

Environment and technical change in endogenous growth theory

- The exam lasts 90 minutes.
- The total value of the exam is 100 points. The value of each question and subquestion is given in brackets before the question.
- You cannot use any lectures material during the exam. You can use pens, pencils, simple calculators and dictionaries of foreign words.
- Please, write in complete sentences and in readable manner. The unreadable text and formulas will not be evaluated.
- As an answer you can use formal derivations or plain words, both are evaluated equally.
- You can use the space provided under each question for the answer as well as back sides of pages. Any additional pages used for auxiliary calculations and etc. *will not be counted* as an answer during evaluation.

THIS IS TEST VERSION; EXAM TAKES PLACE
30.05.2018 IN S14, 14.30-16.00,
QUESTIONS MAY (AND WILL) DIFFER

1. Technical change in neoclassical growth theory

(15 points)

- (a) (5 points) What types of technical change can be accounted for in neoclassical theory? (Factor neutrality)
- (b) (10 points) What is the impact of technology on growth rates, production and consumption in neoclassical growth framework?

2. Environment in 1st generation endogenous growth models

(15 points)

- (a) (5 points) Describe the concept of Coase's theorem. What are the consequences if it holds? What are the arguments pro and contra its application in Environmental Economics?
- (b) (15 points) Describe the basic setup of the model Keeler, Spence, Zeckhauser (1972). Which specifications of pollution are discussed? What is the difference between the golden age and murky age equilibria?

3. Endogenous growth framework

(20 points)

- (a) (10 points) Describe the taste for variety concept. Where it originated and how is it employed in the New Growth Theory?
- (b) (10 points) What are other endogenous sources of growth as used in the literature? How their impact differs?

4. Ways to model environment

(30 points)

- (a) (10 points) How environment is represented in growth models (describe at least two ways)
- (b) (10 points) How the interaction of environment and economy is realised? (Feedbacks, welfare..)

5. Knowledge creation mechanics

(20 points)

- (a) (10 points) Describe the non-rival knowledge creation in endogenous growth theory. What is the role of patents?
- (b) (10 points) What is the role of rival knowledge creation? What is the role of creative destruction in such an economy?

**6. Optimal control of the exhaustible resource:
Dasgupta&Heal (1974)**

(10 points)

- (a) (5 points) Describe the basic setup of the model formally. What is the role of the resource?
- (b) (5 points) Describe the optimal depletion program. Is ongoing growth possible? If not, why? How it can be achieved by appropriate modification of the model?