ECONOMICS 202B

MIDTERM EXAMINATION

There are two parts. Part A counts for 30 points; Part B counts for 50 points.

Section A. Multiple choice (30 points)

In your blue book, give the <u>best</u> answer to <u>10 of the following 11</u> questions.

Note:
   – If you wish, you may add a brief explanation of your answer to <u>AT MOST TWO</u> questions. In that case, your grade on that question will be based on your answer and explanation together. This means that an explanation can either raise or lower a grade.
   – If you answer all 11 questions, your overall score will be based on your average, not on your 10 best scores.

1. Consider a household maximizing $\sum_{t=0}^{T} U(C_t)/(1 + \rho)^t$, $U'(\bullet) > 0$, $U''(\bullet) < 0$, subject to $\sum_{t=0}^{T} C_t/(1 + r)^t \leq A_0 + \sum_{t=0}^{T} W_t/(1 + r)^t$. The Euler equation relating C_t and C_{t+1} for this problem is:
   A. $\dot{C}(t)/C(t) = (r - \rho)/\theta$.
   B. $U'(C_t) = [(1+ r)/(1+ \rho)]U'(C_{t+1})$.
   C. $U'(C_t)dC_t = (r - \rho)U'(C_{t+1})dC_{t+1}$.
   D. $\lim_{t\to\infty} A_t/(1 + r)^t \geq 0$.

2. In a Ramsey-Cass-Koopmans economy where the initial value of k exceeds its balanced-growth-path value, as the economy moves towards its balanced growth path:
   A. The $\dot{k} = 0$ locus is shifting down and the $\dot{c} = 0$ locus is shifting to the left.
   B. The $\dot{k} = 0$ locus is shifting down and the $\dot{c} = 0$ locus not shifting.
   C. The $\dot{c} = 0$ locus is shifting to the left and the $\dot{k} = 0$ locus is not shifting.
   D. None of the above.

3. Consider an economy that is described by the Diamond overlapping-generations model whose balanced growth path is dynamically inefficient. Then on the balanced growth path:
      A. The marginal product of capital is less than the growth rate of the economy.
      B. A permanent increase in the fraction of labor income saved by the young would permanently raise the economy's growth rate.
      C. The factors of production are not earning their marginal products.
      D. Labor supply is inefficiently high.

4. In the simple model of R&D and growth $(Y(t) = (1-a_L)L(t)A(t)$, $\dot{A}(t) = B[a_L L(t)]^\gamma A(t)^\theta$, $\dot{L}(t) = nL(t))$ with $\theta < 1$, a permanent rise in a_L when the economy is on its balanced growth path:
      A. Permanently raises the growth rate of knowledge (A).
      B. Temporarily raises the growth rate of knowledge.
      C. Can either raise or lower output in the short run, but necessarily raises it in the long run.
      D. None of the above.

5. In Paul Romer's model of endogenous technological change, the allocation of workers between the R&D sector and the goods-producing sector is:
      A. Exogenous.
      B. Determined by a social planner maximizing the lifetime utility of the representative household.
      C. Determined by a social planner maximizing the growth rate of the economy.
      D. Determined by the condition that wages in the R&D sector and the goods-producing sector are equal.

6. Suppose Country A has higher income per worker than Country B because its schools are more successful in teaching that hard work is virtuous, and as a result its workers exert more effort. Hall and Jones's decomposition of cross-country differences in income per person into the contributions of physical capital, human capital, and a residual would:
      A. Attribute this difference in income to human capital.
      B. Attribute this difference in income to the residual.
      C. Attribute fraction α of this difference in income to physical capital and fraction $1-\alpha$ to human capital, where α is physical capital's share.
      D. Attribute fraction α of this difference in income to physical capital and fraction $1-\alpha$ to the residual.

7. "Accounting"-style studies of cross-country income differences suggest that:
    A. Skilled workers typically earn less than their social marginal products.
    B. The elasticity of substitution between human and physical capital is high.
    C. Differences in school quality account for a substantial fraction of cross-country income differences.
    D. Differences in the amount of schooling per worker account for a substantial fraction of cross-country income differences.
    E. All of the above.

8. "Regression"-style studies of cross-country income differences suggest that:
    A. Countries with better social infrastructure have on average higher income per capita.
    B. Countries with higher ratios of real investment to real GDP have on average higher income per capita.
    C. Countries whose workers have more average years of schooling have on average higher income per capita.
    D. All of the above.
    E. None of the above.

9. Consider a cross-country regression of output per person on a measure of social infrastructure.
    A. If the regression is estimated by OLS, it shows the effect of social infrastructure on output per person.
    B. If the regression is estimated by instrumental variables using variables that are not affected by social infrastructure as instruments, it shows the effect of social infrastructure on output per person.
    C. If the regression is estimated by OLS and has a high R^2, this means that there are no important influences on output per person that are omitted from the regression; thus in this case, the coefficient estimate from the regression is likely to be close to the true effect of social infrastructure on output per person.
    D. None of the above.

10. Glaeser, La Porta, Lopez-de-Silanes, and Shleifer argue that:
    A. Higher levels of human capital lead to higher growth by leading to better political outcomes.
    B. A good way to estimate the impact of institutions on growth is to regress growth over some period on a measure of institutional quality, instrumenting for institutional quality using the institutional quality of the country's neighbors.
    C. A good way to estimate the impact of policies on growth is to regress growth over some period on measures of inflation, budget deficits, and exchange-rate volatility over that period.
    D. The experiences of Brazil, Colombia, Hong Kong, Thailand, Uganda, and Zaire show the central role of policies rather than deep institutions in cross-country income differences.

11. According to Auerbach, Furman, and Gale:
    A. The Congressional Budget Office's baseline budget projections suggest that there will be large budget deficits over most of the next decade.
    B. Most of the worsening of the U.S. budget outlook since 2001 is the result of the unexpectedly poor performance of the macroeconomy.
    C. A useful way of thinking about the long-term budget outlook without making explicit long-term forecasts is to look at the projected paths of revenues and spending over the near term neglecting Medicare, Social Security, and government pensions.
    D. An important limitation of conventional budget projections is that they ignore the prescription drug benefit that was recently added to Medicare. Adjusting the projections to incorporate the prescription drug benefits leads to a substantially worse picture of the long-run fiscal outlook.
    E. All of the above.

Section B. Problems (50 points)

Answer <u>all 3</u> questions.

(16 points) 12. Consider the Solow growth model. Find an expression for the elasticity of the balanced-growth-path level of consumption per unit of effective labor with respect to the saving rate. Simplify your expression as much as possible.

(20 points) 13. Consider a Ramsey-Cass-Koopmans economy where capital income is taxed at rate $\bar{\tau}$, $0 < \bar{\tau} < 1$. Thus the after-tax real interest rate households face at time t is $(1-\bar{\tau})f'(k(t))$, and so the equation of motion for c is $\dot{c}(t)/c(t) = [(1-\underline{\tau})f'(k(t)) - \rho - \theta g]/\theta$.

The government makes no purchases, but instead rebates the tax revenues to households in a lump-sum manner. Thus the equation of motion for k is $\dot{k}(t) = y(t) - c(t) - (n+ g)k(t)$.

Let $\bar{c}*$ denote the balanced-growth-path value of c in this economy.

Now suppose the government switches to a policy where the tax rate on capital income depends on c: $\tau(t) = \tau(c(t))$, with $\tau'(c) > 0$, $0 < \tau(c) < 1$ for all c, and $\tau(\bar{c}*) = \bar{\tau}$. The τ a household faces is determined by the economy-wide value of c, not by the household's own value of c. As before, the tax revenues are rebated to households in a lump-sum manner.

a. How, if at all, does this change affect the $\dot{c} = 0$ locus? Explain.

b. How, if at all, does this change affect the $\dot{k} = 0$ locus? Explain.

(14 points) 14. Consider an economy described by the Diamond overlapping-generations model in the special case of logarithmic utility and Cobb-Douglas production. Assume that initially k is above its balanced-growth-path level. Now suppose there is an unexpected, permanent rise in agents' discount rate, ρ.

Sketch the resulting paths of k, and what that path would have been if ρ had not changed. Explain your answer.