1. Please answer the following terms: (20%)

   1.1. Which of the following assets can be depreciated?
        Land, Crane, Bulldozer, Mutual Fund, Printer, Trademark, Building
   1.2. What is Owner's Equity?
   1.3. What are the differences between Equity Capital and Debt Capital?

2. The National Expressway Engineering Bureau (NEEB) proposes a new highway. There are two different designs are under evaluation. Design A calls for a concrete pavement costing NT$900 per meter with a 20-year life; two paved ditches costing NT$30 per meter each; and three box culverts every kilometer, each costing NT$90,000 and having a 20-year-life. Annual maintenance will cost NT$18,000 per kilometer; the culvert must be cleaned every five years at a cost of NT$4,500 each per kilometer.
   Design B calls for bituminous pavement costing NT$450 per meter with a 10-year life; two sodded ditches costing NT$15 per meter each; and three pipe culverts every kilometer, each costing NT$22,500 and having a 10-year life. The replacement culverts will cost NT$24,000 each. Annual maintenance will cost NT$27,000 per kilometer; the culverts must be cleaned yearly at a cost of NT$2,250 each per kilometer; and the annual maintenance will cost $15 per meter per ditch.
   Compare the two designs on the basis of equivalent worth per kilometer for a 20-year period. Find the most economical design on the basis of equivalent annual worth if the NEEB's MARR (Minimum Attractive rate of Return) is 10%, per year. (25%).

3. You are assigned by your company to evaluate an athletic training center which will service athletes before and during a major sport event. Your company has a MARR of 10% per year. Ignoring inflation and given the following information, what is your recommendation about this venture in terms of NPV (Net Present Value)? (25%)

Planning Horizon:	2 years (time before and during the major sport event)
Initial Capital Investment:	$500,000, in which $300,000 will be repaid in two equal annual payments to a local bank at the nominal interest rate of 12% per year, compounded monthly.
Expected revenues:	$300,000 /year
Labor Costs:	$100,000/year
Operating Costs:	$150,000/year
Depreciation:	Straight-Line Method
Salvage Value:	90% of the initial capital investment
Tax Rate:	40%

4. Your firm is considering developing a commercial building. The initial cost is NT$400,000,000 for the construction of the building only (you already own the land and the construction of the building will be completed in one year from now). The building will have a salvage value of NT$240,000,000 at the end of 5 years and will be depreciated by using the straight-line method over the 5-year period. The debt-to-equity ratio is 60% (that is, 60% of the total cost will be borrowed). The loan for the portion of the initial cost that will be financed through debt will be at 4%, compounded annually, and your firm will

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repay the entire loan amount in 3 equally annual payments. Presently estimated annual revenues and expenses are NT$600,000 /year and NT$250,000/year, respectively. These revenues and expenses are sensitive to the inflation rate of 3% for the next 5 years. The marginal tax rate is 40% and your firm desires a 15% MARR.

4.1. Develop the depreciation schedule, indicating the deprecation amount and book value at the end of each year. (5%)
4.2. Develop the three-year payment schedule, indicating the interest and principal repaid each year? (10%)
4.3. Would you suggest your firm to develop this commercial building project by using NPV? (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)

$$F = \frac{G}{i}(F/A, i\%, N) - \frac{NG}{i}, \quad P = \frac{A_1}{1+f}(P/A, i_{CR}\%, N), \quad i_{CR} = (1+i)/(1+f)-1.$$