Final Exam

Question I: Country Magistere is a closed economy and obeys IS-LM model. Assume that it has equilibrium in both the goods market and money market. Magistere's economy is described by the following equations:

Goods markets:

- $C = c_0 + c_1(1-t)Y$, where C is consumption, Y is income, t represents a proportional tax, and c_0 and c_1 are positive constants.
- $I = b_0 - b_1 i$, where I is investment, i is the interest rate, and b_0, b_1 are positive constants.
- $G = \bar{G}$, where G is goverment spending and $\bar{G}$ is a positive constant

Money markets:

- $M^d = (m_0 + m_1 Y - m_2 i)P$, where M^d is money demand, P is the price level, m_0, m_1, m_2 are positive constants.
- M^s is money supply.

1. Combine the goods market equations to derive an expression for Y as a function of i. That is to say, derive the IS curve. Give the definition of the IS relation.
2. Use the money market equations to express i as a function of Y. That is to say, derive the LM curve. Given intuition for why the LM curve slopes upward or downward. That is to say, first justify slope is upward or downward, then explain in words to give intuition.
3. Graph the IS and the LM curves on the same graph, putting i on the vertical axis and labeling the curves. Label the equilibrium interest rate and output, i_0 and Y_0, respectively.
4. Suppose the government increases its spending by $\Delta\bar{G}$. Which curve will shift, if any? Calculate by how much it will shift and draw a diagram that shows the impact of this policy.
5. What will happen to invetment as a result of he government policy described in last question? (You do not need to calculate anything, just give intuition.)(Warning: No change of monetary policy!)
6. Suppose that the government decides to cut taxes instead of increasing spending. Analyze the effects of this expansionary fiscal policy using a diagram. (You do not need to calculate anything, just draw the graph.)
7. Using the IS-LM model, explain what can be done to offset the changes in the interest rate caused by increased government spending and, at the same time, keep output from declining. That is to say, suggest a way to bring the interest rate back to the level it was at before the policy in question 4 took place without causing a reduction in output.

8. From now, suppose you are the chair of central bank of Magistere. How will you raise the interest rate? (Explain clearly and concisely. No more than three sentences.)

9. After you raised the interest rate, what happens to the price of bonds? Why? (No more than three sentences.)

10. If lowering output is your main objective when the interest rate increases, can fiscal policy achieve the same objective? How? (No more than four sentences.)

Questions about AS-AD:

11. Derive the expression for aggregate demand using the above equations. Is the AD curve upward- or downward-sloping?

12. Show mathematically that output Y, is an increasing function of the real money stock, M/P, and an increasing function of government spending, $\bar{G}$.

13. Let $c_0 = 200$, $c_1 = 0.5$, $b_0 = 300$, $b_1 = 0.4$, $m_0 = 400$, $m_1 = 1$, $m_2 = 0.8$, $M^s = 200$, $\bar{G} = 100$, $t = 0$. Derive the AD equation using these numbers.

Question III: The Philips Curve Suppose the Philips curve is given by

$$\pi_t = \pi_t^e + 0.2 - 5u_t,$$

where $\pi_t^e = \theta\pi_{t-1}$

1. What is the natural rate of unemployment in this economy?

2. For now assume that $\theta = 0$. What does that mean? Suppose that the government decides to lower unemployment to 3% and keep it there forever. What is the rate of inflation for $t = 100$? Is this realistic? Why?

3. Assume that only for the first three periods ($t = 1, t = 2, t = 3$) people form their expectations using $\theta = 0$. After the third period, from $t = 4$ on, they start using $\theta = 1$ forever. Also, the government still wants to keep unemployment at 3%. What is the rate of inflation for $t = 4, 5$, and 6? What is the expected rate of inflation for t =4,5, and 6? Is this setup more realistic? Why?