Problem 1 *Consider the optimal unemployment insurance with asymmetric information we analyzed in class. Set up the problem with the following extensions. You do not need to characterize the solution yet it would be a good exercise to do so. Feel free to introduce any extensions you like.*

1. The agent can borrow at a fixed rate

2. The agent is asked to pay for the insurance cost once employed and the tax might depend on the duration of unemployment

3. From time to time government forgets your previous actions and outcomes (that is the length of your unemployment period) and treats you as a new person.

4. There is a certain probability of loosing a job every period and going back to unemployment and it does not depend on, on the job effort.

5. Same as previous case but probability of loosing the job depends on the effort you provide during employment

As an exercise (you are not required to turn it in) also show that c_t is decreasing and a_t is increasing over time in the efficient unemployment insurance scheme.

Problem 2 *(Not required to turn in)Consider the model with one-sided lack of commitment, the value of the contract to the risk neutral agent with commitment is $P(V)$ if she promised V to the risk averse agent.*

$$P(V) = \max_{\{c_s,\omega_s\}_{s=1}^S} \sum_s \Pi_s[(y_s - c_s) + \beta P(\omega_s)] \tag{1}$$

subject to

$$u(c_s) + \beta\omega_s \geq u(y_s) + \beta V^A \quad \forall s \tag{2}$$

$$\sum_s \Pi_s[u(c_s) + \beta\omega_s] \geq V \tag{3}$$

Calculate the maximum value of promised utility that the agent with commitment technology will ever promise to the other.

Problem 3 *With a usual strictly concave utility function, show that the cheapest way to deliver a promised level of utility is to provide it in the form of a constant consumption stream.*