OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG
FAKULTÄT FÜR WIRTSCHAFTSWISSENSCHAFT

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# *Economics IV/Economic Policy (5026) (11071)*

## *Final Exam – Summer Term 2010*

*Solve the 3 problems below. The bold figures indicate the maximum points per question.*

*The usage of pocket calculators, textbooks, lecture notes or dictionaries is not permitted. Notes on this exercise sheet will be disregarded during the grading. Give answers exclusively in your working sheets; leave a margin of 3cm*

*Undecipherable scribbling will not be graded. Use the terminology and the mathematical tools presented in the lecture and the tutorial; make clear how you derive your results.*

Problem 1 (54 Points)
The inhabitants of a village catch fish in a nearby lake. The annual value (measured in monetary terms) of the catch is given by $V(B)=180B-4B^2$ where B is the number of boats that are used by the inhabitants. The total revenue is distributed evenly among the boats that are used. The marginal cost for operating a boat amounts to 20. Each inhabitant is endowed with enough money to afford one boat.

a) What are the defining properties of the good "fishing ground." Explain the two categories for the classification of goods and give one example for each of the four cases. **(10)**
b) Derive the marginal revenue and the average revenue from fishing. **(4)**
c) Derive the socially optimal number of boats. **(2)**
d) Derive the equilibrium number of boats if access to the lake was unrestricted. **(2)**
e) Explain why the individual profit maximization deviates from the social welfare maximization. **(6)**
f) Show your results of c) and d) in a diagram and determine the dead weight loss graphically. **(12)**
g) Calculate the deadweight loss of the free access situation in comparison with the social optimum. **(8)**
h) Suppose the inhabitants want to ensure an efficient utilization of the lake and decide to sell permits. How many permits will be granted to ensure an optimal number of boats and what will be the maximum revenues of selling these permits. **(6)**
i) Derive the optimal Pigou tax. **(4)**

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Problem 2 (26 Points)
Two car drivers' willingnesses to pay (WTP) for one gallon of gasoline are given by the following inverse demand functions: $p_a= 90 -q$ and $p_b= 90-2q$. Both drivers would have to pay the constant producer price p=30. Each driver contributes according to his gasoline usage to air pollution. The marginal environmental cost of the emission is given by MEC = 1/3q.

a) Derive the aggregate demand for gasoline. **(2)**
b) Derive the equilibrium price and quantity in a unregulated market. **(3)**
c) Derive the socially optimal quantity of gasoline usage **(2)**

Assume the government limits the gasoline usage to a total quantity of q=60. Because the government is not aware of the drivers' individual WTP and only can observe the total emission, each driver is permitted to use the half.

d) Demonstrate in a diagram that this policy is not efficient. **(15)**
e) Derive in the diagram the amount of gasoline usage rights the drivers would like to trade. **(4)**

Problem 3 (40 Points)
A firm produces a good which creates a profit (returns minus factor cost) of 20 (all figures are present monetary values) and a net consumer benefit of 80. As a byproduct, the firm emits dirt onto the adjacent premises which, in the initial scenario, belongs to no one.

a) What is the net welfare generated by this production? (2)
b) A new neighbor moves in who immediately suffers a harm H>0 from the dirt. Discuss briefly who causes this harm. (5)
c) Describe briefly what property rights and transaction cost are. (6)
d) What is the efficient allocation of property rights in b) if H=50? If H=150? (2)
e) The firm could totally avoid the emission by installing a filter which costs K>0.Assume that K=70 or K=120, and that H=50 or H=150. In which scenario(s) is it efficient if
   - the firm uses a filter
   - the household suffers the harm
   - no production takes place? (12)
f) Assume that transaction cost (TAC) for the reallocation of property rights are negligible. Which initial allocation of property rights is efficient in the different scenarios identified in e)? (4)
g) Use an Edgeworth box diagram to explain the invariance and the distribution hypothesis of the Coase theorem. (9)