

Engineering Economics

Final Exam

Directions: Answer all problems, all problems have the same value.

1. If investments of \$2000 now, \$2500 in two years, and \$1000 in four years are all made at 4 % effective interest, what will be the total in ten years ?
2. Part of the income that a machine generates is put into a sinking fund to replace the machine when it wears out. If \$1500 is deposited annually at 7 % interest, how many years must the machine be kept before a new machine costing \$30,000 can be purchased ?
3. John Jay is purchasing a \$24,000, which is to be paid for in 48 monthly installments of \$543.35. What is the effective annual interest rate on this financing arrangement ?
4. A pilot plant has been constructed to convert garbage to oil, natural gas, and charcoal. The plant cost 44 million to build and will have a 20-year life with no salvage value. The cost of processing 1 ton (907 kg) of garbage is \$14. From each ton are derived products which can be sold for \$21 (\$0.023 per kg). However, 20 % of the end products are consumed as energy during the processing. The cost of delivery, sorting, and shredding a ton of garbage is \$2.50 (0.0028 per kg), after deducting the value of the salvageable materials recovered. How many tons (kg) of garbage must be processed to recover the cost of the plant at an interest rate of 9% ? *Take 20 year*
5. The lining of a chemical tank must be replaced every 3 years at a cost of \$1800. A new type of lining is available that is more resistant to corrosion. The new lining costs \$3100. If the MARR is 12 %, and taxes and insurance are 4% of the first cost annually, how long must the improved lining last to be more economical than the present lining ?
6. A group of concerned citizens has established a trust fund that pays 6% interest compounded monthly to preserve a historical building by providing annual maintenance funds of \$30,000 forever. Compute the capitalized equivalent amount for these maintenance expenses.
7. You are considering purchasing a dump truck. The truck will cost \$45,000 and have operating & maintenance costs that start at \$15,000 in the first year and increases by \$2,000 per year . Assume the salvage value at the end of five years is \$9,000 and the interest rate is 12 % . What is the equivalent annual cost of owning & operating the truck.
8. Consider the following two mutually exclusive investment projects:

	Project A	Project B
0	\$100	-\$800
1	0	1,150
2	0	40
3	51.66%	46.31%