Problem 1 (25 Points)
Consider an economy producing apples and bananas with the following data.

<table>
<thead>
<tr>
<th></th>
<th>1990</th>
<th>1991</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td>apples sold</td>
<td>1 billion at $1 each</td>
<td>2 billion at $2 each</td>
<td>3 billion at $3 each</td>
</tr>
<tr>
<td>bananas sold</td>
<td>1 billion at $1 each</td>
<td>2 billion at $3 each</td>
<td>1 billion at $3 each</td>
</tr>
</tbody>
</table>

Using 1990 as the base year, calculate for each year:
1. nominal GDP
2. real GDP
3. GDP Deflator

Problem 2 (15 Points)
You are given the following information about an economy:
- Investment = 40
- Government purchases of goods and services = 60
- GNP = 200
- Taxes = 30
- Factor income received from the rest of the world = 7
- Factor payments made to the rest of the world = 9
• Net Exports = 0

Find the following:
1. Net factor payments from abroad
2. GDP
3. Consumption

Problem 3 (30 Points)
Consider the partial equilibrium model of labor supply. The consumer has preferences over leisure \( l \) and consumption goods \( c \) represented by a utility function

\[ U(c, l) = c + 0.45 \log l \]

The \( MRS \) associated with this utility function is:

\[ MRS = \frac{0.45}{l} \]

Suppose that the government imposes a proportional income tax on the representative consumer’s wage income \( t \). That is, the consumer’s wage income is \( w(1 - t)(h - l) \) where \( t \) is the income tax rate, \( w \) is the wage. Assume \( w = 1 \) and that there is no dividend income \( \pi = 0 \). The total time endowment of the consumer \( h = 1 \).

1. Assume \( t = 0.1 \) and there is no lump-sum tax \( T = 0 \).
   (a) What is the budget constraint of workers? Represent it graphically.
   (b) What is the opportunity cost of leisure? Precisely, if leisure increases by 1 unit, by how much must consumption decrease to satisfy the budget constraint of the consumer?
   (c) Calculate \( c, l \) and tax revenue.

2. The government increases taxes to 0.25 so that \( t = 0.25 \).
   (a) Calculate \( c, l \) and tax revenue with this new tax rate.
   (b) Argue there are two opposing forces that affect \( l \) following the tax increase
   (c) Argue there are two opposing forces that affect tax revenue following the tax increase

Some useful algebra: \( \frac{0.45}{0.75} = 0.6; \frac{0.45}{0.25} = 1.8; \frac{0.45}{0.5} = 0.9; \frac{0.45}{0.9} = 0.5; \frac{0.4}{0.75} = 0.4; \frac{0.4}{0.25} = 0.4 \)

Questions (30 Points)
Choose two out of the following three questions. Do not answer more than two questions.

1. List three issues in measuring the change in the cost of living using the Consumer Price Index (CPI). Give a short example for each issue.

2. List three economic activities that are difficult to measure and that may not be well accounted for in the nominal GDP. Give a short explanation for each activity.

3. Describe concisely the evolution of hours worked per person over the last 50 years. Distinguish between (1) the extensive and the intensive margin (2) males and females.