

IE 342 18-19 Spring Semester

Study Set 6

Please note that we will not send the solution key! But you can ask your questions in the office hour.

1) A company has just received a special job order from one of its clients. The following financial data have been collected:

- This three-year project requires the purchase of special-purpose equipment for \$60,000. The equipment falls into the MACRS five-year class.
- The machine will be sold for \$30,000 (today's dollars) at the end of three years.
- The project will bring in additional annual revenue of \$120,000 (actual dollars), but it is expected to incur an additional annual operating cost of \$54,800 (today's dollars).
- The project requires an investment in working capital in the amount of \$15,000 (today's dollars) at $n=0$. In each subsequent year, additional working capital needs to

be provided at the general inflation rate. Any investment in working capital will be recovered after the project is terminated.

- To purchase the equipment, the firm expects to borrow \$55,000 at 10% over a three-year period. The remaining \$5,000 will be taken from the firm's retained earnings.
- The firm expects a general inflation of 5% per year during the project period. The firm's marginal tax rate is 40%, and its market interest rate is 18%.

a) Compute the after-tax cash flows in actual dollars.

b) What is the equivalent present value of this amount at time 0?

2) The annual fuel costs required to operate a small solid-waste treatment plant are projected to be \$1.8 million, without considering any future inflation. The best estimates indicate that the annual inflation-free interest rate will be 7% and the general inflation rate will be 6%. If the plant has a remaining useful life of six years, what is the present equivalent of its fuel costs? Use actual-dollar analysis.

3) A company is considering buying workstation computers to support its engineering staff. In today's dollars, it is estimated that the maintenance costs for the computers (paid at the end of each year) will be \$20,000, \$30,000, \$35,000, \$38,000, and \$42,000 for years 1 to 5, respectively. The general inflation rate is estimated to be 8% per year, and the company will receive 12% per year on its invested funds during the inflationary period. The company wants to pay for maintenance expenses in equivalent equal payments (in actual dollars) at the end of each of the five years. Find the amount of the company's payments.

4) A series of four annual constant-dollar payments beginning with \$5,000 at the end of the first year is growing at the rate of 9% per year. (Assume that the base year is the current year) If the market interest rate is 12% per year and the general inflation rate is 7% per year, find the present worth of this series of payments, based on

(a) constant-dollar analysis.

(b) actual-dollar analysis.

5) You will invest in an apartment building project that requires an investment of \$12,500,000. Maintenance cost of the building is expected to be \$250,000 in the first year, and it is expected to increase \$50,000 each year. (\$300,000 in the second year, \$350,000 in the third year etc.) Operational cost per year is estimated to be \$80,000. After 5 years of ownership, the building can be sold for \$14,000. If MARR is 15% and tax rate is 35%, what is the present worth of this investment? Assume the building will be fully occupied during the operation. (Building will be depreciated according to 39 years MACRS and will be placed service in January of the first year and sold in December in the fifth year.)

6) Suppose you borrow \$25,000 at 12% compounded monthly over 5 years. Knowing that, 12% will represent the market interest rate you realize that the monthly payment in actual dollars will be \$450. If the average monthly general inflation rate is expected to be 0.8%, determine the equivalent equal monthly payment series in constant dollars.