THE OPEN UNIVERSITY OF SRI LANKA
Department of Civil Engineering
Construction Management Programme – Level 7
CEX7110 – Construction Project Appraisal
FINAL EXAMINATION – 2015/2016
Time Allowed: Three Hours

Date: 07-12-2016 (Wednesday) Time: 0930 - 1230 hrs.

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

Q1.

(a) "Lenders are the losers during a period of high inflation". Explain this statement.

(Marks 06)

(b) Briefly explain what is understood by the following two terms; compounding and discounting. Illustrate your answer taking examples from construction industry.

(Marks 07)

(c) Explain the usefulness of 'capital recovery factor' to a contractor who intends to acquire property, plant and equipment.

(Marks 06)

(d) Define the 'sinking fund deposit factor'. Explain its usefulness to people engaged in decision making with regard to investments.

(Marks 06)

Q2

(a) Discuss the advantages and disadvantages of 'pay back period' as an investment appraisal method.

(Marks 10)

(b) The annual net cash flows for three projects A, B and C are shown in the table below.

	Project A (Rs. 000's)	Project B (Rs. 000's)	Project C (Rs. 000's)
Year 0	-1,000	-1,000	-2,000
Year 1	600	500	600
Year 2	400	400	600
Year 3	300	600	600
Year 4	300	700	1600

Prepare a table, show cumulative cash flow and then compute the payback period for each project.

(Marks 08)

(c) A contractor is planning to invest in a project which yields the highest return and having a project life of 5 years. The initial investment and the profits generated are tabulated as follows (values given in Rs.);

Year	Project 1	Project 2	Project 3
Initial Investment	800,000	1,000,000	1,200,000
1nt	200,000	350,000	150,000
2	200,000	200,000	150,000
3	200,000	150,000	150,000
4	200,000	150,000	200,000
5	200,000	150,000	350,000
Total	1,000,000	1,000,000	1,000,000

Calculate the average annual rate of return (ARR) of all 3 projects.

(Marks 07)

Q3

(a) A firm is considering three alternative projects each with an initial investment of Rs.1,000,000 and a life of 5 years. The profits generated by the projects are estimated to be as follows (all values in Rs.);

Year	Project 1	Project 2	Project 3
1	200,000	350,000	150,000
2	200,000	200,000	150,000
3	200,000	150,000	150,000
4	200,000	150,000	200,000
5	200,000	150,000	350,000
Total	1,000,000	1,000,000	1,000,000

Determine the Net Present Value of all the 3 projects. Assume the interest rate as 15 per cent. Make your comments on the values obtained.

(Marks 07)

(b) Assume you are planning to retire at the age of 60 years and would like to accumulate enough money by age 60 to withdraw Rs.225,000 per year for 15 years from there on. In order for this you plan to pay into your account 30 equal installments, beginning when you are 30 and ending when you are 60. Your account bears an interest rate of 12 per cent per year.

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

(ii) How much money do you need to pay in each equal installment to build up the necessary funds?

(Marks10)

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

(Marks 08)

Q4

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

(Marks 08)

(b) The following information are applicable to cashflows of a construction project;
Interest rate = 24%
Inflation rate = 18%
Determine the effective interest rate applicable to the project

(Marks 05)

(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. 1,695,000 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 resulting from increased volume of production. Compute the IRR of this investment.

(Marks 12)

Q5

(a) Two mutually exclusive investments have cash flows as follows:

	Year 0	Year 1	Year 2	Year 3
Project A	-24,000	+8,000	12,000	16,000
Project B	-24,000	+16,000	10,000	8,0000

The cost of capital is 10%.

Appraise the two projects using;

i) Net present value technique

ii) Internal rate of return

(Marks 10)

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

(Marks 05)

(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 (interest 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.

The University of Colombo (UOC) is considering replacing some Ricoh copiers with faster copiers purchased from Kodak. The UOC administration is very concerned about the rising costs of operations during the last decade.

To convert to Kodak, two operators would have to be retrained. Required training and remodeling would cost Rs. 600,000. The UOC's three Ricoh machines were purchased for Rs. 1,000,000 each, five years ago. Their expected life was 10 years. There resale value now is Rs. 300,000 each and will be zero in five more years. The total cost of the new Kodak equipment will be Rs. 5,000,000; it will have zero disposal value in five years.

The three Ricoh operators are paid Rs. 800 an hour each. They usually work a 40 hour week. Machine breakdowns occur monthly on each machine, resulting in repair costs of Rs. 5,000 per month and overtime of four hours, at Rs. 1,200 an hour each, per machine per month, to complete the normal monthly work load. Toner, supplies, and so on cost Rs. 10,000 a month for each Ricoh copier.

The Kodak system will require only two regular operators, on a regular work week of 40 hours each, to do the same work. Rates are Rs. 1000, an hour, and no overtime is expected. Toner, supplies, and so on, will cost Rs. 330,000 annually. Maintenance and repairs are fully serviced by Kodak for Rs. 105,000 annually. (Assume a 52- week year).

(a) Using DCF techniques compute Net present value of both options and determine whether UOC should keep the Ricoh copiers or replace it with Kodak (all relevant cash flows, under both alternatives, can be discounted at 12 per cent).

(Marks 20)

(b) What other considerations might affect the decision? Discuss.

(Marks 05)