MIDTERM 2

Name ________________________________________ Student ID ______________

Instructions:
The exam consists of three parts: (1) 10 multiple choice questions; (2) two problems; and (3) one graphical question. Please answer all questions in the space provided in this exam. You may use scratch paper but do not turn it in as it will not be graded. Please budget your time appropriately. Good Luck!

Multiple Choice [30 points – 3 points each]

Place your multiple-choice answers here

1. In the Keynesian-cross model, a decrease in the interest rate _________ planned investment spending and ___________ the equilibrium level of income.
   A) increases; increases
   B) increases; decreases
   C) decreases; decreases
   D) decreases; increases

2. The assumption of constant velocity is equivalent to assuming that the demand for real money balances depends on:
   A) income alone.
   B) the interest rate alone.
   C) income and interest rates.
   D) people economizing on real balances as the interest rate rises.

3. The intersection of the IS and LM curves determines the values of:
   A) \( r, Y, \) and \( P \), given \( G, T, \) and \( M \).
   B) \( r, Y, \) and \( M \), given \( G, T, \) and \( P \).
   C) \( r \) and \( Y \), given \( G, T, M, \) and \( P \).
   D) \( p \) and \( Y \), given \( G, T, \) and \( M \).

4. If the LM curve is vertical and government spending rises by \( G \), in the IS-LM analysis, then equilibrium income rises by:
   A) \( G/(1 – MPC) \).
   B) more than zero but less than \( G/(1 – MPC) \).
   C) \( G \).
   D) zero.

5. If \( MPC = 0.75 \) (and there are no income taxes) when \( G \) increases by 100, then the IS curve for
any given interest rate shifts to the right by:
A) 100.
B) 200.
C) 300.
D) 400.

6. The slope of the IS curve depends on:
A) the interest sensitivity of investment and the amount of government spending.
B) the interest sensitivity of investment and the marginal propensity to consume.
C) the interest sensitivity of investment and the tax rates.
D) tax rates and government spending.

7. The LM curve is steeper the ________ the interest sensitivity of money demand and the ________ the effect of income on money demand.
A) greater; greater
B) greater; smaller
C) smaller; smaller
D) smaller; greater

8. Other things equal, a given change in government spending has a larger effect on demand the:
A) flatter the IS curve.
B) steeper the IS curve.
C) larger the interest sensitivity of expenditure demand.
D) smaller the interest sensitivity of money demand.

9. The rational-expectations point of view, in the most extreme case, holds that if policymakers are credibly committed to reducing inflation, and rational people understand that commitment and quickly lower their inflation expectations, then the sacrifice ratio will be approximately:
A) 5.
B) 2.8.
C) 1.
D) 0.

10. In the Keynesian-cross model, if government purchases increase by 250, then the equilibrium level of income:
A) increases by 250.
B) increases by more than 250.
C) decreases by 250.
D) increases, but by less than 250.
Analytical Questions [50 points]
Please answer in the space provided. Point breakdown indicated in brackets.

11. [36 points total] Assume that an economy is described by the IS curve \( Y = 3,600 + 3G - 2T - 150r \) and the LM curve \( Y = 2M/P + 100r \) [or \( r = 0.01Y - 0.02(M/P) \)]. The investment function for this economy is \( I = 1,000 - 50r \). The consumption function is \( C = 200 + (2/3)(Y - T) \). Long-run equilibrium output for this economy is 4,000. The price level is 1.0 and \( M = 1,200 \).

A) Assume that government spending is fixed at 1,200. The government wants to achieve a level of investment equal to 900 and also achieve \( Y = 4,000 \).

(i) [3 points] What level of \( r \) is needed for \( I = 900 \)? (Hint: the solution is already in actual percentage terms)

From the investment function, \( 900 = 1,000 - 50r \). Hence, \( r = 2 \).

(ii) [7 points] What levels of \( T \) and \( M \) must be set to achieve the two goals of \( Y = 4,000 \) and \( I = 900 \)?

From the IS curve

\[
4,000 = 3,600 + 3\times1,200 - 2T - 150\times2
\]

\[
2,900 = 2T
\]

\[
T = 1,450
\]

From the LM curve

\[
4,000 = 2M + 200
\]

\[
M = 1,900
\]

(iii) [5 points] What will be the levels of private saving, public saving, and national saving?

Private Saving:

Disposable income is \( Y-T \) or \( 4,000 - 1,450 = 2,550 \)

Consumption is given by the consumption function: \( C = 200 + 2/3\times2,550 \)

Hence private savings are the difference between disposable income and consumption
\[ S_{\text{private}} = 2,550 - 200 - 2/3 \times 2,550 = 650 \]

Public Saving:
\[ S_{\text{public}} = T - G = 1,450 - 1,200 = 250 \]

National Saving:
\[ S = S_{\text{private}} + S_{\text{public}} = 650 + 250 = 900 \]

B) Now assume that the government wants to cut taxes to 1,000.

(i) [7 points] With \( G \) set at 1,200, what will the interest rate be at \( Y = 4,000 \) and what will the value of \( M \) be?

From the IS equation
\[ 4,000 = 3,600 + 3 \times 1,200 - 2 \times 1,000 - 150r \]
\[ 150r = 1,200 \]
\[ r = 8 \]

From the LM equation
\[ 4,000 = 2 \times M + 100 \times 8 \]
\[ 3,200 = 2 \times M \]
\[ M = 1,600 \]

(iii) [3 points] What will \( I \) be?

From the investment function, \( I = 1,000 - 50 \times 8 = 600 \)

(iv) [5 points] What will be the levels of private, public, and national saving? \( \text{(Hint: Check } C + I + G = Y. \text{)} \)

\[ S_{\text{private}} = (Y - T) - C = (4,000 - 1,000) - (200 + 2/3 \times (4,000 - 1,000)) = 800 \]
\[ S_{\text{public}} = T - G = 1,000 - 1,200 = -200 \]
\[ S_{\text{national}} = 800 - 200 = 600 \]
C) [6 points, 2 each] Answer the following questions with an A or a B only, according to whether the policies described in parts A) or B) are best described as:

(i) tight fiscal, loose money?  A

(ii) loose fiscal, tight money?  B

(iii) Which "policy mix" most encourages investment?  A

12. [14 points total] Assume that in a certain economy the LM curve is given by $Y = 2,000r - 2,000 + 2(M/P) + u$, where $u$ is a shock that is equal to $+200$ half the time and $-200$ half the time, and the IS curve is given by $Y = 8,000 - 2,000r$. The price level ($P$) is fixed at 1.0. The natural rate of output is 4,000. The government wants to keep output as close as possible to 4,000 and does not care about anything else. Consider the following two policy rules:

i. Set the money supply $M$ equal to 1,000 and keep it there.

ii. Manipulate $M$ from day to day to keep the interest rate constant at 2 percent.

A) [6 points] Under rule i, what will $Y$ be when $u = +200$? Under rule i, what will $Y$ be when $u = -200$?

In equilibrium, the IS = LM. Notice that the IS can be expressed as $(8,000 - Y)/2,000 = r$. Plugging this into the LM

$$Y = 2000 \times (8,000 - Y)/2,000 - 2,000 + 2,000 + u$$

$$Y = 4,000 + u/2$$

Hence, if $u = 200$, $Y = 4,100$, if $u = -200$, $Y = 3,900$

B) [6 points] Under rule ii, what will $Y$ be when $u = +200$? Under rule ii, what will $Y$ be when $u = -200$?

Under this rule, $r = 2$ constantly so from the IS equation we now $Y = 4,000$ always.

C) [2 points] Which rule will keep output closer to 4,000?

Clearly policy ii
Graphical Question [20 points total, 5 extra]

The following two figures are based on U.S. quarterly data from 1992-I to 2003-IV.

**Figure 1**

Government Expenditures and Investment as a percent of GDP

![Graph showing the relationship between G/Y Ratio and I/Y Ratio](image1)

**Figure 2**

Investment to GDP ratio in percent as a function of the 1 year interest rate

![Graph showing the relationship between Interest Rate and I/Y ratio](image2)
Answer the following questions based on figures 1 and 2.

A) [10 points] What is the magnitude of the “crowding-out” effect? 1.4622 (Hint: how much does the investment to GDP ratio decline for a 1% increase in the Government expenditures to GDP (G/Y) ratio?)

B) [10 points] Suppose the ratio G/Y increases by 1%. Given your answer in part A), and figure 2, how much do you expect interest rates will increase by?

A 1% increase in G/Y reduces I/Y by 1.4622%. From the slope of the investment function in figure 2, a change in interest rates by 1% increases investment by 0.4076. Hence the resulting decrease in interest rates is $1.4622/0.4076 = 3.59$. Note that the investment function goes against all economic intuition. I should have paid more attention here because the investment function depends positively on interest rates. This is what the data suggest but there are good empirical reasons why one may obtain this odd result (you should take econometrics to find out what those are!).

C) [5 extra points] Given that the marginal propensity to consume in the U.S averages to 0.9 with historical data and assuming that the investment function is well described by the linear relationship in figure 2, what is the government expenditures multiplier from the implied IS curve?

This is a very simple question once you realize that since I make no mention of how monetary policy sets interest rates, all you can really answer is the usual $1/(1 – MPC)$ which in this case is $1/(1-0.9) = 10$. 