Assignment 4

EECE/CPEN 481

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Selected problems from the textbook (Engineering Economic Analysis: Fourth Canadian Edition) and other sources.

Problems are drawn from lecture materials and Chapter 8.

1. Problem 1 (2 pts)
2. Problem 2 (2 pts)
3. Problem 3 (2 pts)
4. Problem 4 (1 pt)

Assignment 4

1. **Problem 1**

List three examples of the potential costs and benefits that should be considered in evaluating a potential nuclear power plant. Give three examples of stakeholder viewpoints that will need to be considered.

2. **Problem 2**

A government agency has estimated that a flood control project has costs and benefits that are parabolic, according to the equation

$(\text{PW of benefits})^2 - 18 * (\text{PW of cost}) + 54 = 0$

Where both benefits and costs are stated in millions of dollars. What is the present worth of cost for the project that optimizes the benefit/cost ratio, over the life of the project? At that optimal level, what is the B/C ratio, rounding to thousandths (x.xxx)?

3. **Problem 3**

Evaluate these mutually exclusive alternatives over a time period of 15 years assuming a MARR of 9%:

	A	B	C
Initial investment	$10,000	$17,300	$22,000
Annual savings	$2,400	$ 5,500	$ 9,600
Annual costs	$1,000	$ 2,750	$ 6,400
Salvage value	$6,000	$ 4,400	$14,000

Use the following:

(a) Conventional B/C ratio (rounded to 3 decimal places)
(b) Present worth analysis (rounded to nearest dollar)
(c) Internal rate of return analysis (rounded to 1 decimal place)
(d) Payback period (rounded up to the total # of years until payback is complete)

Assume that salvage value is considered like a cost in these evaluations.

4. **Problem 4**

A proposed bridge will cost $4 million to build and $200,000 per year to maintain. The bridge should last 40 years. Time-saving benefits to the driving public are estimated to be $1,000,000 per year. Ongoing damage to adjacent property owners due to noise is estimated to be worth $250,000 per year. It is uncertain what interest rate should be used to evaluate the project: calculate the break-even annual interest rate that results in a B/C ratio of 1. Round your answer to 1 decimal place (x.x%).