※ 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. 回答下面問題：(20%)

    1.1. 列舉並說明三種不是因為實際支出而產生的成本？

    1.2. 一般而言 Minimum Attractive Rate of Return (MARR) 和 Weighted Average Cost of Capital (WACC)哪一個的值會較大？為甚麼？

    1.3. 假設你向銀行借貸 100 萬元，四年期，年利率 5%，下列哪個還款計畫，就最大化現值而言，哪個方案最好？為什麼？(A)四年後本金及利息一起償還　(B)每年償還利息，四年後償還本金 (C)分四年，每年等金額償還本金與利息 (D)第一年償還利息，第二年起償還償還本金與利息。

    1.4. 分別計算 12% nominal interest, compounded semi-annually 及 12% nominal interest, compounded quarterly.的 effective interest rate.

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 12% compounded monthly. (15%)
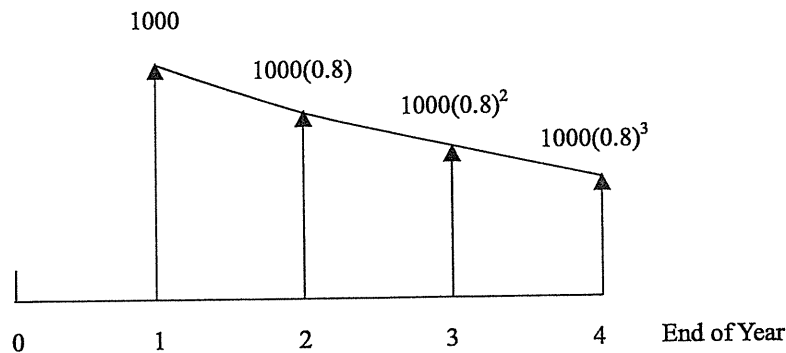

Fig. 1

3. A reginal infrastructure building and maintenance contractor must decide to buy a new machine or wait and buy it 2 years from now when a big project will require the new machine. The cost of new machine is $68,000 if purchased now or an estimated $81,000 if purchased 2 years from now. At MARR =10% per year and inflation rate=5% per year, determine if the contractor should buy now or two years from now

    3.1. Without any adjustment for inflation (10%)

    3.2. With inflation considered (10%)

4. A company must select a new system. Two alternatives are available for evaluation with the following estimates:

System	A	B
Initial Cost, $	-150,000	-850,000
Net Cash Flow, $ per year	60,000	20.000
Life, Years	3	5

The company is in the 35% tax bracket and assumes straight line depreciation for alternative comparison at an after-tax MARR of 6% per year. A salvage value of zero is used when depreciation is calculated.

However, system B can be sold after 5 years for an estimated 10% of its initial cost. System A has no anticipated salvage value. Use Annual Worth (AW) method to determine which alternative is more economical. (20%)

5. A company bought a facility which was on a 20-year 1.8% nominal interest rate mortgage of NT$6,000,000 from ABC bank. The payment is due each month. However, the company is allowed to pay back only the interest due for the first three years (grace period) then make the monthly payments thereafter. The company has paid back the loan for 7 years including the two years of grace period.

　5.1. What is the total interest that you have paid in 7 years? What is the remaining principal after 7 years of payments? (10%)

　5.2. The bank FGH offers the company a bargain to transfer the loan at the nominal rate of 1.5% for the remaining 13 years with a transfer fee of NT$35,000. 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. (15%)

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

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

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

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