

IE 342 18-19 Spring Study Set 5

**Please do not submit your answers as they will not be graded!!
(Solutions will not be provided)**

1. An electrical appliance company purchased an industrial robot that costs \$300,000 in year 0. The robot is classified as a seven-year MACRS property. If the robot is sold at the end of year 5, compute the amounts of gains (or losses) for the following three salvage values (assume that both capital gains is taxed at 40% and ordinary incomes is taxed at 34%):
(a) \$70,000. **(\$73,510.5)**
(b) \$125,460. **(\$110,114.1)**
(c) \$320,000. **(\$237,310.5)**
2. Derive a 7-year recovery percentages.
(20%, 32%, 19.20%, 11.52%, 6.91%, 4.14%, 4.15%, 2.07%)
3. You are considering building a luxury apartment that requires an investment of \$12,500,000. You expect the maintenance cost for the apartment building to be \$250,000 the first year and \$300,000 the second year, after which it will continue to increase by \$50,000 in subsequent years. The cost to hire a manager for the building is estimated to be \$80,000 per year. After five years of operation, the apartment building can be sold for \$14,000,000. What is the present worth of the cash flow under MARR 15%? Assume that the building will remain fully occupied during the five years. Assume also that your tax rate is 35%. The building will be depreciated according to 39-year MACRS and will be placed in service in January during the first year of ownership and sold in December during the fifth year of ownership. (Hint: You first need to find the minimum annual renting payment, which will be the gross revenues for the first five years.)
(-\$2,104,502.1)
4. A series of four annual constant-dollar payments beginning with \$10,000 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 **(\$40,652.76)**
b) actual-dollar analysis. **(\$40,650.39)**
5. 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 annual inflation-free interest rate is estimated to be 8% and the general inflation rate is estimated to be 6% during the planning horizon. If the plant has a remaining useful life of six years, what is the present equivalent of its fuel costs? Use actual-dollar analysis.
(\$8,321,183.3)
6. Suppose that you borrow \$20,000 at 12% compounded monthly over five years. The market interest rate is 12%. If the average monthly general inflation rate is expected to be 0.5%, determine the equivalent equal monthly payment series in constant dollars.
(\$386.38)

7. 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 \$55,000. The equipment falls into the MACRS five-year class.
 - The machine will be sold for \$27,000 (today's dollars) at the end of three year.
 - The project will bring a gross revenue of \$114,000 (actual dollars), but it is expected to incur an annual operating cost of \$53,800 (today's dollars).
 - The project requires a working capital investment of \$12,000 (today's dollars) at year 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 when the project is terminated.
 - To purchase the equipment, the firm expects to borrow \$50,000 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 market interest rate is 18%.

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

n	Net Cash Flow
0	-\$17,000
1	\$20201
2	\$20511.6
3	\$54201.21

b) What is the equivalent present value of this amount at time 0? (**\$47839.13**)

c) What is IRR of this project? (**120%**)