

※ 考生請注意: 本試題可使用計算機。請於答案卷(卡)作答, 於本試題紙上作答者, 不予計分。

1. ANSWER the following questions: (20%)
 - 1.1. Is it possible that someone is willing to buy a bond at the price more than the face value of the bond? Why or why not?
 - 1.2. Can we compare alternatives by maximizing their IRRs (Internal Rate of Return)? Why or why not?
 - 1.3. Describe the following terms: Sunk Cost, Retaining Earning, Book Cost
2. You bought a house which was on a 20-year 2.4% nominal interest rate mortgage of NT\$6,000,000 from ABC bank. The payment is due each month. However, you are allowed to pay back only the interest due for the first two years (grace period) then make the monthly payments thereafter. You have paid back the loan for 5 years including the two years of grace period. (30%)
 - 2.1. What is the interest due per month for the first two years? What is the monthly payment that you are asked to make after 2 years of grace period?
 - 2.2. What is the total interest that you have paid in 5 years? What is the remaining principal?
 - 2.3. Another bank CDE offers you a bargain to transfer your loan at the nominal rate of 2.16% for the remaining 15 years with a transfer fee of NT\$40,000. You also get an opportunity that would give you 12% return on the investment per year. Will you transfer your loan? Why or why not? Show your calculation.
3. A contractor is considering the purchase of a set of machine tools at a cost of \$50,000. The purchase is expected to generate profits of \$19,000 (revenues less expenses) per year in each of the next 4 years. Additional profits will be taxed at a rate of 40%. The asset is depreciated by straight-line method with zero salvage value. The contractor's real after-tax MARR is 10% (25%)
 - 3.1. What is the PW of this investment? Should the contractor purchase the machine tools?
 - 3.2. What is the PW of this investment if the general inflation is 3% in the 4 years period? Should the contractor purchase the machine tools?
4. Consider a piece of equipment that initially cost \$10,000 and has these estimated annual expenses and MV, as shown in Table 1. If this equipment is depreciated by the straight-line method in five year, the effective income tax rate is 30%, and the after-tax MARR is 7%, show each year's EUAC (Equivalent Uniform Annual Cost) of this asset and determine its economical life? (25%)

(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

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Table 1

EOY, k	Annual Expenses	MV at EOY
1	2000	7000
2	2000	5000
3	4000	3500
4	4000	2800
5	4500	2200
6	5600	1800
7	6500	1400
8	7750	1300

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)

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

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

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