ECO 209Y – L0101
MACROECONOMIC THEORY

Term Test #2

LAST NAME ___________________________________________

FIRST NAME ___________________________________________

STUDENT NUMBER ______________________________________

INSTRUCTIONS:
1. The total time for this test is 1 hour and 50 minutes.
2. Aids allowed: a simple calculator.
3. Use pen instead of pencil.

DO NOT WRITE IN THIS SPACE

Part I __________/36

Part II __________/14

Part III 1. __________/10

2. __________/10

3. __________/10

TOTAL __________/80
PART I  (36 marks)

**Instructions:** Enter your answer to each question in the table below. Only the answer recorded in the table will be marked. Table cells left blank will receive a zero mark for that question. Each question is worth 3 marks. No deductions will be made for incorrect answers.

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1. Consider the fixed-price model of an open economy with fixed exchange rates and imperfect capital mobility. Which one of the following statements is correct in this model?
   - A) Expansionary monetary policy will appreciate the domestic currency.
   - B) Expansionary fiscal policy will cause output to increase.
   - C) Expansionary monetary policy will cause output to increase.
   - D) Both expansionary monetary policy and expansionary fiscal policy will cause output to increase.
   - E) None of the above is correct.

2. Consider the fixed-price model of an open economy with fixed exchange rates. In this model, an increase in the international rate of interest will cause
   - A) both the domestic rate of interest and the level of output to fall.
   - B) both the domestic rate of interest and the level of output to rise.
   - C) the domestic rate of interest to rise and the level of output to fall.
   - D) the domestic rate of interest to fall and the level of output to rise.
   - E) the domestic rate of interest to rise with no change in the level of output.

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Use this space for rough work.
3. Consider the fixed-price model of an open economy with perfect capital mobility and flexible exchange rates. If the international rate of interest increases by 2 percentage points and the exchange rate is expected to depreciate by 1%, in the new equilibrium the domestic rate of interest will
   A) increase by approximately 2 percentage points.
   B) increase by approximately 1 percentage point.
   C) decrease by approximately 1 percentage point.
   D) increase by approximately 3 percentage points.
   E) decrease by approximately 3 percentage points.

4. Consider the fixed-price model of a closed economy. When the economy is in a liquidity trap, expansionary monetary policy is ineffective with respect to income because
   A) investment is insensitive to changes in the rate of interest.
   B) the public already holds all the money they want.
   C) the real demand for money is insensitive to changes in the rate of interest.
   D) the public is willing to hold any amount of money being offered at the current rate of interest.
   E) none of the above.

5. When a balance-sheet recession occurs, which one of the following government policies would be most effective in stimulating the economy and creating jobs?
   A) Reducing the rate of interest to stimulate consumption and investment expenditure.
   B) Decreasing income taxes on the wealthy in order to stimulate investment.
   C) Increasing government expenditure on infrastructure.
   D) Increasing the salaries of government employees to stimulate their consumption expenditure.
   E) Increasing expenditure on new social programs in order to reduce the rate of unemployment.

   Use this space for rough work.
6. If Canada is on a system of fully flexible exchange rates and the U.S. central bank increases the U.S. money supply, then
   A) the Canadian dollar will increase in value.
   B) the Bank of Canada will have to buy US dollars.
   C) the Bank of Canada will have to sell US dollars.
   D) the Canadian dollar will decrease in value.
   E) there will be no effect on the Canadian economy whatsoever.

7. Consider a fixed-price model of an open economy with flexible exchange rates and imperfect capital mobility. If the government wishes to increase interest rates without changing the value of the domestic currency, the government should
   A) increase its expenditure and cut the money supply.
   B) raise its expenditure and raise the money supply.
   C) leave its expenditure unchanged while increasing the money supply.
   D) lower its expenditure and cut the money supply.
   E) lower its expenditure and raise the money supply.

8. In a flexible exchange rate system with perfect capital mobility, which one of the following statements is correct?
   A) Expansionary monetary policy will appreciate the domestic currency.
   B) Fiscal expansion is very effective in stimulating aggregate expenditure.
   C) Fiscal expansion will cause an appreciation of the domestic currency.
   D) An increase in exogenous exports will increase net exports.
   E) Both C) and D) are correct.

9. China is being accused by Western countries of setting the value for its domestic currency too low. All else equal, which one of the following statements might describe the impact on the Chinese economy of an undervalued Chinese currency?
   A) The prices of imported goods would be artificially low for Chinese consumers.
   B) Inflation pressure would tend to decrease in the Chinese economy.
   C) The Chinese money supply would tend to increase.
   D) The balance in China’s capital account would improve.
   E) None of the above is correct.

Use this space for rough work.
10. Consider an open economy with flexible exchange rates. Which of the following incidents will lead to an improvement in the balance of the current account?
   A) A decrease in foreign income.
   B) An increase in consumer’s confidence.
   C) Expansionary fiscal policy.
   D) Contractionary monetary policy.
   E) An increase in foreign interest rates.

11. The U.S. Federal Reserve has recently announced an upcoming policy shift that just about everyone knew was coming: As the economy heals, stimulus will be withdrawn. Surprisingly, this announcement provoked a tumultuous reaction in the markets: the Dow Jones industrial average immediately fell by 2.3 percent and the yield on 10-year U.S. bonds rose above 2.4 percent. Which of the following might explain this market perception that monetary stimulus is still needed?
   A) Current low rates of inflation suggest that the economy is not running on all cylinders yet.
   B) The state of the European Union economies remains an ongoing concern.
   C) The slowdown of the Chinese economy exacerbates investors' lack of confidence in the state of the American economy.
   D) The U.S. economy is growing but the rate of unemployment remains still too high.
   E) All of the above help to explain this market perception.

12. Some economists believe that the Canadian dollar is overvalued and suggest that the Bank of Canada should sell Canadian dollars in the exchange market to remedy this situation. At the same time, advocates of a flexible exchange rate system argue that such an action by the Bank of Canada would
   A) cause the rate of interest to rise, thus further deteriorating the balance in the current account.
   B) reduce the amount of money available in the Canadian economy thus causing a recession.
   C) create inflationary pressure by increasing the domestic money supply.
   D) cause a massive outflow of capital, thus reducing the rate of investment in the real sector of the Canadian economy.
   E) contribute to increase domestic income, thus further appreciating the Canadian dollar.

Use this space for rough work.
Consider the fixed-price model of an open economy with perfect capital mobility. This economy is initially in external balance and characterized by the following behavioural equations:

\[ C = 160 + 0.69Y \]
\[ I = 180 - 1000i \]
\[ G = 20 \]
\[ L = 0.5Y - 200i \]
\[ NX = 25 - 0.09Y - 2eP/P \]
\[ P' = 1 \]
\[ P = 2 \]

Note: Although not required, you might find helpful drawing a diagram when answering this question (but marks will not be given for your diagram).

a) If the central bank fixes the nominal exchange rate at \( e = 90 \), what are the values of equilibrium income and equilibrium rate of interest? (2 marks) What are the balances of the current and capital accounts in this equilibrium? (1 mark)

If there is perfect capital mobility and the economy is in external balance, then the domestic rate of interest is equal to the international rate of interest. To find the values of equilibrium income and equilibrium rate of interest we must equate the IS and LM curves.

To find the equation for the IS curve we must equate \( Y \) to \( AE \).

\[ AE = C + I + G + NX \]
where \( NX = 25 - 0.09Y - 2eP/P = 25 - 0.09Y - 90 = -65 - 0.09Y \]
\[ = (160 + 0.69Y) + (180 - 1000i) + 20 + (-65 - 0.09Y) \]
\[ = 295 + 0.6Y - 1000i \]

Therefore, the expression for the IS curve is:

\[ Y = AE \rightarrow Y = 295 + 0.6Y - 1000i \rightarrow 1000i = 295 - 0.4Y \rightarrow i = 0.295 - 0.0004Y \]

To find the expression for the LM curve we must equate \( M/P \) and \( L \):

\[ 115 = 0.5Y - 200i \rightarrow 200i = -115 + 0.5Y \rightarrow i = -0.575 + 0.0025Y \]

And to find \( Y^* \) we must equate the IS and LM curves:

\[ 0.295 - 0.0004Y = -0.575 + 0.0025Y \rightarrow 0.0029Y = 0.87 \rightarrow Y^* = 0.87 / 0.0029 = 300 \]

And by plugging this value for \( Y^* \) into the equation for either the IS or LM curve we find the corresponding value for equilibrium rate of interest:

\[ i = 0.295 - 0.0004Y^* = 0.295 - 0.0004(300) = 0.295 - 0.12 = 0.175 \text{ (or 17.5\%)} \]

The balance in the current account is:

\[ NX = -65 - 0.09Y^* = -65 - 0.09(300) = -65 - 27 = -92 \]

And since the economy is in external balance, then \( BP = NX + CF = 0 \) and the balance in the capital account is \( CF = +92 \).
b) Suppose that the foreign rate of interest increases by 0.005 while the central bank maintains the nominal exchange rate fixed at \( e = 90 \). What is the value of the new equilibrium income? What is the size of the nominal money supply in this new equilibrium? (2 marks) What are the balances of the current and capital accounts in this equilibrium? (1 mark)

Note: Although not required, you might find helpful drawing a diagram when answering this question (but marks will not be given for your diagram).

The increase in the international rate of interest will cause an outflow of capital and thus a deficit in the exchange market. The central bank will sell foreign currency to keep the value of the exchange rate unchanged and the money supply will decrease and the domestic rate of interest will rise. Therefore, equilibrium \( Y \) will fall as a result of the increase in \( i \). Graphically, the \( LM \) curve will shift up to the left until the domestic rate of interest once again equals the international rate. In the new equilibrium, therefore, the domestic rate of interest will be \( i = 0.18 \).

To find the corresponding equilibrium income we must plug this value for \( i^* \) on the equation for the \( IS \) curve:

\[
0.18 = 0.295 - 0.0004Y^* \rightarrow 0.0004Y^* = 0.295 - 0.18 = 0.115 \rightarrow Y^* = \frac{0.115}{0.0004} = 287.5
\]

In the new equilibrium, the money supply \((M/P)\) will be equal to the quantity demanded \((L)\):

\[
L = 0.5Y^* - 200i^* = 0.5(287.5) - 200(0.18) = 143.75 - 36 = 107.75.
\]

The balance in the current account is:

\[
NX = -65 - 0.09Y^* = -65 - 0.09(287.5) = -65 - 25.875 = -90.875.
\]

And since the economy is in external balance, then \( BP = NX + CF = 0 \) and the balance in the capital account is \( CF = +90.875 \).
c) Go back to the initial equilibrium of part a) above. Suppose now that the foreign rate of interest increases by 0.005 but the central bank adopts a fully-flexible exchange rate system. What is the value of the new equilibrium income? (2 marks)

Note: Although not required, you might find helpful drawing a diagram when answering this question (but marks will not be given for your diagram).

The increase in the international rate of interest will cause an outflow of capital and thus an increase in the demand for foreign currency in the exchange market. Therefore, the exchange rate will appreciate and $NX$ will increase, causing the $IS$ curve to shift out to the right. An excess demand arises in the goods market and $Y$ increases, and so does $i$. A new equilibrium is achieved when the domestic rate of interest equal the international rate once again (at $i = 0.18$).

To find the corresponding equilibrium income we must plug this value for $i^*$ on the equation for the $LM$ curve:

$$0.18 = -0.575 + 0.0025Y^* \Rightarrow 0.0025Y^* = 0.18 + 0.575 = 0.755 \Rightarrow Y^* = \frac{0.755}{0.0025} = 302.$$
d) What are the levels of consumption and investment expenditures in the equilibrium of part c) above? (2 marks) What are the balances of the current and capital accounts in this equilibrium? (2 marks) What is the value of the nominal exchange rate in this equilibrium? (2 marks)

When \( Y = 302 \), the values of \( C \) and \( I \) are:

\[
C = 160 + 0.69Y^* = 160 + 0.69 (302) = 160 + 208.38 = 368.38
\]

\[
I = 180 - 1000i^* = 180 - 1000 (0.18) = 180 - 180 = 0.
\]

Therefore, since \( Y = C + I + G + NX = 302 \) and \( G = 20 \), then

\[
NX = Y - C - I - G = 302 - 368.38 + 0 - 20 = -86.38.
\]

And since \( BP = NX + CF = 0 \) at \( Y = 302 \), then

\[
CF = +86.38.
\]

Since \( NX = 25 - 0.09Y - e \) and \( NX = -86.38 \) when \( Y = 302 \), then the value of the nominal exchange rate is:

\[
25 - 0.09 (302) - e = -86.38 \rightarrow e = 25 - 27.18 + 86.38 = 84.2.
\]
PART III  (30 marks)

Instructi0ns: Answer the following questions in the space provided. Each question is worth 10 marks.

1. Answer true or false to the following statement: “If the U.S. Government imposes duties on the importation of softwood lumber from Canada, the impact of this policy on the Canadian economy will be a decrease in the money supply, a decrease in the level of equilibrium income, an improvement in the balance of the capital account, and a deterioration in the balance of the current account.” (Show your answer with the help of a diagram and explain the economics. Consider the fixed-price model of an open economy with fixed exchange rates and perfect capital mobility.)

True

The imposition of a tariff on Canadian exports to the U.S. results in a decrease in \( NX \). Graphically, therefore, the \( IS \) curve shifts down to the left to \( IS' \) (see diagram). The decrease in exports causes the balance in the current account to deteriorate, and thus a deficit arises in the external sector (i.e., \( BP < 0 \) at point A).

In turn, the fall in exports causes the supply of foreign currency to decrease, and thus an excess demand for foreign currency arises in the exchange market. In order to keep the exchange rate constant at the set level, the Bank of Canada sells foreign currency in the exchange market and the domestic money supply decreases. Therefore, the \( LM \) curve shifts up to the left. Note that the domestic rate of interest increases above the level of the international rate of interest as a result of the decrease in the money supply, and thus during the process of adjustment the balance in the capital account improves.

Also note that as the level of income falls and the excess supply in the goods market decreases, the demand for real balances decreases. This puts downward pressure on the domestic rate of interest and reduces somehow the process of improvement in the capital account. At the same time, the decrease in income also reduces imports and also contributes to slowdown the deterioration of the balance in the current account.

Therefore, the statement is correct. The new equilibrium \( Y \) will be lower than before (due to the fall in NX causing an excess supply in the goods market), and the money stock will decreases (as a result of the Bank of Canada selling foreign currency). At the same time, the balance in the current account will deteriorate (as a result of the decrease in exports) while the balance in the capital account will improve (as a result of the decrease of the money supply and the increase in the domestic rate of interest during the process of adjustment).
2. Consider the fixed-price model of an open economy with fixed exchange rates and no capital mobility. At present this economy experiences a recessionary gap and a deficit in the external sector. What policies should the government implement if it wants to achieve both internal and external balance while keeping the exchange rate unchanged? (Show your answer graphically and explain the economics.)

To achieve both internal and external balance simultaneously, the government should implement a combination of expansionary monetary/fiscal policy (to achieve internal balance) together with a policy that would eliminate the deficit in the trade account (e.g., imposition of tariffs). Let’s analyze this process in three steps: 1) how external balance is initially achieved in the absence of any active policy (while the recessionary gap increases; 2) how internal balance is achieved while moving away from external balance; and 3) how external balance is achieved while maintaining internal balance.

The economy is initially in equilibrium at income $Y_1$ and rate of interest $i_1$. As shown in the left-hand side diagram above, at point $A$ there is a recessionary gap since $Y_1 < Y_{fe}$. And as shown in the right-hand side diagram, at $Y_1$ there is also a deficit in the external sector equal to the vertical distance between the $X$ and $Q$ curves (at $Y_1$). Given the level of the fixed exchange rate, equilibrium in the external sector (i.e., $BP = NX = 0$) would thus be achieved at $Y_0$.

**Step 1** — The deficit in the external sector (i.e., $NX < 0$) translates into a deficit in the exchange market, thus putting pressure on the exchange rate to appreciate. Since the central bank wants to keep the value of the exchange rate ($e$) fixed, it will sell foreign currency to eliminate this deficit in the exchange market. Consequently, the domestic money supply decreases and the $LM$ curve shifts to $LM'$. Therefore, the rate of interest rises to $i_2$ (point $B$) and an excess supply arises in the goods market. As a result, $Y$ decreases and the demand for money falls, thus also decreasing the rate of interest. Note that the adjustment path follows a movement down along the $LM'$ curve until the excess supply in the goods market is eliminated at $Y_0$ (point $C$). Also note that as $Y$ decreases, $Q$ also decreases until the deficit in the external sector is eliminated at $Y_0$. At point $C$ there is external balance but the recessionary gap is even larger than before.

**Step 2** — To eliminate the recessionary gap the government could implement expansionary fiscal and/or monetary policy. Let’s assume that it implements expansionary fiscal policy, and thus the $IS$ curve shifts up to $IS''$. An excess demand arises in the goods market, and thus $Y$ increases. All else equal, equilibrium income will be achieved at $Y_{fe}$ but a deficit will also arise in the trade account (i.e., $Q > X$ at $Y_{fe}$).

**Step 3** — The government could now impose a tariff to reduce $Q$, thus shifting the $Q$ curve down to $Q'$ and achieving external balance at $Y_{fe}$. Therefore, the $BP$ curve will shift to $BP'$. However, the reduction of $Q$ increases $NX$ and thus it will have an expansionary effect on the economy. Therefore, the $IS''$ curve will shift up to $IS'^*$. To maintain internal balance, the government should thus combine the imposition of the tariff with contractionary fiscal policy (thus preventing the $IS'$ curve from shifting up to the right). In this way, both internal and external balances will be achieved simultaneously.
3. Consider the fixed-price model of an open economy with imperfect capital mobility and flexible exchange rates. What would be the impact on this economy of a decrease in the international rate of interest? In your answer, clearly indicate the effect on equilibrium income, on the equilibrium rate of interest, and on the current account and capital account balances. (Show your answer with the help of a diagram and explain the economics. Assume that this economy is initially in external balance and that a recessionary gap exists.)

As shown in the diagram, the economy is initially in equilibrium at point A. Since point A is also a point on the BP curve, initially there is also external balance in the economy. The drop in \( i^* \) leaves the balance in the current account unchanged but causes the balance in the capital account to improve. Therefore, at point A there is now a surplus in the external sector. Note that for the external sector to remain in equilibrium (i.e., \( BP = 0 \)), the domestic interest rate must decrease by the same amount as the international rate did (so the interest rate differential would remain constant and the balance in the capital account unchanged). Therefore, the drop in the international rate of interest will cause the BP curve to shift down to \( BP' \) as shown in the diagram.

But the economy is at point A and thus there is a surplus in the external sector due to the improvement in the capital account. In other words, there is now an excess supply of foreign currency in the exchange market and thus the exchange rate will depreciate (i.e., the domestic currency will appreciate). The appreciation of the domestic currency makes domestic goods less competitive in international markets and thus NX falls. This appreciation of the domestic currency will cause the balance of the current account to deteriorate by the same absolute size as the improvement in the capital account in order for the external sector to remain in equilibrium at \( Y_1 \) (i.e., \( BP = 0 \) at \( Y_1 \)). Graphically, the appreciation of the domestic currency causes the IS curve to shift down to \( IS' \) and the \( BP' \) curve to shift up back to \( BP \). At point A, there is now equilibrium in the money market (i.e., point A is on the LM curve) and equilibrium in the external sector (i.e., point A is on the BP curve), but a situation of excess supply in the goods market (i.e., point A is above the IS' curve). Therefore, \( Y \) will have to fall to eliminate this excess supply.

As output starts to fall (as a result to the firms’ involuntary increase in inventories), the demand for money decreases and the rate of interest falls to keep the money market in equilibrium. The decrease in the rate of interest also deteriorates the balance in the capital account (i.e., an excess demand for foreign currency arises in the exchange market) and thus the domestic currency depreciates. The depreciation of the domestic currency increases NX and improves the balance in the current account to maintain equilibrium in the overall balance of payments (i.e., \( BP = 0 \)). Graphically, the depreciation of the domestic currency causes the IS curve to shift up and the \( BP \) curve to shift down and this process will continue as long as \( Y \) is falling, i.e., until the excess supply in the goods market is eliminated.

Therefore, graphically the adjustment path can be depicted as a movement down along the LM curve—the economy always being at a point of intersection between the moving BP curve and the static LM curve (i.e., the money market and the external sector always in equilibrium). Once the \( BP \) curve shifts all the way to \( BP'' \) and the IS' curve all the way to IS'', not only the money market and the external sector continue in equilibrium but now the excess supply in the goods market is also eliminated and thus a new equilibrium for the economy as a whole is reached. This is shown at point C in the diagram above.

Therefore, under the assumption of imperfect capital mobility and flexible exchange rates, a decrease in the international rate of interest causes domestic income to decrease, the domestic rate of interest to fall, the balance in the current account to deteriorate (because of the appreciation of the domestic currency), and the balance in the capital account to improve (because of the change in the interest rate differential between the domestic and the international rates of interest).