E120: Principles of Engineering Economics

Midterm Exam 1 Solutions

Part 1: Concepts. (20 points, 5 each)

1.1). Which of the following is **NOT** a type of agency cost?

a. The cost of an audit of the firm's financial statements.
b. The cost of a corporate jet provided to the CEO as part of her compensation package.
c. Loans provided to the firm's managers at below-market interest rates.
d. The costs of financing the firm.
e. The cost of providing life insurance to the firm's CFO.

Answer: D

1.2) Which of the following is considered a secondary market transaction?

I. You buy shares in the public offering of a start-up company in the computer industry.
II. Your mother sells you the shares she purchased in your uncle's latest business venture.
III. You buy shares in General Motors from your closest friend.

a. I only
b. II only
c. I and II only
d. II and III only
e. I, II, and III

Answer: D

1.3) Which of the following is/are **FALSE** regarding the balance sheet and income statement?

I. The income statement reflects a summary of activity that occurs over some period of time while the balance sheet is a snapshot taken at a single point in time.
II. Both represent a summary of activity that occurs over some time period.
III. The two statements, taken together, give an accurate estimate of the firm's cash flows and market value.

a. I only
b. II only
c. III only
d. I and III only
e. II and III only

Answer: E

1.4) Which of the following is **FALSE** regarding book and market values?

a. Financial managers should rely on book values, and not market values, when analyzing the firm's tax liability.
b. Financial managers should rely on market values, and not book values, when making decisions for the firm's strategic direction.
c. Book value is an accounting summary of value and is inferior to market value as a source of current information regarding the true value of the firm.
d. The market value of fixed assets is often difficult to determine.
e. Market value always exceeds book value.

Answer: E

Part 2: calculations.

(28 points, 4 points for each part) You are given the following income statement and balance sheet of a firm.

	2000	2001			2000	2001
Cash	60	70		**Current Liabilities**	95	85
Accounts receivable	115	80		**Long-term debt**	320	340
Inventory	50	60		Common stock	250	262
Total current asset	225	210		Retained earnings	200	223
Net fixed assets	640	700		**Total owner's equity**	450	485
Total assets	865	910		**Total liabilities**	865	910

finish the following income statement for the year of 2001

Net Sales	320
Cost of goods sold	200
Depreciation	45
Earnings before interest and taxes	*75*
Interest paid	25
Taxable income	*50*
Taxes (tax rate=34%)	*17*
Net income	*33*
Addition to retained earnings	23
Dividends paid	*10*

What is operating cash flow for 2001?

OCF = EBIT +D – T = 75+45-17 = 103

What is cash flow to stockholders for 2001?

CF to stockholders = dividends – net new equity raised

= dividends – (common stock$_{2001}$ – common stock$_{2000}$) =10 - (262 - 250) = -2

What is cash flow to creditors for 2001?

CF to creditors = interest – net new borrowing

= interest – (long-term debt$_{2001}$ – long-term debt$_{2000}$) = 25 – (340-320) = 5

What is net capital spending for 2001?

Net capital spending = NFA$_{2001}$-NFA$_{2000}$ +D = 700-640+45=105

What is the change in net working capital during 2001?

Change in NWC = (C/A-C/L) $_{2001}$ – (C/A-C/L) $_{2000}$ = (210-85) – (225-95) = 125-130 = -5

What is cash flow from assets for 2001?

CF from assets = CF to creditors + CF to stockholders = 5 + (-2) = 3

Or = OCF - net capital spending – change in NWC = 103-105-(-5)=3

3. (24 points, 12 points for each part) You are 21st years old now, and decide to invest in you IRA for your retirement at the age of 65.

a. You will make 44 equal annual investments of $3000 with the first investment due a year from now. Assume the APR is 10% compounded annually, how much balance is in your IRA when you retire?

FV = 3000 [1-1/1.1^44]/0.1 = 1,957,922.28*

b. Assume in part (a) that the APR is 10% compound annually for the first 20 years and 12% compounded annually afterwards, how much is in your IRA account when you retire?

FV = FV of first 20 payments + FV of last 24 payments

= {3000 [1-1/1.1^20]/0.1}* (1.12^24) + 3000* [1-1/1.12^24]/0.12 = 2,962,533.62*

4. (28 points) You want to buy the new model-2005 Mustang GT. Its price is $28,000. You decide to pay nothing down and finance all of it. Your bank offers you a 4-year loan with 3.99% APR compounded monthly. You pay monthly to your bank. (ignore all fees, charges, and possible points)

(7 points) How much is your monthly payment?

*r = 3.99%/12 = 0.003325 ; n = 4*12 = 48*

28000 = C [1-1/1.003325^48]/0.003325 ; C = 632.09*

(7 points) How much is the balloon payment if you want to pay off the loan right after the 24th payment?

Balloon payment = value of the last 24 payments after the 24th payment

= 632.09 * [1-1/1.003325^24]/0.003325 = 14,557.42

(7 points) How much interest will you pay for the entire loan, if you pay as schedule?

Interest = 48 payments – loan value

= 48 632.09 – 28000 = 2340.32*

(7 points) How much interest will you pay from your LAST 24 payments if you make

payments as schedule?

Interest = 24 payments – balloon payment

*= 24 * 632.09- 14557.42 =612.72*