Problem 1

Given the following financial data, determine the Conventional Payback Period

- Investment cost at n=0: $10,000.
- Investment cost at n=1: $15,000
- Useful life: 10 Years
- Salvage value (at the end of 11 years): $5,000
- Annual revenues: $12,000 per year
- Annual expenses: $4,000 per year
- MARR = 10%

(Note: The first revenues and the expenses will occur at the end of year 2.)

In the following, the ranges indicate the actual time interval where the Payback will occur from the inception of the project.

A. Payback Period: greater than 3 and less or equal 4
B. Payback Period: greater than 4 and less or equal 5
C. Payback Period: greater than 5 and less or equal 6
D. Payback Period: greater than 6 and less or equal 7
Problem 2

The City of Auburn has decided to build a softball complex and the city council has already voted to fund the project at the level of $800,000 (initial capital investment). The city engineer has collected the following financial information for the complex project.

- Annual upkeep costs: $120,000
- Annual utility costs: $13,000
- Renovation costs: $50,000 for every 5 years
- Annual team user fees (revenues): $32,000
- Useful life: Infinite
- Interest rate: 8%

If the city can expect 40,000 visitors to the complex each year, what should be the minimum ticket price per person so that the city can breakeven? In answering the question, identify the range that contains the solution.

A. Price: greater than $2.50 and less or equal $3.00
B. Price: greater than $3.00 and less or equal $3.50
C. Price: greater than $3.50 and less or equal $4.00
D. Price: greater than $4.00 and less or equal $4.50

Problem 3

Find the present worth of the following cash flow series at an interest rate of 9%.

A. PW(9%): greater than $640 and less or equal $700
B. PW(9%): greater than $770 and less or equal $800
C. PW(9%): greater than $860 and less or equal $890
D. PW(9%): greater than $900 and less or equal $930
Problem 4

Find the capitalized equivalent worth of the following project cash flow series at an interest rate of 10%.

\[ \text{CE}(10\%) = \$1,476 \]

\[ \text{CE}(10\%) = \$1,500 \]

\[ \text{CE}(10\%) = \$3,000 \]

\[ \text{CE}(10\%) = \$1,753 \]

Problem 5

Consider the following two investment situations:

In 1970, when Wal-Mart Stores, Inc. went public, an investment of 100 shares cost $1,650. That investment would have been worth $2,991,080 after 25 years. The Wal-Mart investors' rate of return would be around 35%.

In 1980, if you bought 100 shares of Fidelity Mutual Funds, it would cost $5,245. That investment would have been worth $80,810 after 15 years.

Which of the following statements is correct?

A. If you bought only 50 shares of Wal-Mart stocks in 1970 and kept it for 25 years, your rate of return would be 0.5 x 35%.
B. The investors in Fidelity Mutual Funds would have made a profit at an annual rate of 30%.
C. If you bought 100 shares of Wal-Mart shares in 1970 but sold them after 10 years. Then immediately, put all your proceeds in buying the Fidelity Funds. After 15 years, the total worth of your investment would be around $511,140
D. None of the above
Problem 6

You purchased a CNC machine for $34,000. It is expected to have an useful life of 10 years and a salvage value of $3,000. At i=15%, what is the annual capital cost of this machine?

A. $6,775  
B. $3,100  
C. $6,627  
D. $3,400

Problem 7

You are considering an investment that costs $2,000. It is expected to have a useful life of 3 years. You are very confident about the revenues during the first two years but you are unsure about the revenue in year 3. If you hope to make at least 10% rate of return on your investment ($2,000), what should be the minimum revenue in year 3.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$-2,000</td>
</tr>
<tr>
<td>1</td>
<td>$1,000</td>
</tr>
<tr>
<td>2</td>
<td>$1,200</td>
</tr>
<tr>
<td>3</td>
<td>$ X</td>
</tr>
</tbody>
</table>

A. X=$220  
B. X=$132  
C. X=$300  
D. X=$274
**Problem 8**

You need a lathe for your machining shop for 10 years. You narrowed down to two models: Kendall and Toyota. You also collected the following financial data:

<table>
<thead>
<tr>
<th></th>
<th><strong>Kendall</strong></th>
<th><strong>Toyota</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>First Cost</td>
<td>$25,000</td>
<td>$32,000</td>
</tr>
<tr>
<td>O &amp; M Cost</td>
<td>$11,000 / yr</td>
<td>$9,700 / yr</td>
</tr>
<tr>
<td>Useful life</td>
<td>10 years</td>
<td>14 years</td>
</tr>
<tr>
<td>Salvage</td>
<td>$3,000</td>
<td>$2,000</td>
</tr>
</tbody>
</table>

(Note that the salvage values represent the values at the end of useful life.)

If your interest rate is 12%, what should be the salvage value of the Toyota model at the end of 10 years so that you would be indifferent between the two models?

A. $1,240  
B. $1,540  
C. $1,610  
D. $1,927

**Problem 9**

The following infinite cash flow series has a rate of return of 15%. Determine the unknown value X.

A. A = $2,500  
B. A = $3,000  
C. A = $3,200  
D. A = $1,967
Problem 10

The following table contains the summary of how a project's balance changes over its 5-year service life at 10% interest (MARR).

<table>
<thead>
<tr>
<th>End of period</th>
<th>Project Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$-1,000</td>
</tr>
<tr>
<td>1</td>
<td>$-1,500</td>
</tr>
<tr>
<td>2</td>
<td>$600</td>
</tr>
<tr>
<td>3</td>
<td>$900</td>
</tr>
<tr>
<td>4</td>
<td>$1,500</td>
</tr>
<tr>
<td>5</td>
<td>$2,000</td>
</tr>
</tbody>
</table>

Which of the following statements is incorrect?

A. The required additional investment at the end of period 1 is $500.
B. The net present worth of the project at 10% interest is $1,242.
C. The net future worth of the project at 10% interest is $2,000.
D. The rate of return of the project should be greater than 10%.