

## Test 3

Time: 100 Minutes

You may use Microsoft EXCEL sheet that was developed. You can use any EXCEL function to check your calculations but you must include the detail of the formula or factors in your exam sheet.

### **PROBLEM 1: (35 Points)**

A company considering an investment of \$400,000 on a 10-year project. At the end of 10 years of life, a cleanup cost of \$300,000 is required. The increased production capacity will bring a steady revenue of \$105,000 annually with an O&M cost of \$25,000 in year 1 and increasing by \$3,000 each year.

Perform an ROR analysis that will provide the following information:

- (a) Type of cash flow series and possible number of ROR values
- (b) PW graph showing all  $i^*$  values
- (c) Actual  $i^*$  values determined using the ROR relation (direct calculation verified by the use of spreadsheet function)
- (d) Conclusions that can be drawn about the correct rate of return from this analysis.

### **PROBLEM 2: (35 Points)**

A company considering an investment of \$400,000 on a major manufacturing equipment on a 6-year project with a salvage value of \$40,000. Estimates for annual revenue of \$100,000 with O&M cost of \$10,000 in year 1 and increasing by \$2,000 each year are provided. Total local, state and federal taxes are estimated at 15% for profit of up to \$50,000 and 20% for any additional profit. Set up a table of NCF for the project using SL, SOYD, and DDB depreciation methods and compare the rate of return before and after taxes for each case (Use IRR function of EXCEL to expedite the results)

**PROBLEM 3:** (10 Points)

An investor who purchased a \$10,000 mortgage bond today paid only \$6000 for it. The bond coupon rate is 8% per year, payable quarterly, and the maturity date is 18 years from the year of issuance. Because the bond is in default, it will pay no dividend for the next 2 years. If the bond dividend is in fact paid for the following 5 years (after the 2 years) and the investor then sells the bond for \$7000, what rate of return will be realized ( a ) per quarter and ( b ) per year (nominal)? %.

**PROBLEM 4:** (10 Points)

A Company wants to build a spare parts storage facility. A plant engineer has identified four different location options. The initial cost and the annual net cash flow estimates are detailed in table below. If the MARR is 10%, use incremental ROR analysis to select the one economically best location.

	A	B	C	D
Initial cost	-200,000	-265,000	-190,000	-350,000
NCF/YR	22,000	35,000	18,500	52,000
Life	30	30	30	30

**PROBLEM 5:** (10 Points)

Find the present worth of the cash flows shown. Some are expressed as constant-value (CV) dollars, and others are inflated dollars. Assume a real interest rate of 8% per year and an inflation rate of 6% per year.

Year	1	2	3	4	5
NCF	3,000	6,000	8,000	4,000	5,000
Stated as	CV	Inflated	Inflated	CV	CV