THE OPEN UNIVERSITY OF SRI LANKA
Department Of Civil Engineering
Construction Management Programme - Level 7
Post Graduate Diploma / Stand Alone Courses
**CEP 2110/CEE 7110 – Construction Project Appraisal**

040

*FINAL EXAMINATION - 2006*

Time Allowed: **Three Hours**

Date: 25-03 2007 –(Sunday) Time: 0930 - 1230 hrs.

**Answer any Four (04) questions.**

**Q1.**

(a) Explain the term 'Economic Assesment' in relation to the construction industry.

(Marks 05)

(b) Differntiate between the factors 'sinking fund deposit' and 'capital recovery'.

(Marks 05)

(c) Explain the effects of inflation on projects appraisal computations carried out using discounted cash flow techniques

(Marks 05)

(d) Describe 'Discounted cash flow yield' and state the benefits of this to a management of a company contemplating on a new investment.

(Marks 05)

(e) Explain what is meant by' Dual rate of return'.

(Marks 05)

**Q2.**

(a) A company is considering the purchase of the following machines (All values are in Rupees)

| | Machine X | Machine Y |
|---|---|---|
| Life | 4 Years | 5 Years |
| Capital Cost | 10,000 | 10,000 |
| Year 1Earnings (After tax) | 4,400 | 3,100 |
| Year 2Earnings (After tax) | 3,300 | 2,400 |
| Year 3Earnings (After tax) | 3,200 | 2,200 |
| Year 4Earnings (After tax) | 4,000 | 2,100 |
| Year 5Earnings (After tax) | - | 1,500 |

Cost of capital is 14%
Compute the payback period for each machine

(Marks 07)

(b) Compute the average annual rate of return of each machine.

(Marks 06)

(c )Discuss the disadvantages of Pay back period over the other methods

(Marks 06)

(d) The inflation rate is 13% and a project is expected to generate a return of 15% per annum on nominal basis. Calculate the real return.

(Marks 06)

**Q3.**

(a) You plan to retire at age 40 after a highly successful but short career. You would like to accumulate enough money by age 40 to withdraw Rs.225,000 per year for 40 years. You plan to pay into your account 15 equal installments beginning when you are 25 and ending when you are 39. Your account bears interest of 12 percent per year.

(i) How much do you need to accumulate in your account by the time you retire?

(ii) How much do you need to pay into your account in each of the 15 equal installments?

(Marks 06)

(b) Sigma is a precast concrete production company that is intending to purchase a new 'cement sand block' casting machine at a cost of Rs.75, 000 in a bid to diversify its business. The machine has an expected life of five years and can produce 100 blocks per day and will be used 260 days per year. Following information is given too;

Salvage value is Rs. 2,000

Maintenance required Rs.10, 000 at the end of the third year.

| | |
|---|---|
| Sales price per block | Rs. 12.75 |
| Cash production cost per block | |
| Direct materials | Rs. 7.50 |
| Variable labour and overhead cost | Rs. 4.25 |

Assuming a 16 percent discount rate, related to Sigma's prospective investment, determine the net present value of the investment.

(Marks 12)

© Discuss the advantages of 'Net Present Value' over 'Internal Rate of Return in capital budgeting.

(Marks 07)

**Q4.** A Metal Products Company is considering an investment in a new product line. The company produces a variety of products from various metals. The new product under consideration is bolts made out of brass.

To produce the product, the company would need to acquire additional production and marketing equipment with an investment of Rs.1,000,000. The equipment would have an expected life of six years, at which time it would have no market value. The company would also need to invest Rs. 200,000 in additional working capital (primarily to support an increase in accounts receivable).

Over the six year life of the equipment, the company projects the following production and sales volume:

| | Sales Volume |
|---|---|
| Year 1 | 200,000 |
| Year 2 | 300,000 |
| Year 3 | 400,000 |
| Year 4 | 300,000 |
| Year 5 | 200,000 |
| Year 6 | 200,000 |

The company projects the sales price for the new products to be Rs.2.75 for all years and estimates all variable costs would sum to Rs.1.30 per unit. Furthermore, fixed cash expenses are projected at Rs.125, 000 per year. For tax purposes, the original cost of the equipment would be depreciated at the following rates;

| | |
|---|---|
| Year 1 | 15% |
| Year 2 | 22% |
| Year 3 | 21% |
| Year 4 | 21% |
| Year 5 | 21% |
| Year 6 | 0% |
| Total | 100% |

The company's marginal tax rate is expected to remain at the current rate of 40% over the life of the equipment. The company uses a hurdle rate of 8 %( its cost of capital) to evaluate projects of this type.

(a) Compute the after-tax NPV of the proposed project. Based on the NPV, is the project acceptable?

(Marks 15)

(b) Compute the payback period for the proposed project.

(Marks 05)

(c) Determine whether the IRR is greater than the discount rate.

(Marks 05)

**Q5**

(a) An extract of a company balance sheet is as follows;

| | Rs. (Million) |
|---|---|
| Long term loans | 1000 |
| Share capital | 800 |

Average before tax cost of borrowing in 18% and cost of equity (share capital) is 25%. The corporate tax rate is 35%. Calculate the Weighted Average cost of capital of the company.

(Marks 06)

(b) Compare the advantages of 'Discounted cash flow methods' over 'Non discounting cash flow methods' in capital budgeting.

(Marks 07)

(c) A pantry cupboard manufacturer who is determined to expand his business is considering the purchase of several electrically operated machines and tools to reduce both costs of production and time taken for production. The total purchase will cost Rs. 1, 95,000 and will have a life of 10 years. These will have only a negligible scrap value, which can be ignored. The machines and tools will result in Labour savings of Rs. 300,000 per year. You may ignore the gains result in from increased volume of production

Compute the internal rate of return (IRR) of this investment

(Marks 10)

## Q6

A firm with a 10% cost of capital is considering the purchase of two machines, X and Y. Both can produce the same component at identical rates per working hour and the relevant data on the machines is as follows (all cash flows in Rupees);

| | Machine X | Machine Y |
|---|---|---|
| Capital cost | 1,000,000 | 1,600,000 |
| Operating costs per working hour | | |
| Energy | 30 | 50 |
| Consumables | 60 | 80 |
| Variable overheads | 60 | 70 |
| Maintenance costs | | |
| Service intervals | 12 p.a. | 10 p.a. |
| Cost of services | 10,000 | 8,000 |
| Random breakdowns | 3 p.a | 1 p.a. |
| Cost of breakdowns | 20,000 | 30,000 |
| Expected availability (working hours per annum) | 1500 | 2000 |
| Gross contribution from production per hour (excluding marginal costs) | 500 | 500 |
| Expected life | 5 years | 5 years |
| Net salvage value at the end of year 5 | 100,000 | 250,000 |

Determine the net present values of both machines and thereby recommend the most cost effective machine.

(Marks 25)