HE1002 Macroeconomics I

Final Practice Examination 3 – Problems

Academic Year 2025/2026, Semester 1

Quantitative Research Society @NTU

November 14, 2025

Examination Instructions

Time Allowed: 120 minutes (2 hours)

Total Marks: 100

Answer Requirements:

There is a total of 4 questions. Answer all the questions.

- **Question 1** consists of 15 calculation questions. 2 marks each, total 30 marks. Please state the formula used and show your working.
- **Question 2** consists of 10 short-answer questions. 3 marks each, total 30 marks. Each answer is expected to be around 4 to 5 lines (or 2 to 3 sentences) long.
- **Question 3** consists of 10 true or false questions. 3 marks each, total 30 marks. Please clearly explain your reasoning for both true and false statements. Each answer is expected to be around 4 to 5 lines (or 2 to 3 sentences) long.
- **Question 4** consists of 2 diagram-related questions. 5 marks each, total 10 marks.

Additional Instructions:

- There are NO MCQ questions.
- Bring a calculator.
- It is a closed-book examination.
- Write all answers in the answer booklet provided.
- Show all working for calculations.

Question 1: Calculations (30 marks)

Answer all 15 questions. Each question carries 2 marks. Show all formulas and working.

1.1 *[Adapted from T01-Q05]*
Given GDP = \$15,000 billion, C = \$9,000 billion, G = \$3,000 billion, NX = \$500 billion.
Calculate Investment (I).

1.2 *[Adapted from T01-Q11]*
Year 1: Nominal GDP = \$500 billion, GDP deflator = 100.
Year 2: Nominal GDP = \$600 billion, GDP deflator = 110.
Calculate real GDP in Year 2.

1.3 *[Adapted from T02-Q08]*
Nominal wage in 2023 = \$50,000, $\text{CPI}_{2023} = 200$.
Nominal wage in 2024 = \$52,000, $\text{CPI}_{2024} = 210$.
Calculate the real wage in both years (in base year dollars).

1.4 *[Adapted from T02-Q11]*
You borrow \$10,000 at a nominal interest rate of 8%. Inflation during the loan period is 3%.
Calculate:

(a) The real interest rate
(b) The real value of the amount you must repay

1.5 *[Adapted from T03-Q06]*
Labor market: $L^d = 80 - 3w$, $L^s = -10 + 2w$ (thousands of workers, w in \$/hour).
Calculate equilibrium wage and employment.

1.6 *[Adapted from T04-Q06]*
Three countries with growth rates: Country A at 2%, Country B at 4%, Country C at 6%.
Using the Rule of 70, calculate how many years each takes to double income.

1.7 *[Adapted from T05-Q04]*
MPC = 0.8, Investment increases by \$100 billion.
Calculate the change in equilibrium output.

1.8 *[Adapted from T05-Q13]*
Given: $Y = 5,000$, $Y_p = 6,000$, MPC = 0.75.
Calculate the size of the output gap and the required increase in autonomous expenditure to close it.

1.9 *[Adapted from T06-Q12]*
Velocity of money = 5, Money supply = \$400 billion.

Using the equation of exchange, calculate nominal GDP.

1.10 *[Adapted from T07-Q14]*
Government debt at start of year = \$2,000 billion. During year: deficit = \$150 billion.
Calculate government debt at end of year.

1.11 *[Adapted from T08-Q07]*
Loanable funds initially: $S = I = 300$ at $r = 5\%$. Government runs deficit of \$50 billion, shifting demand right.
New equilibrium: $r = 6\%$, $S = I + \text{Deficit} = 320$.
Calculate the amount of private investment crowded out.

1.12 *[Adapted from T09-Q11]*
Central bank buys \$2 billion in government bonds. Reserve ratio = 0.10.
Calculate the maximum change in money supply.

1.13 *[Adapted from T10-Q18]*
Money supply growth = 8%, Real GDP growth = 3%, Velocity is constant.
Calculate inflation rate using the Quantity Theory.

1.14 *[Adapted from T10-Q20]*
Natural unemployment rate = 6%, Actual unemployment = 8%.
Calculate cyclical unemployment.

1.15 *[Adapted from T12-Q13]*
Exchange rates: 1 USD = 0.85 EUR, 1 EUR = 130 JPY.
Calculate the USD/JPY exchange rate (yen per dollar).

Question 2: Short Answer (30 marks)

Answer all 10 questions. Each question carries 3 marks. Each answer should be 4-5 lines (2-3 sentences).

2.1 *[Adapted from T01-Q14]*
Explain why GDP is an imperfect measure of economic well-being. Provide two specific limitations.

2.2 *[Adapted from T02-Q10]*
Distinguish between the GDP deflator and the Consumer Price Index (CPI) as measures of inflation.

2.3 *[Adapted from T03-Q04]*
Why does the unemployment rate sometimes increase even when the economy is creating new jobs?

2.4 *[Adapted from T04-Q11]*
Explain the concept of "convergence" in economic growth theory. Under what conditions is it most likely to occur?

2.5 *[Adapted from T05-Q01]*
What is the difference between planned aggregate expenditure (PAE) and actual expenditure? What role do inventories play?

2.6 *[Adapted from T06-Q05]*
Explain why the long-run aggregate supply curve is vertical at potential output.

2.7 *[Adapted from T07-Q06]*
What are "automatic stabilizers" in fiscal policy? How do they differ from discretionary fiscal policy?

2.8 *[Adapted from T08-Q15]*
What is "crowding out" and how does it reduce the effectiveness of fiscal policy?

2.9 *[Adapted from T09-Q05]*
Explain the three tools of monetary policy available to the Federal Reserve.

2.10 *[Adapted from T12-Q08]*
How does currency appreciation affect a country's net exports? Explain the mechanism.

Question 3: True or False (30 marks)

Answer all 10 questions. Each question carries 3 marks. State whether each statement is TRUE or FALSE and explain your reasoning in 4-5 lines (2-3 sentences).

3.1 *[Adapted from T01-Q15]*
Statement: A country's GDP increases when a domestic company sells products to foreign buyers (exports).

3.2 *[Adapted from T02-Q13]*
Statement: If the CPI increases from 120 to 132 over a year, the inflation rate is 12%.

3.3 *[Adapted from T03-Q08]*
Statement: Minimum wage laws that are set above the equilibrium wage increase structural unemployment.

3.4 *[Adapted from T04-Q12]*
Statement: According to the principle of diminishing returns, as an economy accumulates more capital, each additional unit of capital produces smaller increases in output.

3.5 *[Adapted from T05-Q09]*
Statement: An increase in the marginal propensity to consume (MPC) increases the expenditure multiplier.

3.6 *[Adapted from T06-Q16]*
Statement: In the short run, an increase in aggregate demand raises both output and the price level.

3.7 *[Adapted from T07-Q16]*
Statement: Expansionary fiscal policy during a recession can reduce cyclical unemployment.

3.8 *[Adapted from T09-Q15]*
Statement: When the Federal Reserve raises the discount rate, banks are more likely to borrow reserves and the money supply increases.

3.9 *[Adapted from T10-Q15]*
Statement: According to the long-run Phillips curve, there is a permanent trade-off between inflation and unemployment.

3.10 *[Adapted from T12-Q11]*
Statement: A country with a trade deficit must be experiencing net capital inflow.

Question 4: Diagrams (10 marks)

Answer both questions. Each question carries 5 marks.

4.1 *[Adapted from T10-Q19]* **(5 marks)**
Consider the short-run and long-run Phillips curves.

(a) Draw both the short-run Phillips curve (SRPC) and long-run Phillips curve (LRPC) on the same diagram, with inflation on the vertical axis and unemployment on the horizontal axis.
(b) Mark the natural rate of unemployment (u_n) on your diagram.
(c) Suppose the economy is initially at the natural rate with 3% expected inflation. Mark this point on your SRPC.
(d) The central bank unexpectedly increases the money supply. Show what happens in the short run and explain the movement along the SRPC.

4.2 *[Adapted from T08-Q20]* **(5 marks)**
Consider the market for loanable funds in a small open economy.

(a) Draw a loanable funds diagram showing supply (domestic saving), demand (domestic investment), and the world interest rate (r_w).
(b) Show the initial equilibrium where the domestic interest rate equals the world rate.
(c) Suppose domestic investment increases due to improved business confidence. Show the effect on your diagram.
(d) Explain whether this country becomes a net borrower or net lender internationally, and identify the net capital outflow (NCO) on your diagram.

END OF EXAMINATION

Total: 100 marks
Time: 120 minutes

All questions adapted from HE1002 Tutorial Problem Sheets 1–12