risk free rate of interest.

Answer: A

Question 17.

The current price of KD Industries stock is \$20. In the next year the stock price will either go up by 20% or go down by 20%. KD pays no dividends. The one year risk-free rate is 5% and will remain constant. The risk neutral probability of an up state for KD industries and the price of a one-year put option on KD stock with a strike price of \$20 are closest to:

- A) 37.5%, \$2
- B) 62.5%, \$2.15
- C) 40.0%, \$2.4
- D) 62.5%, \$1.45

Answer: D

Explanation: A)

B)

C)

$$D) \quad p = \frac{(1+r_f)S - S_d}{S_u - S_d} = \frac{(1.05)(\$20) - \$16}{\$24 - \$16} = .625 \text{ or } 62.5\%$$

$$P = \frac{.625(\$0) + (1 - .625)(\$4)}{1.05} = \$1.43$$