Regrade policy: If you would like your test regraded, please submit a written statement to explain why. Your entire test will be regraded, so there is a possibility that points could be lost rather than gained.

Multiple Choice:
1) e 2) c 3) b 4) d 5) a 6) c 7) e 8) a 9) e 10) c

Problem 1: Neoclassical Model
a) \( Y^s = 12 \times 1000^{1/3} \times 1000^{2/3} = 12 \times 1000 = 12,000 \)

\( Y^d = C + I + G = [2000 + 0.6(12,000-2000) - 500r] + [3000 - 500r] + 1200 \)

setting \( Y^s = Y^d \):
\( 12,000 = 12,200 - 1000r \)
so \( r = 0.20 \)

I = 3000 - 500r = 3000 - 500(0.20) = 2900

and C = 2000 + 0.6(12,000-2000) - 500(0.20) = 7900.

sp = Y - T - C = 12,000 - 2000 - 7900 = 2100.

sg = T-G = 2000 - 1200 = 800.

Total saving = sp + sg = 2900.

real wage = MPL = \( 12(2/3) K^{1/3} L^{-1/3} = 8 \)(1000/1000) \(1^{1/3} = 8 \).

Total payments to labor = real wage \times L = 8000.

Labor share = 8000/12,000 = \( \frac{2}{3} \).

b-d) b) rise T c) rise G d) rise L

Y no change no change rise
r fall rise fall
I rise fall rise
C fall fall rise
sp fall rise rise
sg rise fall no change

Explanation for b): We can be certain that consumption falls. Consumption is the only part of demand here that responds to the tax increase: the fall in disposable income tends to lower consumption. Things are complicated somewhat by the fact that consumption is assumed here to respond to the interest rate: a lower rate means it is less costly to get loans to purchase large consumption items like a car. But we know that the fall in interest rates cannot be strong enough to make consumption rise on net. After all, the only reason the interest rate falls in the first place here, is because of the fall in consumption demand: if consumption did not fall, neither would the interest rates. This conclusion can be verified easily enough by doing the math for a case of a tax rise of any amount you want to try.

Problem 2: Solow Growth Theory
a) steady state: \( s f(k^*) = (\delta+n) k^* \) so \( 0.20 \times 10k^{s1/2} = 0.10k^* \) so \( k^{s1/2} = 20 \) and \( k^* = 400 \)

\( y^* = 10k^{s1/2} = 10 \times 20 = 200. \)
c* = (1-s) y* = (1 - 0.20) x  200 = 160

b) golden rule: MPK = δ+n so 5k* \( \text{gold} \) \( \frac{1}{2} \) = 0.10 so \( k* \) \( \text{gold} \) \( \frac{1}{2} \) = 50 and \( k* \) \( \text{gold} \) = 2500. Consumption = \( f(k* \) \( \text{gold} \)) - (δ+n) \( k* \) \( \text{gold} \) = 10(2500) \( \frac{1}{2} \) - (0.10)2500 = 500 - 250 = 250.

Use the steady state condition to find the necessary saving rate:
\[ s f(k*) = (\delta + n) k* \]
so \( s \) \( \text{gold} \) x 10(2500) \( \frac{1}{2} \) = 0.10(2500) so \( s \) \( \text{gold} \) x 500 = 250, so \( s \) \( \text{gold} \) = ½.

A saving rate higher than this is bad, because the extra output you get from a larger capital stock is less than the extra output you need to set aside as investment to maintain this capital stock, so consumption would be lower.

c) i) Ambiguous: A rise in saving raises the capital stock and output. If the saving rate was below the golden rule level, then this will raise consumption. But if the saving rate was above the golden rule level, it will lower consumption.

ii) Fall: A higher population growth rate lowers the steady state consumption level. More output must be set aside to equip new labor force members with capital, so less is left over for consumption.

iii) Fall: A rise in beta lowers the effect that capital has on output. So as you raise capital, the point comes sooner where capital cannot produce enough output and savings to pay for its own replacement after depreciation. This conclusion can be derived mathematically from the steady state condition:
\[
 sf (k) = (\delta + n)k \\
 sA k^{1-\beta} = (\delta + n)k \\
 k^{-\beta} = \frac{\delta + n}{sA} \\
 k* = \left( \frac{sA}{\delta + n} \right)^{\frac{1}{\beta}}
\]
So a rise in beta lowers k*.

(10/17/03)