Engineering

1. (10 points) A series of twenty-one constant-dollar payments beginning with $5,000 at the end of the first year are growing at a rate of 4% per year. If the inflation-free rate is 3% per year and the inflation rate is 6% per year, find the present equivalent of this series of payments using constant-dollar analysis. The base year is year 0.

2. (20 points) An investor’s projections of future purchasing power needs, based on an estimated inflation rate of 5% per year, are given in the cash flow diagram below.



Available investments are expected to yield 10.25% during the first 6 years and 15.5% during the final 6 years.

a) Use constant-dollar analysis to determine the future worth at year 12 in the same constant dollars specified above (year 6 dollars).

b) How many actual dollars would need to be invested at t = 0 to achieve the projected needs under the expected yield rates?

3. (20 points) A couple takes out a loan for $350,000 to purchase a house. They get an adjustable rate mortgage (ARM) that starts with an interest rate of 3.5% annual compounded monthly with a term of 30 years and they will make monthly payments. After two years the interest rate increases 6.5% annual compounded monthly and two years after that the interest rate increases to 8.5% annual compounded monthly.

a) What are the loan payments for each interest period in this loan?

b) What is the total interest paid on this loan?