Part I. Material Since the Second Midterm (66 points total; 56 minutes total)

Question 1 (15 points total; 13 minutes total)

A. (10 points) Explain why the monetary policy reaction function (MPRF) slopes up. That is, explain why an increase in π is followed by an increase in u. Equations alone are insufficient. "Explain" means use words to tell the story.

B. (5 points) Suppose the central bank has the Taylor Rule we used in the textbook in which only inflation (and not unemployment) is relevant. Suppose further that the central bank decides it will fight inflation somewhat aggressively when $\pi > 4$ percent, but that it will not fight inflation at all when $\pi < 4$ percent. Draw the MPRF. Briefly explain why you drew it the way you did.

Question 2 (11 points total; 9 minutes total)

A. (6 points) Explain why the Phillips curve slopes down. That is, explain why a decrease in u is followed by an increase in π. Equations alone are insufficient. "Explain" means use words to tell the story.

B. (5 points) Akerlof, Dickens and Perry (1996, full citation will be posted on Piazza) proposed that "social norms" are relevant to the Phillips curve. In particular, they argued there are social norms that stop firms from cutting wages because of a shared societal belief that it is unfair to workers to cut their wages. When unemployment is so high that there would usually be wage deflation (that is, %Δwages < 0, wages tomorrow < wages today, pay cuts), social norms prevent employers from actually cutting wages.

   Let uH be the unemployment rate at which there would usually be wage deflation in the absence of these social norms. Draw the Phillips curve that incorporates these social norms. Briefly explain why you drew it the way you did.

Question 3 (20 points total; 17 minutes total)

Suppose the economy can be described by the following. Units are billions of $ per year.

$$MPRF: u = 0.05 + 4(\pi - 0.03) \qquad\qquad PC: \pi = 0.03 - 0.5(u - 0.05)$$

A. (10 points) Suppose expectations are static. What are the equilibrium values of the inflation rate and the unemployment rate? Show all your work. Put a box around your answers. (If you need scratch paper, use the inside cover of the exam.)

B. (4 points) Based on the equations in the prompt, what are the values of each of the following?

   u^* _____ u_o _____ π^e _____ π^t _____

C. (6 points) Suppose instead that expectations are the very strong form of rational expectations ("crystal ball expectations"). If aggregate demand falls, will the new equilibrium unemployment rate be greater than, the same as, or less than the value you found in part A? Will the new equilibrium inflation rate be greater than, the same as, or less than the value you found in part A? Defend your answers.

Question 4 (20 points total; 17 minutes total)

At a conference on May 3 at Stanford (links will be posted in Piazza), macroeconomists and Federal Reserve Bank presidents debated what strategy the Fed should pursue if the Fed's targets for nominal interest rates – the interest paid on excess reserves (IOER) and the federal funds rate (FFR) – hit the zero lower bound (ZLB) the next time a recession hits. This is the sort of worry that keeps central bankers up at night.

A. (4 points) What does it mean for the FFR or the IOER to "hit the zero lower bound"?

B. (6 points) One concern expressed is that the "natural rate of interest" (what we labeled r_o in our Taylor rule, but central bankers routinely refer to as r*) has fallen over the last 25 years. Calculate the nominal rates of interest in each line below. Then discuss why a fall in the natural rate of interest, r*, makes it more likely that the central bank will hit the ZLB in the next recession.

   If r* = 3% and π^e = 2 percent, then the nominal rate of interest =

   If r* = 1% and π^e = 2 percent, then the nominal rate of interest =

C. (5 points) Why does the ZLB "interfere with the central banks ability to offset negative aggregate demand shocks to the economy"? (Quote is from a paper by FRB-NY President (and Cal alum!) John Williams, link will be posted in Piazza.)

D. (5 points) Williams (link will be posted in Piazza) suggests the Fed should increase π^e by announcing a higher inflation target during boom periods. Why would increasing inflationary expectations be helpful to the Fed's monetary policy efforts when they face the ZLB?

Part II. Material From the Entire Course (74 points total; 64 minutes total)

Question 5 (24 points total; 21 minutes total)

A. (6 points) Explain the connection between long-term interest rates and the long-run flexible price model. Your explanation should include a clear definition of "long term interest rate."

B. (3 points) Define each of the three types of expectations: static, adaptive, and rational. Equations or words or both are acceptable.

C. (5 points) What type of expectations are relevant to long-term interest rates: static, adaptive, or rational? Defend your answer.

D. (10 points) The day after Pres. Trump was surprisingly elected in 2016, the US Treasuries yield curve got steeper. There was no change in short-term interest rates. Trump's election surprised everyone. Trump, unlike his opponent Secretary Clinton, had promised a big tax cut. Why did the surprise election of a candidate who promised a big cut in taxes cause the yield curve to get steeper, even though it would be a full year before the tax cut bill was written, voted on, signed into law, and implemented? Would the effect on the yield curve have been the same if Trump's election had been widely anticipated, rather than the surprise it was? Explain.

Question 6 (13 points total; 11 minutes total)

Suppose the economy can be defined by the following. Units are billions of $ per year.

s = 24 %	g = 2 %	$\alpha = 1/3$
n = 1 %	$\delta = 3$ %	E = 1,000

A. (9 points) In BGE, what are the values of K/Y, Y/L, and K/L? You must write down the formulas you are using, then plug in the values, then simplify – or no credit. If you cannot complete the math without a calculator, go as far as you can to receive the most partial credit. Please put a box around each answer.

B. (4 points) In balanced growth equilibrium in this economy, what is the value of the annual rate of growth of output per worker? In one sentence (which can be brief), tell us how you know that's the answer.

Question 7 (12 points total; 10 minutes total)

A. (6 points) Suggest one policy that will increase efficiency (E) or the growth rate of efficiency (g(E) = g). Tell us whether you think your policy will increase efficiency but not produce a permanent change in g, or whether it will produce a permanent change in g. Defend your answer.

B. (6 points) We know that in balanced growth equilibrium, the growth rate of the standard of living equals the growth rate of efficiency. Why then do policies designed to increase the standard of living often involve increases in the saving rate even if increasing the saving rate has no effect on E or g(E)?

Question 8 (15 points total; 13 minutes total)

The investment equation we typically used in Econ 100B is $I = I_0 - I_r r$

A. (5 points) Define "investment spending." What common mistake do many people make when listing the types of purchases included in "investment"?

B. (10 points) Discuss where in the investment equation is the role for expectations. Be sure your discussion makes clear *whose* expectations. And, expectations of *what*?

Question 9 (10 points; 9 minutes)

John Maynard Keynes famously wrote, "In the long run, we are all dead." The full quote, with a bit more context, is:

> But this long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task, if in tempestuous seasons they can only tell us, that when the storm is long past, the ocean is flat again. (Source: Keynes, *A Tract on Monetary Reform* (1923), Chapter 3.)

(Tempestuous means "very stormy.") Why do we study the long run in macro if "in the long run, we are all dead"?

The Comprehensive Essay Question

Due date: Thursday, May 9, 8:00 a.m. Submit via bCourses, assignments tab. **No late submissions.**
10-11-12 pt font; <u>double spaced</u>; pages numbered; 1,000 words max.
Use "quote marks" as appropriate. Cite your sources.
Works cited page & data charts not included in 1,000 word maximum.
Your name, SID, GSI's name, & word count on first page
Acceptable file types: .doc, .docx, .pdf, .rtf

Congratulations! You are a finalist for a research assistant (RA) position with a well-known macroeconomist at a prestigious research university. As part of the final round, she asks that you write an essay consisting of two parts. Part I is an analysis of the likely effects – both long run and short run – of additional personal income tax reductions in today's U.S. economy. In Part II, she wants you to suggest three research questions that are a logical extension of your analysis, and defend why those are interesting questions.

She provides you with this helpful paragraph

A research question should be specific ("what causes inflation?" is way too broad, not at all specific), and it should be answerable ("what will X be in the future?" is not answerable because we don't have psychic powers to see into the future). Economics is an empirical science, which means its research questions are answered with data. We gain insight into how the economy works by studying what has happened, using existing data. Some questions are interesting because they get at some part of a big question. For example, Berkeley PhD Carola Conces Binder asks a specific question (do gas prices affect people's inflationary expectations?, https://www.ssrn.com/abstract=3267721) that is answerable with data, and it's an interesting question because it relates to the bigger questions of how do people form expectations and how do our inflationary expectations affect the inflation rate.

So you sit down to plan out your essay. She has said "1,000 words maximum" and because you *really* want this RA position, you definitely will stay within the word limit. You plan to supplement what you write with some data which you plan to get from Fred. You are grateful that in your intermediate macro class you learned about the rules of logic that underlie the development of research questions, since new questions can almost always be boiled down to "Ok, but does that conclusion hold if we assume instead . . . "

Here is the beginning of your outline. You look it over and decide it's pretty good so far. You might tweak it a bit here and there, and your next step is to flesh it out, but you definitely want to include at least all of what's in your outline so far.

- Start by summarizing the current condition of the U.S. economy because the effect of a cut in personal income taxes depends in part on whether or not the economy is currently near full employment.
- Explain why and how another personal income tax cut would affect the economy
  - The very long run effect on the standard of living
  - The long run effect on interest rates
  - The short run effect on unemployment and inflation
    - Discuss monetary policy here, whether the Fed will take a dovish or hawkish response, and why that matters
- Research questions (3).
  - One paragraph each, with the question, what sort of data might be useful in answering the question, and why the question is interesting (how it relates to the big questions of macro).

And all in 1,000 words.