THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Construction Management Programme - Level 7
CEX7110 – Construction Project Appraisal
FINAL EXAMINATION – 2016/2017
Time Allowed: Three Hours

Date: 29-11-2017 (Tuesday) Time: 0930 - 1230 hrs.

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

Q1.

(a) Interest-time relationships are extensively used in modern invetment 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 buisenss.

(Marks 06)

(c) 'Lenders are the losers during a period of high inflation'. Explain this statement taking examples from condruction industry.

(Marks 06)

(d) Briefly explain the concept of sensitivity analysis.

(Marks 07)

Q2.

(a) Describe in detail the pay back period method while highliting its main strengths and weaknesses.

(Marks 10)

(b) 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 has suggested as potential projects. The former has projected the future cash flows for each potential project. 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.

(Marks 08)

c) 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 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 07)

Q3.

(a) Explain alternative ways of incorporating inflation in the computations made under discounting cash flow techniques. You are expected to use an example to illustrate your answer.

(Marks 08)

(b) Nexco Ltd. is considering investing in new equipment. The following data is available;

	Present Equipment (5 years old)	Proposed Equipment
Capital cost (Rs.)	1,000,000	1,500,000
Written down value (Rs.)	500,000	1,500,000
Estimated life (Years)	10	10
Running hours per annum (Hours)	2000	2000
Output per hour (units)	10	15
Selling price per unit (Rs.)	50	46
Elements of unit cost (Rs.)		
power	3	3
consumable stores	5	5
materials	22	20
wages	5	5

The present equipment would realize Rs.400,000 if sold now, but scrap value should be zero after five years. The proposed equipment is expected to be worth Rs. 750,000 after 5 years and would have no scrap value after 10 years. The company's cost of capital is 12% p.a. Compute the following for the both equipment:

i) Average annual rate of return (AARR) for both scenarios of original investment and average investment.
ii) Net Present Value (NPV)
ii) Explain whether Nexco Ltd. should replace the equipment.

(Marks 17)

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. 800,000. 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 (units)
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.
The company uses a hurdle rate of 8%(its cost of capital) to evaluate projects of this type.

(a) Compute the 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 06)

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

(Marks 07)

Q5.

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

(Marks 06)

(b)

A company is considering which of two mutually exclusive projects it should 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 of a cost of capital of 10% and the net after tax cash flows of the projects are as follows:

Year	Project X (000,000)	Project Y (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 08)

(ii) Recommend, with reasons, which project you would undertake (if either);

(Marks 04)

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

(Marks 04)

(iv)Identify the cost of capital at which your recommendation in (ii) would be reversed.

(Marks 03)

Q6.

The chief ranger of the state's Department of Natural Resources is considering a new plan for fighting forest fires in the state's forest lands. The current plan used eight fire-control stations, which are scattered throughout the interior of the state forest. Each station has a four-person staff, whose annual compensation total Rs. 20,000,000. Other costs of operating each base amount to Rs. 10,000,000 per year. The equipment at each base has a current salvage value of Rs. 12,000,000. The buildings at these interior stations have no other use. To demolish them would cost Rs. 1,000,000 each.

The chief ranger is considering an alternative plan, which involves four fire-control stations located on the perimeter of the state forest. Each station would require a six-person staff, with annual compensation costs of Rs. 30,000,000. Other operating costs would be Rs. 11,000,000 per station per annum. Building each perimeter station would cost Rs. 20,000,000. The perimeter bases would need helicopters and other equipment costing Rs. 50,000,000 per station. Half of the equipment from the interior stations could be used at the perimeter stations. Therefore, only half of the equipment at the interior stations would be sold if the perimeter stations were built.
The state uses a 10 percent hurdle rate for all capital projects.

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

(Marks 06)

(b) Using net-present-value analysis, determine the most cost effective fire-control plan. Assume that the interior fire-control stations will be demolished if the perimeter plan is selected. The chief ranger has decided to use a 10-year time period for the analysis.

(Marks 15)

(c) What qualitative factors would the chief ranger be likely to consider in making this decision?

(Marks 04)