

※ 考生請注意：本試題 可 不可 使用計算機

1. Please answer the following questions:

Can we compare alternatives by maximizing Net Present Value only? Why?(5%)

What are the differences between cost accounting and cost engineering? (5%)

2. Consider the end-of-year geometric sequence of cash flow in Fig. 1 and determine the PW and AW equivalent values. The rate of decrease is 20% per year after the first year, and the interest rate is 24% compounded monthly. (15%)

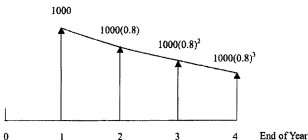


Fig. 1

3. A contractor is considering a bank loan for purchasing a new crane costing \$150,000. The loan would be at a rate of 8% for 3 years (15%)
- 3.1 What is the semiannual repayment amount of principal and interest?
- 3.2 What is the total interest paid over the 3 years?
- 3.3 What is the balance owed by the contractor if, after 2 years of payments, they pay off the remainder of the loan?
4. You purchased a building five years ago for \$100,000. Its annual maintenance expense has been \$5,000 per year. At the end of three years, you spent \$9,000 on roof repairs. At the end of five years (now), you sell the building for \$120,000. During the period of ownership, you rented out the building for \$10,000 per year paid at the beginning of each year. Use the AW method to evaluate this investment when your MARR is 8% per year. (20%)
5. Suppose that the new equipment has a cost basis of \$12,000 and a salvage value of \$3,000 at the end of 6 years. This asset is depreciated by the Straight-Line method. The effective income tax rate is 40% and the after-tax MARR $i_c = 10\%$. If the company is going to sell this asset after 3 years at the market value of \$6,000, **what is the minimum profit per year this asset should produce to breakeven the investment?** (20%)
6. The capital investment for a new highway paving machine is \$900,000. The current estimated annual expense is \$100,000. This expense is estimated to increase at the rate of 6% per year. Assume that f (inflation rate) = 5%, $N = 7$ years, MV at the end of year seven is 15% of the capital investment, and the MARR (inflation-free) is 10% per year. What uniform annual revenue would the machine need to generate to break even? (20%)

(背面仍有題目,請繼續作答)

系所組別: 土木工程學系戊組

考試科目: 工程經濟

考試日期: 0307, 節次: 2

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To Find:	Given:	Factor by Which to Multiply "Given"	Factor Name	Factor Functional Symbol
<i>For single cash flows:</i>				
F	P	$(1+i)^N$	Single payment compound amount	(F/P, i%, N)
P	F	$\frac{1}{(1+i)^N}$	Single payment present worth	(P/F, i%, N)
<i>For uniform series(annuities):</i>				
F	A	$\frac{(1+i)^N - 1}{i}$	Uniform series compound amount	(F/A, i%, N)
P	A	$\frac{(1+i)^N - 1}{i(1+i)^N}$	Uniform series present worth	(P/A, i%, N)
A	F	$\frac{i}{(1+i)^N - 1}$	Sinking fund	(A/F, i%, N)
A	P	$\frac{i(1+i)^N}{(1+i)^N - 1}$	Capital recovery	(A/P, i%, N)

$$F = \frac{G}{i}(F/A, i\%, N) - \frac{NG}{i}$$

$$P = \frac{A_1}{1+f}(P/A, i_{CR}\%, N)$$

$$i_{CR} = (1+i)(1+f)-1$$