

國立成功大學
110學年度碩士班招生考試試題

編 號： 100

系 所： 土木工程學系

科 目： 工程經濟

日 期： 0202

節 次： 第 2 節

備 註： 可使用計算機

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第1頁，共2頁

※ 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。

MARR: Minimum Attractive Rate of Return

1. Explain the following terms: Balance Sheet, Retainage, Depreciation, Owners Equity, Sunk Cost (15%)
2. An asset is purchased with 40% loan on 15% interest per year and 60% savings account funds earning 5% per year. Instead, you can invest the required money to bonds that would give you 12% return per year. What is the yield rate you will use to evaluate this asset? Why? (10%)
3. An engineering school wants to acquire a new engineering complex which costs \$5 million dollars. A campaign, targeting alumni, is planned to raise funds for future maintenance costs, which are estimated at \$1 million per year. Assuming the raised fund can earn 8% interest annually, how much has to be raised now to cover the initial capital and annual costs? (10%)
4. The capital investment for a new highway pavement machine is \$838,000. The estimated annual expense, in year zero dollars, is \$92,600. This expense is estimated to increase at the rate of 6.3% per year. Assume that inflation rate is 4.5%, the planning horizon is 7 years, market value at the end of year seven is 15% of the capital investment, and the MARR(in real term) is 10.5% per year. What uniform annual revenue (before taxes), in actual dollars, would the machine need to generate to break even? (20%)
5. A contractor plans to purchase a new excavator to enhance its current operation. The cost of this new excavator is \$ 1,500,000 and will have a salvage value of \$300,000 (at the end of 5 years). In addition, it is expected that this new equipment will produce a net cash flow of \$400,000 per year for the next 5 years. The economic life of this new equipment is 5 years. The effective tax rate is 30% and the company has an opportunity of investment at the rate of 10% (after tax, with the consideration of the inflation). The straight-line method is applied to determining the depreciation of this excavator.
 - 5.1. If the contractor can get a loan (owner's equity is 30% of the cost of the equipment) from a local bank at the rate of 12% and the loan would be paid back annually in the next 5 years, is this investment justified? (20%)
 - 5.2. Assume that there is another alternative that the contractor could buy the excavator directly from the manufacturer from a foreign country at the cost of 5,200,000 Yen. To promote the new product, the sale representative in Taiwan provides a competitive loan plan that the associated bank could grant a loan of 4,000,000 Yen at very low rate of 5%. In addition, the contractor pays only the interest in the loaning period and then pays back all debts in the fifth year. If the exchange rate from \$ to Yen is 1 : 3.5 now and is expected to be devalued at the rate of 2% per year, is this investment justified? (25%)