

PART I (30 points)

Instructions:

Enter your answer to each of the 15 multiple-choice questions in the **bubble sheet** provided on **page 12** below. Each correct answer is worth **2 points**. **Note that no deduction will be made for incorrect answers**. Table cells left blank will receive zero points. **Do NOT guess your answers! Manage your time properly!**

- Which of the following is considered an investment in the expenditure approach of measuring GDP?
 - Ontario's Northern Telecom builds a new plant in Mexico City.
 - The Royal Bank of Canada purchases a small trust company in Manitoba.
 - General Motors (Canada) issues new shares to raise the capital required to build a new plant in Oshawa.
 - The University of Toronto sells the north section of the Varsity Stadium to a private developer who plans to build a new condominium on the site.
 - None of the above.
- In May of last year a construction company imported 10 designer's kitchen cabinets from Italy at a cost of \$20,000 each. The company installed 6 of these kitchen cabinets at \$30,000 each by the end of 2018. As a result of these transactions, the country's gross domestic product increased in 2018 by:
 - \$60,000.
 - \$100,000.
 - \$120,000.
 - \$200,000.
 - \$300,000.
- In 2018, Speedy Motors purchased \$5 million worth of steel and car parts in order to produce 1,000 cars. Speedy Motors sold in 2018 all these 1,000 cars to Global Car Dealer for \$15,000 each. Global Car Dealer sold 800 of these cars to the public in 2018, at a retail price of \$20,000 each. What was the contribution of Speedy Motors and Global Car Dealer to GDP in 2018?
 - \$5 million.
 - \$14 million.
 - \$15 million.
 - \$20 million.
 - None of the above.

Use this space for rough work.



4. Consider an economy without depreciation of the capital stock and without indirect taxes. Suppose that National Income (Y) = 5,500; Budget Surplus (BS) = 150; Disposable Income (YD) = 4,400; Net Exports (NX) = 100; and Consumption (C) = 4,100. The value of Investment (I) is
- A) 50.
 - B) 150.
 - C) 350.
 - D) 450.
 - E) None of the above.
5. Suppose that the government has a balanced budget. It collects \$40 billion in taxes, purchases \$10 billion in goods and services from private companies, pays \$10 billion in welfare benefits, pays \$2 billion in interest on the national debt, and pays government workers \$18 billion in wages. The government contribution to GDP is
- A) \$10 billion.
 - B) \$12 billion.
 - C) \$18 billion.
 - D) \$28 billion.
 - E) \$40 billion.
6. Suppose that an economy produces only apples and oranges, and that prices (in dollars) and quantities (in pounds) are as shown in the following table:

Good	Year 2017		Year 2018	
	Quantity	Price	Quantity	Price
Apples	3,000	\$3	2,000	\$2
Oranges	5,000	\$5	6,000	\$4

- Using the chain-weighted method, in 2018 the rate of growth of real GDP was approximately:
- A) 6.00 percent.
 - B) 6.33 percent.
 - C) 6.50 percent.
 - D) 6.67 percent.
 - E) 7.00 percent.

Use this space for rough work.

7. Suppose that Justin buys a newly-built house, for which he pays \$150,000. Knowing that the rent for a similar house is \$20,000 per year and that Justin previously lived with his parents, what is the impact of this transaction on full-year GDP?
- A) Consumption rises by \$150,000 and investment is unchanged.
 - B) Consumption rises by \$20,000 and investment rises by \$150,000.**
 - C) Consumption is unchanged and investment rises by \$150,000.
 - D) Consumption rises by \$20,000 and investment is unchanged.
 - E) GDP is unchanged.
8. The saving and investment functions of a hypothetical closed economy with no government sector are $S = -100 + 0.2 Y$ and $I = 50$, respectively. When $Y = 1000$, the involuntary change in inventory is
- A) +50.**
 - B) +100
 - C) +250.
 - D) -50.
 - E) -250.
9. If a household's disposable income increases from \$10,000 to \$15,000 and its consumption expenditures increase from \$8,000 to \$11,000, which one of the following is correct?
- A) The household is dissaving.
 - B) The average propensity to consume over this range of income is increasing.
 - C) The slope of the consumption function is 0.6.**
 - D) The marginal propensity to consume is 0.4.
 - E) None of the above is correct
10. Assume a simple model without government and without an external sector. If an increase in exogenous investment of 40 leads to an increase in consumption of 160, then the marginal propensity to save is
- A) 0.10.
 - B) 0.20.**
 - C) 0.25.
 - D) 0.40.
 - E) 0.75.

Use this space for rough work.

11. Consider a closed economy with an expenditure multiplier equal to 4. Suppose that this economy starts trading with the rest of the world and that its marginal propensity to import is 0.25. What is the value of its expenditure multiplier now?
- A) 1.5.
 - B) 2.0.**
 - C) 2.5.
 - D) 3.0.
 - E) None of the above.
12. When unplanned inventory reduction occurs, we can conclude that
- A) imports are greater than exports.
 - B) desired investment is greater than actual investment.
 - C) GDP is greater than its equilibrium level.
 - D) GDP is less than its equilibrium level.
 - E) both B) and D) are correct.**
13. At the initial equilibrium income there is a trade deficit and the government is running a budget surplus. Due to a decrease in consumers' confidence, autonomous consumption now decreases. As a result, which of the following will be true?
- A) Actual investment will fall.
 - B) Actual savings will decrease.
 - C) The government budget surplus will decrease.**
 - D) The trade deficit will increase.
 - E) Both C) and D) will be true.
14. Suppose the economy is in a recession and the government is running a budget deficit. If the government tries to reduce its deficit, which of the following will be true?
- A) Taxes will decrease and equilibrium income will rise.
 - B) Business confidence will increase and desired investment will rise.
 - C) Government spending will decrease and equilibrium income will fall.
 - D) The trade deficit will decrease.
 - E) Both C) and D) will be true.**
15. Statistics Canada reported that Canada's trade deficit decreased by almost one-third in August. This was mostly due to:
- A) a greater decrease in imports than in exports.
 - B) a greater increase in exports than in imports.**
 - C) an increase in exports and a decrease in imports.
 - D) an increase in exports with practically no change in imports.
 - E) a decrease in imports with practically no change in exports.

Use this space for rough work.

PART II (15 marks)

Consider the following closed economy, where Y is income and i is the rate of interest:

Consumption	$C = 325 + 0.8YD - 10i$
Investment	$I = 100 - 15i + 0.08Y$
Government spending	$G = 260$
Transfer payments	$TR = 100$
Taxes	$TA = 50 + 0.1Y$
Full-employment income	$Y_{fe} = 3500$

- a) As a function of both Y and i , what is the equation for the AE curve? (1 mark) What is the size of the aggregate expenditure multiplier? (1 mark) **Show all your work.**

First, we must find the equation for the AE curve:

$$\begin{aligned} 1) \quad AE &= C + I + G \\ &= [325 + 0.8(Y - TA + TR) - 10i] + [100 - 15i + 0.08Y] + 260 \\ &= 685 - 25i + 0.08Y + 0.8[Y - 50 - 0.1Y + 100] \\ &= 685 - 25i + 0.08Y + 0.8(0.9Y + 50) \\ &= 725 - 25i + 0.8Y \end{aligned}$$

- 2) And the expression for the expenditure multiplier is:

$$\alpha_{AE} = 1 / (1 - \text{slope of } AE \text{ curve}) = 1 / (1 - 0.8) = 1 / 0.2 = 5$$

- b) If the central bank sets the rate of interest at 5 percent (i.e., $i = 5$), what is the level of equilibrium income? (1 mark) **Show all your work.**

We have found above the equation for the AE curve as a function of Y and i . And for $i = 5$ we get:

$$AE = 725 - 25i + 0.8Y \quad 725 - 25(5) + 0.8Y = 725 - 125 + 0.8Y = 600 + 0.8Y$$

To find equilibrium income we must equate Y and AE :

$$Y = AE \rightarrow Y = 600 + 0.8Y \rightarrow 0.2Y = 600 \rightarrow Y^* = 600/0.2 = 3000$$

c) What is the level of private saving (S) when the economy is in equilibrium at $i = 5$? (1 mark) What is the level of government saving (or budget surplus, BS) when the economy is in this equilibrium? (1 mark) What is the level of national saving (S_N) when the economy is in this equilibrium? (1 mark) What is the level of private investment in this equilibrium (1 mark) **Show all your work.**

1) Since $S = YD - C$, let's find the values of YD and C :

$$YD = Y - TA + TR = Y - 50 - 0.1Y + 100 = 50 + 0.9Y = 50 + 0.9(3000) = 2750$$

$$C = 325 + 0.8YD - 10i = 325 + 0.8(2750) - 10(5) = 325 + 2200 - 50 = 2475$$

$$\text{Therefore, } S = YD - C = 2750 - 2475 = 275$$

2) $BS = TA - (G + TR) = 50 + 0.1(3000) - (260 + 100) = -10$

3) $S_N = S + BS = 275 - 10 = 265$

4) $I = 100 - 15i + 0.08Y = 100 - 15(5) + 0.08(3000) = 100 - 75 + 240 = 265$

d) Given the situation of the economy and the budgetary situation of the government you have described above, what do you think the government should do to improve that situation? (2 marks)

The economy is in a deep recession since $Y = 3000$ and $Y_{fe} = 3500$. In addition, the government is running a relatively small deficit since $BS = -10$, which represents about 0.33 percent of GDP. Moreover, this deficit is not only small but cyclical in nature since at the level of full employment income (\$3500) the government would be running a surplus. Indeed,

$$BS_{fe} = TA - G - TR = 50 - 0.1(3500) - 260 - 100 = 400 - 360 = 40.$$

Therefore, it seems that expansionary fiscal policy should be implemented to get Y closer to full employment even at the cost of increasing the government deficit in the short run.

e) By how much could government purchases (G) increase without moving the government into a situation of a structural deficit? **(1 mark)** What would be the level of equilibrium income if the government were to increase G by this amount? **(1 mark)** Show all your work.

1) A structural deficit means that at the level current level of expenditure the government would also be running a deficit at the level of full employment income. We have shown above that this is not the case – the government would be running a surplus of \$40 at $Y = \$3500$. Therefore, the government could increase its purchases by \$40 and still have a balanced budget at Y_{fe} .

2) An increase in G equal to \$40 would cause equilibrium income to increase by:

$$\Delta Y = \alpha_{AE} \Delta G = 5 (\$40) = \$200.$$

Therefore, the new level of income would be $Y = \$3200$.

f) All else equal, what change in government purchases (G) would be necessary for the economy to reach the level of full-employment income? **(1 mark)** Given this increase in G, what would be the level of government saving (or budget surplus) at the level of full-employment income? **(1 mark)** In your view, should the government implement such an increase in G? **(2 marks)** Show all your work.

1) Since $Y_{fe} = \$3500$, equilibrium income must increase by \$500. Given that $\alpha_{AE} = 5$, ΔG must be \$100.

2) Given $\Delta G = \$100$ and $Y_{fe} = \$3500$,

$$BS_{fe} = 50 + 0.1 (3500) - 360 - 100 = 400 - 460 = - 60.$$

3) Should the government increase G by \$100? It could be argued that the government should increase G enough to stop the decline in Y and, at the same time, trigger a sufficient increase in Y to restore some degree of confidence on the part of the private sector. The crucial point here is to regain the confidence of households in order for them to start spending once again. In turn, once consumers start spending, at some point the business sector will also start investing once again. Will a \$100 increase in G be enough? Or will it be too much? A \$100 increase in G will cause the government to increase its deficit in the short run to more than 3% of the current level of GDP. This is a relatively large deficit but the economy is in a deep recession and this increase in G might not be even enough to jump start the economy and restore the confidence of the private sector. In any case, in these circumstances it's better to err on the plus side rather than on the minus side. If the increase in G is excessive there is always time to reduce it at a faster pace as the level of economic activity starts moving closer to full employment and inflationary pressure builds up. That's why most of the increase in G should be on infrastructure investment since, in addition to increasing economic efficiency, once the projects are completed G can go back to its initial level.

PART III (30 points)

Instructions: Answer the following three questions in the space provided. Each question is worth 10 points.

1. **Critically comment on the following statement:** “An increase in government spending is less effective with respect to income when investment is an increasing function of income.” **Show your answer algebraically and explain the economics.**

This statement is false.

Let's consider a closed economy initially in equilibrium, and let's assume first that investment does not depend on Y (i.e., only C is assumed to depend on the level of Y). What is the impact of an increase in G on equilibrium Y ?

An increase in G increases autonomous AE by the same amount and through the multiplying process causes equilibrium income to increase by:

$$\Delta Y = \alpha_{AE} \Delta G.$$

Let's look at this multiplying process. The increase in G increases autonomous AE and creates a situation of disequilibrium in the economy where $AE > Y$. Firms start selling more than they are actually producing and thus they experience an involuntary decrease in inventories. It is this involuntary decrease in inventories that gives the signal to the firms that production must be adjusted upwards, and thus output and income increase. As Y increases, a fraction “ $c(1-t)$ ” of any additional dollar of Y is re-spent by consumers in the purchase of goods and services — i.e., the marginal propensity to spend is equal to the MPC_Y — and thus AE increases further and so does Y . This is the multiplying effect of an increase in autonomous expenditure and, in this case, the expenditure multiplier is

$$\alpha_{AE} = 1 / [(1 - c(1 - t))].$$

Let's consider now the case of a closed economy initially in equilibrium, but assuming that both consumption and investment depend on the level of Y . That is, let's assume now that:

$$I = \bar{I} + fY.$$

What is now the impact of an increase in G on equilibrium Y ?

As before, the increase in G increases autonomous AE by the same amount and through the multiplying process causes equilibrium income to increase further by the increase in G times the expenditure multiplier — $\Delta Y = \alpha_{AE} \Delta G$. This multiplying process is also basically the same as before, except for one important point. As Y increases to eliminate the excess demand in the economy, a fraction “ $c(1-t)$ ” of any additional dollar of Y is re-spent by consumers in the purchase of goods and services but now also another fraction “ f ” (i.e., the marginal propensity to invest) of any additional dollar of Y is re-spent in the purchase of investment goods (i.e., on investment) — i.e., the marginal propensity to spend is now equal to the MPC_Y plus the marginal propensity to invest — and thus AE increases further and so does Y . In this case, then, the multiplying effect of an increase in autonomous expenditure is greater since the expenditure multiplier is

$$\alpha_{AE} = 1 / [1 - c(1 - t) - f],$$

where $1 / [1 - c(1 - t) - f] > 1 / [1 - c(1 - t)]$.

Therefore, the statement is false: An increase in G is more effective in increasing Y when investment is also an increasing function of income.

2. Critically comment on 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 a recession.” **Show your answer with the help of a graph and explain the economics.**

This statement is fallacious.

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.

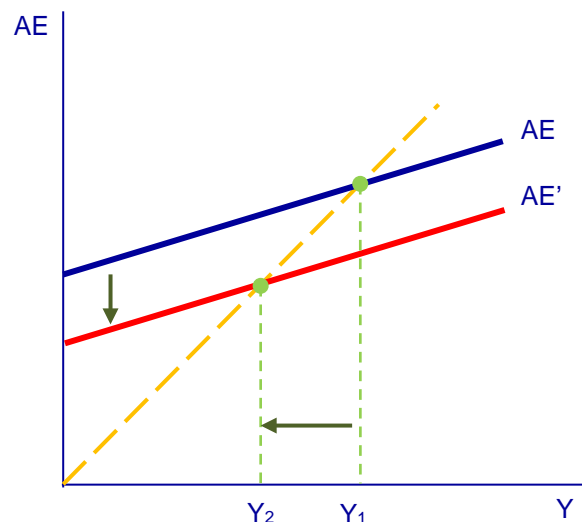
Since, by definition, saving is always equal to *actual* investment and high rates of investment are desirable, are high rates of saving also desirable?

Our *AE* 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 *AE* 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 *AE*. In turn, lower *AE* 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 thus the *AE* curve shifts down to AE' . A situation of excess supply arises in the economy and output and income starts to fall towards the new equilibrium at 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 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.



3. Critically comment on the following statement: *“A responsible government should always try to keep a balanced budget. Therefore, it should increase taxes when running a budget deficit and increase expenditures when running a budget surplus.”*

First of all, we must keep in mind that there is nothing intrinsically wrong (or right, for that matter) with budget deficits. Over the business cycle it is expected that governments will run deficits during periods of recession and surpluses during periods of economic boom. At most, it could be argued that 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 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 root and aims to the reduction (rather, the minimization) of the economic role of the state. 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 economic boom for the same reason. The long-run impact would be to minimize the economic and social role of the government. This proposition is based on what Krugman calls the “starving the beast” theory.

Chronic budget deficits—that is, deficits during periods of recession and also during periods of economic boom—are a different story. Here it could be argued that government deficits might crowd out private investment. If that’s the case, then it could be argued that governments should 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—so such a deficit should not be a matter of concern. In such a case, what we must look at is what the budget surplus (or deficit) would be if the economy were to be at full employment (at the current level of government spending and taxation). If at the level of potential output we could determine that the government would be running a balanced budget or a small surplus, then in this case the best policy for the government might be to use expansionary instead of contractionary fiscal policy—even at the cost of increasing the deficit further in the short run. Therefore, instead of reducing government expenditure to reduce the deficit, it would be best for the government to use expansionary fiscal policy to reduce the recessionary gap, even at the cost of further increasing the deficit in the short-run. That is, the government priority should be to get the economy out of the recession even at a cost of a higher deficit in the short run.

As the economy moves out of the recession, the government deficit will come down due to higher revenues. Of course, if the economy is out of the recession but the government is still running a deficit, then this means a structural deficit—a matter that now should be addressed by the government. In this case, the government should reduce expenditure or increase the level of taxation. But this should not be done until the economy is actually out of the recession, i.e., until the level of income is close to what is considered to be full employment.