

Année d'étude : Étudiant cycle ingénieur

Matière : Environmental and energy economics (EV04)

Durée de l'épreuve : 1h30

2 pages

Documents autorisés ou Fournitures autorisées : Calculator

SUJET (S) :

Exercise 1 : Questions (11pts)

1. What is the definition of **willingness to pay** and **willingness to sell**? Why these two notions are important in a context of market analysis? **2pts**
2. What is an **externality**? Give several examples of positive and negative externalities of consumption and production (*At least 4 examples, one for each possibility*) **2pts**
3. Why taxes are socially more preferable than abatement costs? **3pts**
4. What are the different decentralized and centralized tools to fight against environmental problems? Why are they relevant? Quote at least one alternative way to government intervention to decrease pollution level? **4pts**

Exercise 2 : Optimal level of tax (9pts)

Imagine a situation in which a factory rejects effluents and toxic wastes in a lake. We can estimate the damage for each level of emissions. The figures are summarized in the following table :

Emission (in tons/year)	MAC	Total abatement cost	Total bill (\$ /tons)	Marginal damage	Total damage
15	0	0	4950	10000	37520
14	12	12	4620	7000	27520
13	30	42	4290	5600	20520
12	45	87	3960	4900	14920
11	75	162	3630	3100	10020
10	140	302	3300	2700	6920
9	175	477	2970	1700	4220
8	200	677	2640	1110	2520
7	260	937	2310	500	1410
6	300	1237	1980	330	910
5	330	1567	1650	210	580
4	525	2092	1320	170	370
3	800	2892	990	100	200
2	1100	3992	660	80	100
1	2100	6092	330	20	20
0	3750	9842	0	0	0

1. Draw the Marginal Abatement Cost (MAC) and Marginal Damage (MD) curves. ... **1pt**
2. The factory rejects 15 tons/year and government decide to reduce the emissions by a tax implementation. What is the optimal level of emissions and why? Explain for an example level of emission under and another one higher the optimal level. **3pts**

3. At the optimal level of emissions, how many dollars the factory will pay considering all different costs? **1pt**
4. The government hesitates between tax and norms. According to you, why government can prefer tax to norms (or the reverse)? If you consider norms, government decides to fix a threshold function of fines/penalties if the factory does not respect the standard : 0 if you respect the norm and between 0 and 3 tons/year and 1500\$/tons if you exceed 4 tons/year. At the optimal level of emissions, what is the most cost-effective policy between taxes and norms? **4pts**