

EM 600 Engineering Economics and Cost Analysis, **Home Work #5**
School of Systems & Enterprises, Stevens Institute of Technology

“I PLEDGE MY HONOR THAT I HAVE ABIDED BY THE STEVENS HONOR SYSTEM”

By: _____

QUESTION 1:

Consider the following 6 investment opportunities:

Project	Required Investment	Annual Savings over 10 years
A	\$160	\$130
B	\$170	\$105
C	\$180	\$140
D	\$220	\$160
E	\$250	\$180
F	\$260	\$200

Projects A and B are mutually exclusive.
Project C is contingent upon Project A.
Projects D and E are also mutually exclusive.
Project F is contingent upon Project D.

- How many mutually exclusive decision alternatives are in the problem including the do-nothing alternative? **[6 points]**
- What is the total required investment for each alternative? **[2 points]**
- What is the total annual savings for each alternative? **[2 points]**

QUESTION 2:

Pinkman Pharmaceuticals is a new company that will manufacture and deliver generic drugs to residents of Albuquerque, New Mexico. They need to raise \$20,000,000 in order to build their new manufacturing plant and distribution center. The Pharmacy Depot's target capital structure calls for a debt ratio of 50%. Therefore, \$10,000,000 needs to be financed from equity from the following sources:

Sources	Amount
Retained earnings	\$4,000,000
New Common Stock	\$4,000,000
Preferred Stock	\$2,000,000

The following details the financial data for both the common stock and preferred stock options:

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	Common Stock	Preferred Stock
Market Price	\$100	\$160
Annual Cash Dividend	\$15 (EOY 1)	\$23
Annual Cash Dividend Growth Rate	10.5%	-
Issue Price	\$90	\$140
Flotation Costs	18%	10% (Market Price)

- a. Using the following 4 steps, calculate the cost of equity required to finance this new venture:
1. Cost of retained earnings **[2.5 points]**
 2. Flotation costs for common stock **[2.5 points]**
 3. Flotation costs for preferred stock **[2.5 points]**
 4. Cost of Equity **[2.5 points]**

QUESTION 3:

Embraer Aircrafts needs to raise \$24,000,000 in order to build a new training facility for their employees. The following table lists 4 critical input variables for the financial analysis and the associated limits of uncertainty:

Input	Lower Limit	Base Case	Upper Limit
Building Cost	90%	\$10,000,000	110%
Equipment Cost	85%	\$8,000,000	120%
Annual Revenue	90%	\$16,000,000	115%
Annual O&M Costs	80%	\$6,000,000	120%

With a MARR of 7% and a project life of 4 years, perform a sensitivity analysis on the data using PW as the figure of merit assessed.

- a. Present the data in tabular format as shown in the lecture. **[6 points]**
- b. Present the data in a “Spider Plot” format. **[3 points]**
- c. Which input has the biggest impact on the PW? **[1 point]**