## ECO 209Y - L0101 MACROECONOMIC THEORY

## Term Test \#1

## LAST NAME

$\qquad$

## FIRST NAME

## STUDENT NUMBER

$\qquad$

## INSTRUCTIONS:

1. The total time for this test is 1 hour and 45 minutes.
2. Aids allowed: a simple calculator.
3. Use pen instead of pencil.

## DO NOT WRITE IN THIS SPACE

Part I

Part II

Part III

1. $\qquad$ /10
2. $\qquad$ /10
3. $\qquad$ /10
$\qquad$ /80

## PART I (40 marks)

## Instructions:

- Enter your answer to each question in the table below.
- Each correct answer is worth 2.5 marks. Note that a deduction of 0.5 mark will be made for each incorrect answer. Table cells left blank will receive a zero mark (i.e., no deduction).
- Do NOT guess your answers!

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A | C | A | C | C | D | A/E | C |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| D | D | A | C | D | B | E | B |

1. Since 2013, Kathrine has been renting a condominium apartment for $\$ 2,000$ a month. She purchased this apartment from her landlord on July 1, 2015 and paid $\$ 500,000$ for it. What is the impact of this purchase on 2015 GDP?
A) Consumption is unchanged and investment is unchanged.
B) Consumption falls by $\$ 12,000$ and investment is unchanged.
C) Consumption is unchanged and investment rises by $\$ 500,000$.
D) Consumption falls by $\$ 12,000$ and investment rises by $\$ 500,000$.
E) Consumption rises by $\$ 12,000$ and investment is unchanged.
2. Minghe bought a one-year government bond for $\$ 500$. He received principal and interest totalling $\$ 540$ one year later. During the year the Consumer Price Index (CPI) rose from 120 to 126 . The nominal interest rate on the bond was $\qquad$ percent, and the real interest rate was $\qquad$ percent.
A) $8 ; 2$.
B) $40 ; 6$.
C) $8 ; 3$.
D) 8 ; -2 .
E) None of the above is correct.

Use this space for rough work.
3. When measuring GDP through the expenditure approach, which one of the following statements about investment is correct:
A) Net investment may be negative.
B) Net investment includes the total of all machinery and equipment produced during the year.
C) Gross investment must equal net investment.
D) Gross investment plus depreciation equals net investment.
E) Net investment is one of the components of total expenditure on goods and services.
4. In the national accounts, which of the following is not included in the government expenditure component of aggregate expenditure?
A) Salaries of civil servants whose responsibilities include the collection of the Harmonized Sale Tax (HST).
B) The city of Edmonton's purchase of forms from a Regina printing company.
C) Canada pension payments to eligible residents of Sherbrook, Quebec.
D) The government of Newfoundland's payment to a New York engineering consulting company.
E) The city of Toronto purchase of Canadian flags from a firm in Brazil.
5. Which one of the following expenses is not considered as investment when measuring GDP?
A) A new coffee-maker bought by a Starbuck's franchise.
B) The construction of a garage in John's backyard by a private contractor.
C) University of Toronto's purchase of the Medical Arts Building at the corner of St. George St. and Bloor St. W.
D) A new limousine bought for the use of the CEO of Magna Corporation.
E) The construction of a new house for the use of the Premier of Ontario.
6. The popcorn industry produced $\$ 1$ billion worth of popcorn in 2015 , using $\$ 500$ million worth of corn as the only intermediate product. The popcorn industry had profits of \$100 million and additional expenditures totalling $\$ 400,000$. These additional expenditures were $\$ 300$ million in wages and salaries, $\$ 50$ million in rent, and $\$ 50$ million in taxes. The contribution of the popcorn industry to the country's GDP in 2015 was
A) $\$ 350$ million.
B) $\$ 1$ billion.
C) $\$ 450$ million.
D) $\$ 500$ million.
A) None of the above.
7. Suppose that an economy produces only apples, bananas, and oranges, and that prices (in dollars) and quantities (in pounds) are as shown in the following table:

Year 2014 Year 2015

| Good | Quantity | Price | Quantity | Price |
| :--- | :---: | :---: | :---: | :---: |
| Apples | 3,000 | $\$ 2$ | 4,000 | $\$ 3$ |
| Bananas | 6,000 | $\$ 3$ | 5,000 | $\$ 2$ |
| Oranges | 8,000 | $\$ 4$ | 9,000 | $\$ 5$ |

Using the chain method, what was the (approximate) percentage change in real GDP in 2015?
A) 7.6 percent.
B) 6.8 percent.
C) 6.2 percent.
D) 5.8 percent.
E) None of the above.
8. Suppose that the federal government runs a budget surplus of $\$ 20$ billion. It collects $\$ 100$ billion in taxes, and it has the following expenditures: $\$ 20$ billion in welfare payments, $\$ 10$ billion in interest on the national debt, $\$ 10$ billion in rent, and $\$ 40$ billion in wages. The government contribution to GDP is
A) $\$ 80$ billion.
B) $\$ 40$ billion.
C) $\$ 50$ billion.
D) $\$ 70$ billion.
E) none of the above.
9. In 2015, a dealership in Toronto buys 30 new cars from the Ford Motor Company in Oakville, Ontario, at a cost of $\$ 15,000$ per car and sells 25 of these cars by the end of the year at a price of $\$ 20,000$ each. The remaining cars are then sold in January 2016 at a price of $\$ 18,000$ each. In these transactions, the dealership's contribution to GDP in the year 2015 was:
A) $\$ 450,000$.
B) $\$ 140,000$.
C) $\$ 590,000$.
D) $\$ 125,000$.
E) none of the above.

Use this space for rough work.
10. Consider a closed economy with a fixed-price level. If investment is very sensitive to the interest rate, which one of the following statements would be correct?
A) The LM curve will be steep.
B) The IS curve will be steep.
C) Monetary policy will have a large effect on nominal interest rates.
D) Monetary policy will have a large effect on output.
E) Fiscal policy will have a large effect on output.
11. Consider a fixed price model of a closed economy, and suppose that consumption demand declines as the interest rate increases. The slope of the IS curve will
A) be flatter the more sensitive consumption demand is to changes in the interest rate.
B) be steeper the more sensitive consumption demand is to changes in the interest rate.
C) be flatter if the interest sensitivity of consumption is greater than the interest sensitivity of investment.
D) be flatter if the interest sensitivity of investment is greater than the interest sensitivity of consumption.
E) not depend on the sensitivity of consumption demand to changes in the interest rate.
12. Consider the fixed-price model of a closed economy. In the short run, a decrease in autonomous investment will
A) lower the interest rate and increase saving.
B) raise the interest rate and increase saving.
C) lower the interest rate and decrease saving.
D) raise the interest rate and decrease saving.
E) lower the interest rate but leave saving unchanged.
13. Suppose that there is a simultaneous tax cut and an open market sale of bonds. As a result of these policies, which of the following will be true?
A) Both output and the interest rate will increase.
B) Both output and the interest rate will decrease.
C) The interest rate will increase and output will decrease.
D) The interest rate will increase.
E) Output will increase.

Use this space for rough work.
14. Consider the IS-LM model of a closed economy with a fixed-price level. The government launches a new project where the purchase of domestic products is financed by selling bonds to the general public. Which of the following best describes the likely impact of this government action?
A) Income will not change.
B) The money supply will not change.
C) The rate of interest will fall.
D) The rate of interest will not change.
E) Both B) and D) are correct.
15. The IS-curve will become flatter if
A) money demand increases.
B) the interest-sensitivity of investment decreases.
C) the marginal propensity to consume decreases.
D) the marginal propensity to save increases.
E) the income tax rate is reduced.
16. An increase in the marginal propensity to save
A) makes the AE curve steeper.
B) causes equilibrium income to fall.
C) increases planned investment.
D) reduces the budget deficit.
E) causes the money supply to rise.

Use this space for rough work.

## PART II (10 marks)

Consider a closed economy with a fixed-price level where the real money demand (L), the real money supply (MIP), and aggregate expenditure (AE) are defined as follows:

$$
\begin{aligned}
& L=0.25 Y+400-15 i \\
& M I P=600 \\
& A E=400+0.75 Y-10 i .
\end{aligned}
$$

a) What are the expressions for the IS and LM curves in this economy? Show all your work. (2 marks)

## Derivation of the IS curve:

$$
\begin{aligned}
& Y=A E \\
&=400+0.75 Y-10 i \\
& \rightarrow 0.25 Y=400-10 i \\
& \rightarrow Y=1600-40 i \text { or } i=40-0.025 Y
\end{aligned}
$$

## Derivation of the LM curve:

$$
\begin{aligned}
& M I P=L \\
& 600=0.25 Y+400-15 i \\
& \rightarrow 0.25 Y=15 i+200 \\
& \rightarrow Y=800+60 i \text { or } i=-40 / 3+(1 / 60) Y
\end{aligned}
$$

b) What are the levels of equilibrium income $\left(Y^{*}\right)$ and equilibrium nominal rate of interest $\left(i^{*}\right)$ ? Show all your work. (2 marks)

## Derivation of equilibrium $i$ and $Y$ :

$$
\begin{aligned}
& I S=L M \\
& 1600-40 i=800+60 i \\
& \rightarrow 100 i=800 \\
& \rightarrow i^{*}=8
\end{aligned}
$$

and plugging $i^{*}=8$ into either the $I S$ curve or the $L M$ curve:
$\rightarrow Y^{*}=1280$
c) Suppose that government purchases increase by $\$ 50$, i.e., $\Delta G=50$. If the real money supply remains constant, what are the new levels of equilibrium income and equilibrium nominal rate of interest? Show all your work. (3 marks)

If $\Delta G=50$, then the expression for the $A E$ curve will be $A E=450+0.75 Y-10 i$, and the equation for the IS curve will be:

$$
Y=A E \rightarrow Y=450+0.75 Y-10 i \rightarrow 0.25 Y=450-10 i \rightarrow Y=1800-40 i
$$

## Derivation of equilibrium $i$ and $Y$ :

$$
I S=L M
$$

$$
1800-40 i=800+60 i
$$

$$
\rightarrow 100 i=1000
$$

$$
\rightarrow i^{*}=10
$$

and plugging $i^{*}=10$ into either the IS curve or the LM curve:
$\rightarrow Y^{*}=1400$
d) Go back to the equilibrium of part b) above. Suppose now that government purchases increase by $\$ 50$ but the central bank changes the money supply to keep the interest rate constant. By how much should the central bank change the money supply? Show all your work. (2 marks) What is the new level of equilibrium income? Show all your work. (1 mark)

Since the autonomous expenditure multiplier $\boldsymbol{\alpha}_{\mathrm{AE}}=1$ / (1-0.75) = 4, if government spending is increased by $\Delta G=50$, the IS-curve will shift horizontally to the right by:

$$
\Delta Y=\alpha_{A E} \Delta G=4 * 50=200 .
$$

If the central bank wants to keep the interest rate constant at $i=8$, money supply has to be increased in a way that the LM-curve shifts to the right by exactly the same amount as the IS-curve does, that is, by $\Delta Y=200$.
Therefore, from MIP $=0.25 Y+400-15 i$ we get that:

$$
\Delta(M / P)=0.25 \Delta Y=0.25(200)=50
$$

so the money supply should be increased by $\$ 50$.

## Derivation of equilibrium $Y$ :

Since MIP = 650 and $i^{*}=8$, from MIP $=0.25 Y+400-15 i$ we get that:

$$
\begin{aligned}
& 650=0.25 Y+400-15(8) \\
& 650=0.25 Y+280 \\
& 0.25 Y=370 \\
& Y^{*}=1480
\end{aligned}
$$

Or more simply, since initial equilibrium $Y$ was $\$ 1280$ at $i=8$, now it will be $\$ 200$ greater at this same rate of interest, i.e., $Y^{*}=1480$.

## PART III (30 marks)

Instructions: Answer the following three questions in the space provided. You may continue your answer on page 12 if additional space is required (but clearly indicate that your answer continues on page 12). Each question is worth 10 marks.

1. Critically evaluate the following statement: "Government budget deficits tend to crowd out private investment. Therefore, the proposition to force governments to run balanced budgets at all times makes economic sense."

This statement is false.
There is nothing intrinsically wrong (or right, for that matter) with (cyclical) budget deficits. During the business cycle it is expected that governments will run deficits during periods of recession (because revenues drop) and surpluses during periods of economic boom (because revenues rise). Overall, government should run a balanced budget over the business cycle where the surpluses of the boom years would offset the deficits of the recession years.

The conservative proposition that governments should always run balanced budgets would have the effect of exacerbating the impact of recessive periods by further reducing aggregate demand when the latter is already weak. That is, it would result in the creation of more unemployment and greater excess productive capacity during recessions instead of contributing to their reduction. Similarly, the elimination of a surplus through a decrease in taxes (or an increase in government spending) during a period of economic boom would create further inflationary pressure in the economy.

This proposition has an ideological (and not an economic) root and aims to reduce the economic role of the state to its minimum. The claim is that government expenditure should be reduced in period of recession to balance the budget, and taxes should be reduced in periods of boom for the same reason. The long-run result would be to minimize the economic and social role of the government.

Structural budget deficits-that is, deficits during both periods of recession and periods of economic boom-are a different story. Here it could be claimed that government deficits might crowd out private investment. If that's the case, then the claim should be that governments should try to run balanced budgets over the business cycle but not at all times.
In short, a deficit in any one year doesn't say much unless we look at it into the context of the business cycle. A deficit in a year of recession is something to be expected-a "cyclical" deficit -and thus this is not a "bad" deficit. What we must determine is what the full employment budget surplus (or deficit) might be. If at the level of potential output we would determine that the government would be running a surplus or a small deficit, then unambiguously the best policy for the government would be to use expansionary (rather than contractionary) fiscal policy. This would allow to reduce the recessionary gap, and thus it would be the right policy even at the cost of further increasing the deficit in the short run.
2. Critically evaluate the following statement: "An increase in the income sensitivity of the demand for real balances will enhance the effectiveness of fiscal policy." (Show your answer with the help of a diagram and explain the economics. Consider the IS-LM model of a closed economy.)

Fiscal policy will have a greater impact on the level of equilibrium income the larger the fiscal policy multiplier is. Given $\beta_{\mathrm{FP}}=1 /[1-c(1-t)+b k / h]$, the fiscal policy multiplier falls when the income sensitivity of the demand for real balances (k) rises, and thus the effectiveness of fiscal policy decreases. The economic explanation is as follows.
The larger the income sensitivity of the demand for real balances, the larger the increase in the demand for money as a result of any given increase in income and, therefore, the larger the increase of the rate of interest and the larger the subsequent crowding out effect (i.e., the reduction in investment). Of course, the larger the crowding out effect, the smaller the impact of fiscal policy on equilibrium income. The following diagram also shows this result.


The expression for the $L M$ curve is given by $i=-(M / P) / h+(k / h) Y$ and, therefore, the larger $k$ the steeper the $L M$ curve. Suppose that the initial equilibrium is at ( $Y_{0}, i_{0}$ ) and that the value of the income sensitivity of the demand for real balances is $k_{1}$ (and thus the $L M$ curve is $L M_{1}$ ). Suppose now that $G$ increases.
As $G$ increases, the IS curve shifts up to the right and a situation of excess demand arises in the goods market. As output starts to increase to eliminate the excess demand, the demand for money also starts to increase and the rate of interest rises. Note that the adjustment is always along the $L M$ curve since the money market is always in equilibrium by assumption. Given $k_{1}, \mathrm{a}$ new equilibrium will be reached at income $Y_{1}$ and rate of interest $i_{1}$.
If $k$ rises to $k_{2}$, the $L M$ curve becomes steeper (i.e., the $L M_{2}$ curve). The increase in $k$ will, in itself, have a contractionary effect on the economy, but it will also reduce the impact of expansionary fiscal policy. Indeed, as shown in the diagram, the increase in $G$ will cause $Y$ to increase only to $Y_{2}$ in this case. This smaller increase in $Y$ is due to the larger increase in the rate of interest (to $\dot{i}_{2}$ ) and thus to the larger crowding out effect (i.e., the decrease in investment).
The statement is, therefore, not true.
3. Critically evaluate the following statement: "In a closed economy, national saving is equal to actual investment. Therefore, the government should implement policies that encourage greater saving to help the economy get out of the recession." (Show your answer with the help of a diagram and explain the economics.)

This statement is false.
Investment plays a very important role in the economy-it increases the capital stock of the country and thus it contributes to increasing the productive capacity of the economy. Therefore, there exists a general consensus among economists that high rates of investment are desirable and necessary for an economy to grow rapidly.
Since, by definition, saving is always equal to actual investment and high rates of investment are desirable, are high rates of saving also desirable?

Our $A E$ model is static and thus unable to properly address the role of investment in the process of economic growth. Nevertheless, the AE model provides us with some important insights to answer the question regarding the desirability of high rates of saving. In this model, planned or desired investment expenditure plays a role only in the present period as part of overall aggregate expenditure-i.e., just like planned consumption expenditure, it contributes to create a demand for domestically produced goods. Therefore, when there exists excess capacity in the economy, higher planned investment is also desirable in the current period because it increases $A E$ and thus equilibrium income.
However, higher planned investment does not depend on higher saving as some economists seem to suggest. Rather, the causation is the other way around: all else equal, higher planned investment determines higher saving. Indeed, higher planned saving implies lower planned consumption expenditure and, therefore, lower $A E$. In turn, lower $A E$ results in involuntary accumulation of inventories and thus in higher actual investment. But there is nothing desirable in higher actual investment as a result of an involuntary accumulation of inventory since it ends up reducing output and income.

The above result is shown in the diagram on the right. Initially the economy is in equilibrium at the level of income $Y_{1}$. An increase in planned or desired saving causes desired consumption expenditure to decrease and the AE curve shifts down to $A E^{\prime}$. A situation of excess supply arises in the economy at $Y_{1}$ and output/income start to fall towards the new equilibrium at $\mathrm{Y}_{2}$.

The claim that planned saving is desirable because it determines planned investment is thus a fallacy. Moreover, the causation goes in the opposite direction-higher planned investment results in higher levels of planned saving. Indeed, an increase in planned investment raises the level of equilibrium income and, therefore, causes the levels of both planned consumption AND planned saving to
 rise.
(Continue on this page if necessary)

