G022 MSc Core Macroeconomics

You have THREE HOURS. Answer ALL questions in Part A. Answer ONE question in Part B. Part A and Part B carry equal weight.

In cases where a student answers more questions than requested by the examination rubric, the policy of the Economics Department is that the student's first set of answers up to the required number will be the ones that count (not the best answers). All remaining answers will be ignored.

PART A

Question A.1

Be concise in your answers to the following two short questions. Irrelevant material will be penalized.

1. *Briefty* (one paragraph) comment on the following statement as either True, False, or Uncertain:

The success of the standard real business cycles model (Kydland and Prescott, 1982) is that it can qualitatively and quantitatively account for the fact that in the U.S. economy (1) hours worked fluctuate considerably more than productivity and (2) the correlation between hours worked and productivity is roughly zero.

2. One of your classmates makes the following statement: "What I am really interested in is important issues in economics, such as optimal unemployment insurance. I therefore see no reason to waste my time learning about asset pricing." *Briefly* (one paragraph) make a case to this student that there is information contained in asset prices that he may be interested in.

TURN OVER

Question A.2

Consider the following two-period economy. The representative household has preferences over consumption in the two periods defined by

$$U = \log c_1 + \beta \log c_2.$$

In period one the representative household has initial endowment y_1 . Households can build up assets a, which are claims to physical capital. They supply labour ℓ to firms at real wage w which is paid at the beginning of period 2, subject to $0 \le \ell \le 1$. The budget constraint for the household is given by

$$c_1 + a \leq y_1$$

$$c_2 \leq (1+r)a + w\ell.$$

Firms rent physical capital K from households at interest rate r and employ labour L at real wage w. K and L denote capital and labour demanded by firms. Capital depreciates at rate δ . Output in period two is given by the aggregate production technology:

$$f(K,L) - (1-\delta)K = \theta K^{\alpha} L^{1-\alpha} + (1-\delta)K.$$

- 1. Define a competitive equilibrium in this economy.
- 2. Assume now that $\delta = 1$. Solve for the competitive equilibrium.
- 3. How would an exogenous increase in the technology parameter θ affect the interest rate? How would it affect asset holdings, consumption in period one and consumption in period two? Explain.

CONTINUED

Question A.3

Consider the following problem which is meant to represent habit persistence in consumption. A consumer chooses a sequence of consumption c_t to maximize

$$\sum_{t=0}^{\infty} \beta^t \log(c_t c_{t-1}^{\gamma}), \qquad 0 < \beta < 1, \qquad \gamma > 0.$$

subject to

$$c_t + k_{t+1} \le Ak_t^{\alpha},$$

 $A > 0,$
 $0 < \alpha < 1,$
 $k_0 > 0,$ and c_{-1} given,

where k_t is the capital stock at the beginning of period t.

- 1. How does the level of consumption in period t-1 affect the marginal utility of consumption in period t?
- 2. Let $V(k_0, c_{-1})$ be the value of $\sum_{t=0}^{\infty} \beta^t \log(c_t c_{t-1}^{\gamma})$ for a consumer who begins time 0 with capital stock k_0 and lagged consumption c_{-1} and behaves optimally. Write Bellman's equation in $V(k_t, c_{t-1})$.
- 3. Verify that the Bellman equation has the form

$$V(k_t, c_{t-1}) = E + F \log k_t + G \log c_{t-1}$$

and that the optimal policy is of the form

$$\log k_{t+1} = I + H \log k_t$$

where E, F, G, I, and H are constants. You do not have to find explicit formulas for these constants.

4. Why doesn't the optimal policy function depend on last period's consumption?

TURN OVER

PART B

Question B.1

- 1. Briefly describe the main features of the Sidrauski-Brock model of a monetary economy with a representative agent with special reference to
 - (a) The derivation of the demand function for money from the first-order condition for utility maximisation.
 - (b) The determination of the steady-state values of real and nominal variables.
- 2. In the context of the Sidrauski-Brock model, explain what is meant by the long-run superneutrality of money. Carefully explain how and why long-run superneutrality may be violated by allowing
 - (a) Real money balances as an argument of the production function.
 - (b) Leisure as an argument of the utility function.
- 3. What are the implications of non-superneutrality for monetary policy?

CONTINUED

Question B.2

A monetary policy maker can be modelled as minimising a loss function

$$L = \lambda (y - k)^2 + \pi^2$$

subject to a Phillips curve

$$y = a(\pi - \pi^e) + \varepsilon$$

where λ , k, and a are positive constants.

- 1. Define y, π , and ε and carefully explain the economic intuition behind each of the equations.
- 2. What is meant by policy under discretion? Derive expressions for output, inflation and welfare given that the monetary policy maker chooses the optimal policy under discretion.
- 3. Show that if commitment is possible welfare is improved.
- 4. Explain why achieving the commitment solution might be difficult in practice. Show that a suitably-chosen "conservative central banker" can achieve improvements in welfare over the discretion case. Are there any costs to appointing a conservative central banker?
- 5. How do governments attempt to achieve the commitment solution in practice? Your answer should refer to the monetary policy arrangements of at least one country.

END OF EXAM