

THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Construction Management Programme - Level 7
Post Graduate Diploma / Stand Alone Courses
CEX7110 - Construction Project Appraisal



028

FINAL EXAMINATION - 2008

Time Allowed: Three Hours

Date: 2009 - 03 - 26 (Thursday)

Time: 1400 - 1700 hrs.

Answer any Four (04) questions.

Q1.

- (a) Capital investment decisions are those that involve current outlays in return for a stream of benefits in future years. Explain the significance of capital investment decisions for a contractor who intends to invest on an earth moving machinery.

(Marks 05)

- (b) Explain what is understood by 'capital recovery factor'. What is the use of this to a prospective investor?

(Marks 05)

- (c) Explain 'Discounted cash flow yield' while emphasizing on its benefits to a firm contemplating on a new investment.

(Marks 05)

- (d) Explain the effects of inflation on project appraisal computations conducted with the use of cash flow techniques.

(Marks 05)

- (e) Describe 'dual rate of return' and explain how it is formed.

(Marks 05)

Q2

- (a) You plan to retire at the age of 40 after a highly successful but short career. You would like to accumulate enough money by the age of 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 an interest rate 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 10)



- (b) The Delta company is considering the purchase of a machine for, Rs.720, 000. The machine has an eight-year useful life and no salvage value. The estimated cash flows (all values in Rupees) are shown in the table below:

End of Year	Inflows	Major Repair Outflow
1	190,000	
2	180,000	
3	160,000	
4	200,000	100,000
5	180,000	
6	160,000	
7	180,000	
8	200,000	

Determine the payback period of the decision to purchase the machine.

(Marks 05)

- (c) Describe the pay back method. What are its main strengths and weaknesses?

(Marks 10)

Q3.

- (a) Under a special licensing arrangement, ABC Company has an opportunity to market a new product in Sri Lanka for a five-year period. The product would be purchased from the manufacturer, with ABC Company responsible for all costs of promotion and distribution. The licensing arrangement could be renewed at the end of the five-year period at the option of the manufacturer. After careful study, ABC Company has estimated that the following costs and revenues would be associated with the new product (all values in Rupees):

Cost of equipment needed	6,000,000
Working capital needed	10,000,000
Overhaul of the equipment in four years	500,000
Salvage value of the equipment in five years	1,000,000

Annual revenues and costs:

Sales revenues	20,000,000
Cost of goods sold	12,500,000
Out-of-pocket operating costs (for salaries, advertising, and other direct costs)	3,500,000

At the end of the five-year period, the working capital would be released for investment elsewhere if the manufacturer decided not to renew the licensing arrangement. ABC Company's cost of capital is 20%. Would you recommend that the new product be introduced? Ignore income taxes..

(Marks 12)



- (b) Explain the theoretical arguments for preferring Net Present Value (NPV) to Internal Rate of Return (IRR) when choosing among mutually exclusive projects.

(Marks 06)

- (c) Compare the advantages of 'Net Present Value' over Non-discounting methods 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 discount 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 12)

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

(Marks 08)

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

(Marks 05)

Q5

- (a) The inflation rate is 15% and a project is expected to generate 18% per annum return on nominal basis. Calculate the real return.

(Marks 05)

- (b) Describe accounting-rate of return (ARR) approach. Compare ARR and the NPV approach with reference to the time value of money.

(Marks 10)

- (c) The management of Sharp Pin Company is contemplating the purchase of a new machine (at a cost of \$100,000) capable of producing 192,000 units per year. The old machine that is capable of producing 130,000 units per annum is to be sold for \$20,000 in the event of purchasing a new machine. The contribution margin per unit from operating the new machine is \$0.125, while it is \$0.10 per unit from operating the old machine.

The useful life of the old machine was 10 years when it was purchased 2 years ago. The useful life of the new machine is eight years. The new machine has a salvage value of \$20,000, while the old machine's salvage value is zero. The old machine will require an overhaul at the end of two years from today at a cost of \$10,000. The new machine will require an overhaul at the end of the fourth year at a cost of \$8,000. The firm's cut off rate for investment decisions is 10 percent. Income taxes are to be



ignored. Using the comparative income approach and net present value analysis, determine whether the old machine should be replaced.

(Marks 10)

Q6

A computing system used by a leading property developer is outdated. The developer has voted to purchase a new computing system to be funded through retained profits. The Chairman has asked the company's finance director to make a recommendation as to which of two computing systems should be purchased. The two systems are equivalent in their ability to meet the company's needs and in their ease of use. The mainframe system consists of one large mainframe computer with remote terminals and printers located through out the sites located in the city. The personal computer system consists of a much smaller mainframe computer, a few remote terminals, and a dozen personal computers, which will be networked to the small frame. Each system would last five years. The finance director has decided to use 12 percent discount rate for the analysis. Following table presents the data pertinent to the decision. The table given below provide a description of the two systems.

Description	Mainframe System (Rs.)	Personal Computer System (Rs.)
Salvage value of old computer (time 0)	250,000	250,000
Acquisition cost of new system (time 0)	4,000,000	3,000,000
Acquisition cost of software (time0)	400,000	750,000
Cost of updating system (time 3)	400,000	600,000
Salvage value of new system (time 5)	500,000	300,000
Operating costs (times 1,2,3,4,5)		
Personnel	3,000,000	2,200,000
Maintenance	250,000	100,000
Other	100,000	50,000
Data link service cost (times 1,2,3,4,5)	200,000	200,000
Revenue from time-share customers (times 1,2,3,4,5)	200,000	200,000

Note: Time 0 denotes 'immediately' Time 1 denotes the end of year 1 etc.

Determine the net present values of both the alternatives and thereby recommend the most cost effective computer system for the organisation.

(Marks 25)

