Problem 1

A company invests $2000 in a project over five years. At the end of every year, for the first three years the project generates $500. At the end of the fourth year the project generates no money. At the end of the fifth year, the project is terminated. How much must the project generate at the end of the fifth year to realize a 13% return on the initial investment?
Problem 2

Which of the following investment options will maximize your future wealth at the end of 20 years? Assume any funds that remain invested will earn a nominal rate of 12% compounded monthly

A. deposit $5000 now
B. deposit $80 at the end of each month for the first 10 years
C. deposit $50 at the end of each month for 20 years
D. deposit a lump sum in the amount of $15,000 at the end of year 10

Problem 3

Geo-Star Manufacturing Company is considering a new investment in a punch press machine that will cost $100,000 and has an annual maintenance cost of $10,000. There is also an additional overhauling cost of $20,000 for the equipment once every four years. Assuming that this equipment will last infinitely under these conditions, what is the capitalized equivalent cost of this investment at an interest rate of 10%?
Problem 4

Company X has been contracting its overhauling work to Company Y for $40,000 per machine per year. Company X estimates that by building a $500,000 maintenance facility with a life of 15 years and a salvage value of $100,000 at the end of its life, they could handle their own overhauling at a cost of only $30,000 per machine per year. What is the minimum annual number of machines that Company X must operate to make it economically feasible to build its own facility? (Assume an interest rate of 10%)

A. $236100 <= CE (10%) <= $238100
B. $238100 < CE (10%) <= $240100
C. $240100 < CE (10%) <= $242100
D. CE (10%) > $244100

Problem 5

Right now you have $10,000 to invest over 5 years. The interest rate in the United States is 10%. The interest rate in France is 12% for invested Francs. The interest rate in Japan is 9% for invested Yen. Assume that these interest rates are expected to remain unchanged over the next 5 years. The current as well as the expected exchange rates is given below.

<table>
<thead>
<tr>
<th>Current Exchange Rates</th>
<th>Expected exchange rates 5 years from now</th>
</tr>
</thead>
<tbody>
<tr>
<td>1$ = 6 Francs</td>
<td>1$ = 8 Francs</td>
</tr>
<tr>
<td>1$ = 125 Yen</td>
<td>1$ = 100 Yen</td>
</tr>
</tbody>
</table>

Which of the following options (if any) will maximize your wealth in US$ at the end of 5 years?

A. Investing in the United States
B. Investing in France
C. Investing in Japan
D. Not enough information to compare
Problem 6

Company X is considering the purchase of a helicopter for connecting services between their base airport and the new intercounty airport being built about 30 miles away. It is believed that the chopper will be needed only for 6 years until the Rapid Transit Connection is phased in. The estimates on two types of helicopters under consideration, The Whirl 2 B and The ROT 8, are given below:

<table>
<thead>
<tr>
<th></th>
<th>The Whirl 2 B</th>
<th>The ROT 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Cost</td>
<td>$95,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Annual Maintenance</td>
<td>$3,000</td>
<td>$9,000</td>
</tr>
<tr>
<td>Salvage Value</td>
<td>$12,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Useful life in years</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

Assuming that the Whirl 2B will be available in the future with identical costs, what is the annual cost advantage of selecting The Whirl 2B ? (Use an interest rate of 10 %)

A. cost more than $4,000  
B. cost between $4,000 and $3,000  
C. save between $3,000 and $2000  
D. save more than $4,000  
E. none of the above

Problem 7

Your company needs a machine for the next 7 years and you have two choices (assume an annual interest rate of 15%):

Machine A costs $100,000 and has an annual operating cost of $47,000. Machine A has a useful life of 7 years and a salvage value of $15,000.

Machine B costs $150,000 and has an annual operating cost of $30,000. Machine B has a useful life of 5 years and no salvage value. However the life of Machine B can be extended by two years with a certain amount of investment. If Machine B's life is extended it will still cost $30,000 annually to operate and still have no salvage value.

Which of the following values is the most you would pay at the end of year 5 to extend the life of Machine B by two years?
Problem 8

The following information on 4 mutually exclusive projects is given below:

<table>
<thead>
<tr>
<th>Project</th>
<th>Investment at year 0</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>$1,000</td>
<td>56%</td>
</tr>
<tr>
<td>B</td>
<td>$1,200</td>
<td>67%</td>
</tr>
<tr>
<td>C</td>
<td>$1,500</td>
<td>43%</td>
</tr>
<tr>
<td>D</td>
<td>$2,500</td>
<td>49%</td>
</tr>
</tbody>
</table>

All four projects have the same service life, and require investment in year 0 only. Suppose that you are provided with the following additional information about incremental rates of return between projects.

IRR (B - A) = 85%, IRR (D - C) = 25%, IRR (B - C) = 30%, and IRR (A - D) = 50 %

Which project would you choose based on the rate return criterion at a MARR of 29%?

A. Project A  
B. Project B  
C. Project C  
D. Project D  
E. Impossible to determine with the given information

Problem 9

Compute the annual equivalent cost of the cash flow series given below. Interest rate is 10%.
Problem 10

You are considering two types of electric motors to power an assembly line in your factory. The financial information and the operating characteristics of the two motors are given below. If you operate the assembly line for 6,000 hours annually, what is the total cost savings per operating hour associated with the more efficient brand (Brand B) at an interest rate of 10%? The motor is required for a period of 5 years.

<table>
<thead>
<tr>
<th></th>
<th>Brand A</th>
<th>Brand B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$9,000</td>
<td>$12,000</td>
</tr>
<tr>
<td>Salvage after 5 years</td>
<td>$1,000</td>
<td>$1,500</td>
</tr>
<tr>
<td>Capacity</td>
<td>30 HP</td>
<td>30 HP</td>
</tr>
<tr>
<td>Efficiency</td>
<td>80%</td>
<td>85%</td>
</tr>
</tbody>
</table>
Current electricity price: $0.08 / kWh
Note: 1 HP = 0.7457 kW

A. less than or equal to 1 cent
B. greater than 1 cent but less than or equal to 3 cents
C. greater than 3 cents but less than or equal to 5 cents
D. greater than 5 cents but less than or equal to 7 cents
E. greater than 7 cents but less than or equal to 9 cents