Name (please print) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ENG 106 – Engineering Economics Midterm Preview Winter 2013

You may use three sheets of hand-written notes. No other reference materials, calculators or other electronic devices are allowed. State any assumptions, show all your work and explain where appropriate. Please use shorthand notation, e.g., (A/G, 5%, 3), where helpful.

The test has four pages and 100 points.

**The following data apply to every problem on the exam: the inflation-free interest rate, i’, is 5.0%/yr, and the market interest rate, i, is 7.1%/yr. The inflation rate, f, is 2.0%/yr.**

1. The amounts on the following cash flow diagram are stated in constant year-zero dollars.

To repeat, i’ = 5.0%/yr, i = 7.1%/yr, and f = 2.0%/yr.

0 1 2 3 4 5 6 7 8 9

233

178

a) (10 pts) Set up all the relationships needed to calculate … . A more efficient set of relationships is worth more points.

b) (10 pts) Set up all the relationships needed to calculate … . . You may begin with either the values on the cash flow diagram or your result from (a).

c) (10 pts) Set up all the relationships needed to calculate … . You may begin with either the values on the cash flow diagram or your result from (a) or (b).

2. (20 pts) The amounts on the following cash flow diagram are stated in constant year-zero dollars.

To repeat, i’ = 5.0%/yr, i = 7.1%/yr, and f = 2.0%/yr.

0 1 2 3 4 5 6 7 8 9

295

280

265

250

Set up all the relationships needed to calculate … . A more efficient set is worth more points.

3. You've been given the following data on two mutually exclusive “do-something” alternatives that BizNuZ is considering pursuing. BizNuZ might also choose to do nothing (DN), in which case there would be no costs or benefits.

|  |  |  |
| --- | --- | --- |
| Alternative: | PurchaseMe (PM) | LeaseMe (LM) |
| Purchase Price | $5k (in yr-0 $) |  |
| Annual Cost | $1k (in yr-0 $) @ EOY 1-5 | 2.2k (actual $ in each year) @ EOY 0-2 |
| Life | 5 years (of the purchased equipment) | 3 years (of the lease contract) |
| Salvage Value | $0.6k (in yr-0 $) @ EOY 5 |  |
| Annual Benefit | $3k (in yr-0 $) @ EOY 1-5 | $3.3k in yr-1 $ @ EOY 1, then increasing by 2% each year over the previous year through EOY 3, in actual $ |

The technology is stable for both the alternatives, and BiZNuZ anticipates continuing indefinitely with one of the do-something alternatives if it chooses one rather than doing nothing. The annual cost for the lease would be fixed for the initial three-year life of the contract. It would be expected to increase with inflation for the second and any subsequent renewals of the contract, as would the annual benefit.

To repeat, i’ = 5.0%/yr, i = 7.1%/yr, and f = 2.0%/yr.

a) (5 pts) Given the unequal lives, what analysis …

b) (20 pts) Set up relationships needed to properly select …

c) (5 pts) State the decision rule for selecting …

d) (20 pts) Working from the raw data (repeated below so you don’t have to refer to the previous page) rather than the results from (b), set up efficient relationships needed to …