Examination:	**Macroeconomic Analysis (No. 1428)**
Semester:	**Summer Semester 2005**
Examiner:	**Prof. Dr. Gerhard Schwödiauer**
The following aids may be used:	**None.**

Examination Problems:

1. Assume that for some (closed) economy the capital-output ratio $K_t / Y_t = 2$, the long-run savings rate $s = 0.2$, the rate of depreciation on the capital stock per period $\delta = 0.03$; the rate of growth of effective labor supply $n = 0.02$.
   a) How high is Harrod's warranted rate of growth?
   b) Why is this economy falling off Harrod's knife's edge? What might be the consequences?

2. According to the Solow-model, how does the above economy cope with its dilemma? Which magnitudes are supposed to adjust towards a long-run, steady-state equilibrium? In particular,
   a) formulate the accumulation equation (in discrete time);
   b) assume that $Y_t = K_t^{1/3} N_t^{2/3}$ and determine $k_t = K_t / N_t$ and the corresponding factor prices for the above economy (i. e., for a capital-output ratio of 2);
   c) how big (approximately) is the growth rate of GDP initially and how will it change in the longer run?
   d) How do factor prices and the functional distribution of income change in the medium and in the long run?
   e) Determine the steady-state capital-output ratio and the corresponding warranted rate of growth.

3. Consider an economy with the same production arrangement as in problem 2 but with overlapping generations of optimizing consumers who live for two periods. In her first period the consumer is endowed with one unit of labor time and does not care for leisure. The consumer's intertemporal elasticity of substitution is 1, her subjective rate of time preference is $\rho = 0.04$.
   a) Set up the equation which describes the dynamics of k_t and calculate the steady-state capital-labor ratio.
   b) Check whether the equilibrium is dynamically efficient.

4. Consider an economy with N identical consumers maximizing

$$\int_0^{\infty} e^{-\rho t} [c(t)]^{\beta}, \quad \rho > 0, \beta < 1, \beta \neq 0,$$

subject to their budget constraint. Each is endowed with 1 unit of labor and owns an equal share in the capital stock. The consumers own the physical capital which they lease to the firms. The firms, whose technology is of the Cobb-Douglas type, maximize their profit and hire capital and labor services at market-clearing prices. Physical capital depreciates at a constant rate δ. Population N is constant and there is no technical progress.

a) Set up the differential equations which describe the perfect-foresight intertemporal equilibrium, and sketch the phase diagram.

b) Calculate the steady-state capital stock per person for the following parameter values: $\rho = 0.02$, $\beta = -1$, $\delta = 0.10$, capital share $\alpha = \frac{1}{3}$.

c) Sketch geometrically the impact, medium- and long-run effects of an increase in the impatience parameter ρ.

d) Assume that the government taxes private consumption at a rate $\tau > 0$ in order to finance public consumption $G = \tau Nc$. How does this change the dynamic equations? What are the impact, medium- and long-run effects of a permanent cut in the tax rate (and the corresponding public consumption)? Sketch geometrically!

– End of text. Good luck! –