CALIFORNIA STATE UNIVERSITY NORTHRIDGE
MSEM DEPARTMENT
Exam 2

This is an open book, open notes exam. Other resources are *NOT* allowed. Read carefully all questions before providing an answer. Use only the paper provided (exam sheets). Provide your answer directly beneath the question. Do not provide any part of your response on the back of the sheets provided (use only the front part of the page). Be sure to show all your work. *No credit* will be given for answers that do not provide specifically how the response was obtained.

You must show all your work & calculations clearly. Answers without showing all work legibly will result in zero credit for the problem. All work in this exam must be your own. Any discussion with or copying of solutions from other students will result in *zero credit* for the entire exam.

Name: ____

Student #:____

Good luck!

Total Score: ______ / 100 points

Problem 1 **Score: ____ / 4.0 points**

In a modified B/C ratio:
A) Disbenefits and M&O costs are subtracted from benefits.
B) Disbenefits are subtracted from benefits and M&O costs are included in costs.
C) Disbenefits and M&O costs are added to costs.
D) Disbenefi ts are added to costs and M&O costs are subtracted from benefits.

Problem 2 **Score: ____ / 4.0 points**

For the four independent projects shown, the one or ones to select using a MARR of 13% per year are:

Project	**Rate of Return(% per Year)**
A	13
B	11
C	15
D	10

A) Only A
B) Only A and C
C) Only C
D) Can’t tell; need to conduct incremental analysis

Problem 3 **Score: ____ / 16.0 points**

The following data is available for three different alternatives (in dollars):

	A	B	C
Initial Cost	1000	1200	2000
Annual Benefit	200	250	650
Useful Life, Years	Forever	20	5

Alternatives B and C are replaced at the end of their useful lives with identical replacements. Using the most appropriate economic analysis, find the most attractive alternative. Use 15% MARR.

Problem 4 **Score: ____ / 17.0 points**

Your grandfather deposited $10,000 now and $1,000 every year until 10 years. What annual amount can he withdraw from year 11 until an infinite number of years if the interest rate is 10%?

Problem 5 **Score: ____ / 20.0 points**

Wiley Coyote is thinking about funding his future roadrunner hunting endeavors. He has found a big pile of gold worth $2,000,000 and is thinking on investing it. For that he has contacted ACME financial services. ACME FS has told Wiley that they will be able to give him $272,020 per year for 15 years if he invests his gold with them. Wiley figures gold will appreciate at a rate of 10% per year, making that his MARR. Is Wiley better off keeping the gold or investing with ACME? Use ROR to answer this question. *Draw your cash flow diagram. Must use trial and error and interpolation.*

Problem 6 **Score: ____ / 24.0 points**

The cash flows for three different alternatives are given in the table below. Assume that alternatives are replaced at the end of their useful lives. If the MARR is 9%, which is the best alternative based on Incremental Rate of Return analysis?

	X	Y	Z
Initial cost	5,000	9,500	7,000
Annual Net Benefits	1000	1,500	1,800
Salvage Value	2,900	3,000	1,100
Life (Year)	4	8	4
Internal Rate of Return	11.11%	9.77%	6.63%

Problem 7 **Score: ____ / 15.0 points**

Two plans have been proposed for a high-speed passenger rail line between Cincinnati and Cleveland. The plans are summarized in the table below. Costs and benefits are in millions of dollars. If we uses a MARR of 5% and the proposed programs have lifespans of 10 years, which proposal should be selected using *conventional* B/C ratio analysis.

	Proposal 1	Proposal 2
Initial Cost ($M)	45	30
Annual Benefits ($M/yr)	10	7.5
Annual Costs ($M/yr)	1.6	1
Annual Disbenefits ($M/yr)	1	0.7