

Remark: The exam consists of four questions and all questions have to be answered. Total available time is 120 minutes. A dictionary as well as a calculator (fulfilling the requirements of the examination office) can be used.

Question 1 (30 points)

Please answer the following questions:

- a) Consider an economy with two firms. Each firm produces one specific (private) good with two input factors capital and labour. Which condition must hold for production efficiency?
- b) Consider two households which benefit from consumption of these two goods. Show graphically how exchange efficiency in the sense of Pareto is achieved. Explain your graphical procedure (very) shortly. Which condition must hold for exchange efficiency?
- c) Show graphically how a general equilibrium (product mix efficiency) is achieved. Explain your graphical procedure (very) shortly. Which conditions must hold for a general equilibrium?
- d) Mention five possible reasons for a market failure.

Question 2 (30 points)

Please answer the following questions:

- a) Would you expect wages and the employment level in a labour market with a monopoly union setting wages to be efficient? Briefly outline the difference between the monopoly union set up and the right-to-manage framework. If the labour market has a monopolist employer how would you expect the wage and employment level to compare to the perfect competition benchmark?
- b) Name one way in which a tax can lead to increased efficiency. Briefly outline what is meant by an indirect and a direct tax and how this distinction may relate to the ability of agents to shift tax burden. Briefly outline what is meant by the ability-to-pay principle and the benefit principle with regards to taxation.
- c) Briefly outline why a lump-sum tax can be considered non-distortionary. What does the Ramsey rule say about how commodities should be taxed in the absence of lump-sum taxation to minimise excess burden? What does the Corlett-Hague rule suggest for the taxation of commodities that are complements to leisure if leisure can't be taxed directly?

Question 3 (30 points)

A town with 50 residents would like to create a park area. The park would be a pure public good. The park costs 100 Euros per square meter section. Each resident has a marginal willingness to pay of $MWP = 10 - x$, where x denotes the number of sections.

a) A citizen's initiative of 20 people wants to create the park area on its own. How many sections will be created if the members of the initiative contribute according to their willingness to pay?

b) How many sections should be created optimally?

c) Calculate the consumer surplus for questions a) and b).

Question 4 (30 points)

Demand for notebooks is given by $D(p^d) = 400 - 8p^d$, where p^d is the consumer price. The supply function is $S(p^s) = 12p^s$, where p^s is the producer price. The market is perfectly competitive.

a) Find the market equilibrium and calculate consumer surplus, producer surplus, and total welfare.

b) Suppose, the government introduces a quantity tax t on notebooks levied on producers. Derive functions for tax revenues (T), excess burden (EB) and total welfare (TW) depending on t .

c) Suppose, the government sets a tax rate of $t_0 = 30$, which yields tax revenues T_0 , an excess burden EB_0 and total welfare TW_0 . Show that there is a tax rate $t^* \neq t_0$ for which $T^* = T_0$, $EB^* > EB_0$, and $TW^* > TW_0$ all hold.