

DEPARTMENT OF CIVIL ENGINEERING, IIT DELHI
CEL 779: CONSTRUCTION ECONOMICS AND FINANCE
MINOR 1

Date: 06th February 2014
Time: 08:00 – 09:00 AM

Venue: V 418 A
Max Marks: 20

NOTE:

1. CELL PHONE NOT ALLOWED EVEN IN SWITCHED OFF MODE. KEEP IT AWAY FROM YOU EITHER IN YOUR BAG OR HAND IT OVER TO THE INVIGILATOR DURING EXAMINATION.
2. CASH FLOW DIAGRAM WHERE REQUIRED IS MUST AND WILL CARRY APPROPRIATE MARKS.
3. USE YOUR OWN CALCULATOR. EXCHANGE OF CALCULATORS IS NOT ALLOWED.

1. A family purchased a rundown house for ₹25,00,000 with the idea of making major improvements and then selling for a profit. In the first year that they owned the house, they spent ₹5,00,000 on improvements. They spent ₹1,00,000 the second year and ₹80,000 the third year. In addition, they paid property taxes of ₹50,000 per year for three years, and then sold the house for ₹40,00,000. What rate of return did they make on their investment? (Assume all expenditure towards improvement and tax at the end of year.) (Hint: Try for value $\leq 10\%$)
6 marks
2. A dirt-moving company requires the service of dirt-moving equipment. The service may be acquired by purchasing a mover for ₹25,00,000 having a negligible salvage value, ₹5,00,000 annual operating cost, and a ₹12,00,000 overhaul cost in year 10 (EOY₁₀). Alternatively, the company may lease the mover that costs ₹7,80,000 for the first year, and increases every year at the rate of 5% over the previous year. Select the economic choice between purchasing and leasing if all other costs are equal and (a) service is needed for less than 10 years and (b) service is needed for more than 10 years. Consider life of equipment to be 12 years and cost of capital 12%.
8 marks
3. The Irrigation Department of Bihar is considering three sites for flood control dams (designated as sites A, B and C). The construction costs are ₹100 crore, ₹120 crore and ₹200 crore, and annual maintenance costs are expected to be ₹15 lakh, ₹20 lakh and ₹23 lakh respectively for sites A, B and C. In addition, ₹75 lakh expenditure will be required every 10 years at each site. The present cost of flood damage is ₹20 crore per year. If only the dam at site A is constructed, the flood damage will be reduced to ₹16 crore per year. If only the dam at site B is constructed the flood damage will be ₹12 crore per year. Similarly, if the site C dam is built the damage will be reduced to ₹14 crore per year.

Since the dams would be built on different branches of a large river, either one or all of the dams could be constructed and decrease in flood damages would be additive. If the interest rate is 5% per year, determine which ones, if any, should be built on the basis of benefit-cost ratios.