

THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Construction Management Programme – Level 7
CEX7110 – Construction Project Appraisal
FINAL EXAMINATION – 2014/2015



Time Allowed: Three Hours

Date: 07-09-2015 (Monday)

Time: 0930 - 1230 hrs.

The paper consists of 06 questions. Answer Four (04) questions.

Q1

- (a) Interest-time relationships are extensively used in modern investment appraisals. Name five such relationships and briefly explain what is meant by each. (Marks 06)
- (b) Briefly explain the significance of using proper techniques of capital budgeting (investment appraisal) for a C1 contractor in his business. (Marks 06)
- (c) Briefly explain what is understood by the following two terms; compounding and discounting. Use examples to illustrate your answer. (Marks 06)
- (d) Explain the effects of inflation on capital budgeting (investment appraisal) decisions which are taken by adopting Discounted Cash Flow techniques. (Marks 07)

Q2

- (a) Describe the pay back period method. Explain its main strengths and weaknesses. (Marks 08)
- (b) The table below gives the Net Cash Flows for three projects. Calculate the payback periods of the three projects and recommend the most viable one.

Year	Project 1	Project 1I	Project 1II
0	-1500	-1500	-1500
1	+600	+400	+300
2	+500	+500	+500
3	+400	+600	+400
4	-	-	+300
5	-	-	+300
6	-	-	+300

Note: The usual investment appraisal assumptions are adopted for the above table that Year 0 means now, Year 1 means at the end of year 1 and Year 2 means at the end of 2 years and so on, and that a negative cash flow represents a cash outflow and a positive sign represents a cash inflow.

(Marks 07)

- (c) Mega Manufacturing is a small company currently analyzing capital expenditure proposals for the purchase of equipment. The capital budgeting is limited to Rs. 50,000,000, which Mega believes is the maximum capital it can raise. An external financial adviser is preparing an analysis of four projects that Mega's president is considering. The former has projected the future cash flows for each potential



purchase. The information concerning the four projects is as follows (all amounts are in Rupees);

Project	Project A	Project B	Project C	Project D
Net initial Investment	20,000,000	19,000,000	25,000,000	21,000,000
Projected cash inflows				
Year 1	5,000,000	4,000,000	7,500,000	7,500,000
Year 2	5,000,000	5,000,000	7,500,000	7,500,000
Year 3	5,000,000	7,000,000	6,000,000	6,000,000
Year 4	5,000,000	7,500,000	8,000,000	4,000,000
Year 5	5,000,000	7,500,000	10,000,000	2,000,000

Calculate the payback period for each of the four projects and recommend the most viable one.

(Marks 10)

Q3

- (a) Under a special licensing arrangement, the Swinyard Company has an opportunity to market a new product in the western United States for a five-year period. The product would be purchased from the manufacturer but Swinyard Company would be responsible for all cost 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, Swinyard Company has estimated that the following costs and revenues would be associated with the new product.

Cost of equipment needed	60,000
Working capital needed	100,000
Salvage value of the equipment in five years	10,000
Overhaul of the equipment in four years	5,000

Annual revenues and costs

Sales revenues	200,000
Cost of goods sold	125,000
Operating costs (for salaries, advertising, and other direct costs)	35,000

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. The Swinyard Company's cost of capital is 20 per cent. Would you recommend that the new product be introduced? Ignore income taxes.

(Marks 12)

- (b) 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.

- How much do you need to accumulate in your account by the time you retire?
- How much do you need to pay into your account in each of the 15 equal installments?

(Marks 07)

- (c) Discuss the advantages of Net Present Value (NPV) method over Internal Rate of Return (IRR) as a capital appraisal technique.

(Marks 06)



Q4

- (a) The following information has been taken from the accounts of a construction project;
 Nominal interest rate = 20%
 Inflation rate = 15%
 Determine the effective interest rate applicable to the project.

(Marks 05)

- (b) A company is trying to select the best out of two mutually exclusive projects which it is considering to undertake. The finance director thinks that the project with the higher NPV should be chosen whereas the managing director thinks that the one with the higher IRR should be undertaken especially as both projects have the same initial outlay and length of life. The company anticipates a cost of capital of 10% and the net after tax cash flows of the projects are as follows:

Year	Project X (Rs.000,000)	Project Y (Rs.000,000)
0	-200	-200
1	35	218
2	80	10
3	90	10
4	75	4
5	20	3

- (i) Calculate the NPV and IRR of each project;

(Marks 10)

- (ii) Recommend, with reasons, which project you would undertake (if either). Identify the cost of capital at which your recommendation in (b) would be reversed.

(Marks 05)

- (iii) Explain the inconsistency in ranking of the two projects in view of the remarks of the directors.

(Marks 05)

Q5

- (a) Compare the advantages of 'Discounting cash flow methods' over 'Non discounting cash flow methods' in capital budgeting.

(Marks 09)

- (b) A company is evaluating two machines; X and Y for the purpose of purchasing one. Machine X has a life of 4 years and an initial investment cost of Rs. 10,000,000. Machine Y has a life of 5 years and an initial investment cost of Rs. 10,000,000. The cost of capital is 14%. The table below depicts the yearly earnings for both the machines;

	Machine X (Rs. 000's)	Machine Y (Rs. 000's)
Year 1	4,400	3,100
Year 2	3,300	2,400
Year 3	3,200	2,200
Year 4	4,000	2,100
Year 5		1,500

Compute the Average Annual Rate of Return (AARR) for each machine.

(Marks 08)



- (c) Your company is planning to create a fund to maintain machinery. The maintenance cost is Rs. 200,000 per annum for three years and Rs. 175,000 per annum for the next two years. The fund can earn an interest of 15%. Calculate the value of the fund you should set aside today.

(Marks 08)

Q6.

ABC Company operates a snack food center at the Airport. On January 1, 2000 ABC purchased a special cookie-cutting machine, which has been used for three years. ABC is considering purchasing a newer, more efficient machine. If purchased, the new machine would be acquired today, January 1, 2003. ABC expects to sell 300,000 cookies in each of the next four years. The selling price of each cookie is expected to average Rs.50.

ABC has two options (1) continue to operate the old machine or 2) sell the old machine and purchase the new machine. The seller of the new machine offered no trade in. The following information has been assembled to help management decide which option is more desirable (all values are given in Rs.):

	Old Machine	New Machine
Initial purchase costs of machine	8,000,000	12,000,000
Terminal disposal value at the end of useful life assumed for depreciation purposes	1,000,000	2,000,000
Useful life from date of acquisition	7 years	4 years
Expected annual cash operating costs:		
Variable cost per cookie	20	14
Total fixed costs	1,500,000	1,400,000
Depreciation method used for tax purposes	Straight line	Straight line
Estimated disposal prices of machines:		
January 1, 2003	4,000,000	12,000,000
December 31, 2006	700,000	2,000,000

Assume a rate of return of 16% and ignore taxes.

- (a) Using Net present value method determine whether ABC should retain the old machine or acquire the new machine.
- (b) How much more or less would the recurring cash operating savings have to be for ABC to exactly earn 16% rate of return? Assume all other data about the investment do not change.
- (c) Assume that the financial differences between the net present values of the two options are so slight that ABC is indifferent between the two proposals. Identify and discuss the non-financial and qualitative factors that ABC should consider to improve its financial situation.

(Marks 12)

(Marks 08)

(Marks 05)

