

**NAME:**

**ECON 603**  
**Macroeconomic Theory**  
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**Midterm**

**1. (50 points)** Suppose that utility function  $U$  of a representative agent is  $U = C^\alpha l^{1-\alpha}$ , where  $C$  is consumption of physical goods and  $l$  is consumption of leisure. Suppose that production technology is represented by  $Y = A\bar{K}^\beta N^{1-\beta}$  where  $A$  is productivity parameter,  $\bar{K}$  is a given amount of physical capital stock, and  $N$  is labor stock. We assume that  $h = l + N$ ,  $w$  is the real wage, and  $\pi$  is real profit. There is no government in the economy. Find the optimal values of  $C$ ,  $l$ ,  $N$ ,  $w$ ,  $Y$ , and  $U$  under the competitive equilibrium (market solution).

**2. (50 points)** Suppose that there is a representative consumer, who lives two periods, the current period and the future period. We further assume that the income of the representative consumer is given (exogenous), that is, we have a partial equilibrium setting. We assume that representative consumer has the following utility function:

$$U = U(C_1, C_2) = U(C_1) + \frac{1}{1 + \rho} U(C_2)$$

where  $C_1$  be a consumer's real consumption in the current period,  $C_2$  be real consumption in the future period and  $\rho$  is called the subjective rate of discount. We assume that utility function is defined as

$$U(C) = \frac{C^{1-\theta} - 1}{1 - \theta}$$

Show that  $C_1$  and  $C_2$  are function of wealth.