Solution 6: Macroeconomic Indicators

Problem 1 (*Gross Domestic Product*)

(i) Output Method: GDP is the sum of market values of all final goods produced domestically in a given period of time (net of intermediate goods produced abroad or in previous periods).

$$\text{GDP}_R = \underbrace{600}_{\substack{\text{Market Value} \\ \text{of Fresh Fish}}} + \underbrace{400}_{\substack{\text{Market Value} \\ \text{of Dried Fish}}} = 1{,}000$$

$$\text{GDP}_F = \underbrace{800}_{\substack{\text{Market Value} \\ \text{of Coconuts}}} + \underbrace{400}_{\substack{\text{Market Value} \\ \text{of Coconut Oil}}} = 1{,}200$$

(ii) Income Method: GDP is the sum of incomes from domestic production in a given period of time.

$$\text{GDP}_R = \underbrace{200}_{\substack{\text{Capital Income} \\ \text{of Friday}}} + \underbrace{800}_{\substack{\text{Labor Income} \\ \text{of Robinson}}} = 1{,}000$$

$$\text{GDP}_F = \underbrace{500}_{\substack{\text{Capital Income} \\ \text{of Friday}}} + \underbrace{100}_{\substack{\text{Capital Income} \\ \text{of Robinson}}} + \underbrace{600}_{\substack{\text{Labor Income} \\ \text{of Friday}}} = 1{,}200$$

(iii) Expenditure Method: GDP is the sum of expenditures on final goods produced domestically in a given period of time (net of expenses for intermediate goods produced abroad or in previous periods).

$$\text{GDP}_R = \underbrace{300+300}_{\substack{\text{Consumption of} \\ \text{goods produced} \\ \text{in } R \text{ and } F}} + \underbrace{400}_{\substack{\text{Investment of} \\ \text{goods produced} \\ \text{in } R}} + \underbrace{300}_{\substack{\text{Exports to} \\ F}} - \underbrace{300}_{\substack{\text{Imports from} \\ F}} = 1{,}000$$

$$\text{GDP}_F = \underbrace{300+300}_{\substack{\text{Consumption of} \\ \text{goods produced} \\ \text{in } F \text{ and } R}} + \underbrace{200+400}_{\substack{\text{Investment of} \\ \text{goods produced} \\ \text{in } F}} + \underbrace{300}_{\substack{\text{Exports to} \\ R}} - \underbrace{300}_{\substack{\text{Imports from} \\ R}} = 1{,}200$$

Problems 2-4 (*Price Level*)

Base Period: 2020

	Nominal GDP	Real GDP	Cost of base-period consumer basket
2020	550,000	550,000	550,000
2021	687,500	550,000	687,500
2022	643,500	495,000	1,100,000

$$\text{GDP-Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}}$$

$$\text{CPI} = \frac{\text{Cost of base-period consumer basket at current prices}}{\text{Cost of base-period consumer basket at base-period prices}}$$

Problem 2

Price Indices in 2021:

$$\text{GDP-Deflator} = \frac{687{,}500}{550{,}000} = 1.25,$$

$$\text{CPI} = \frac{687{,}500}{550{,}000} = 1.25.$$

$\Rightarrow$ **(B)** is correct.

Problem 3

Price Indices in 2022:

$$\text{GDP-Deflator} = \frac{643{,}500}{495{,}000} = 1.3,$$

$$\text{CPI} = \frac{1{,}100{,}000}{550{,}000} = 2.$$

$\Rightarrow$ **(D)** is correct.

Problem 4

Inflation rates between 2021 and 2022

$$\text{based on GDP-Deflator:} \quad \frac{1.3 - 1.25}{1.25} = 0.04,$$

$$\text{based on CPI:} \quad \frac{2 - 1.25}{1.25} = 0.6.$$

$\Rightarrow$ **(B)** is correct.

Problems 5-6 (*Unemployment*)

The labor force participation rate is

$$e = \frac{L}{N} = \frac{E + U}{N}. \tag{1}$$

The unemployment rate is

$$u = \frac{U}{L} = \frac{U}{E + U}. \tag{2}$$

Problem 5

Rearranging (1) and substituting $N = 70$, $U = 2.1$, and $e = 0.5$ yields

$$E = e \cdot N - U \quad \Rightarrow \quad E = 0.5 \cdot 70 - 2.1 = 32.9.$$

$\Rightarrow$ **(A)** is correct.

Problem 6

Rearranging (2) and substituting $U = 2.1$ and $u = 0.05$ yields

$$L = \frac{U}{u} \quad \Rightarrow \quad L = \frac{2.1}{0.05} = 42.$$

Substituting $L = 42$ into (1) yields

$$e = \frac{42}{70} = 0.6.$$

$\Rightarrow$ **(C)** is correct.