

國立高雄大學 101 學年度研究所碩士班招生考試試題

科目：個體經濟學
 考試時間：100 分鐘

系所：應用經濟學系
 本科原始成績：100 分

是否使用計算機：否

1. Suppose an acre of farmland can supply up to **TWO** units of rice. Farmers must rent an acre of farmland of \$100/year to enter the rice market. **Note: no cost incurred if farmers supply nothing in the market.** A farmer's total cost is the sum of its rent plus the total of variable cost for all the rice he supplies. Farmers' variable cost is distributed as follows:

Table 1. Distribution of Farmers' Variable Cost/Unit

Variable Cost/unit	Number of Farmers
\$10	2
\$30	2
\$50	2
\$90	2

Suppose that each consumer buy at most **ONE** unit of rice in the market and their willingness to pay is distributed as follows:

Table 2. Distribution of Consumers' Willingness to Pay

Willingness to Pay/unit	Number of Consumers
150	2
120	3
90	4
60	3

1.a. Suppose you are a farmer with variable cost \$30/unit. You have rented an acre of farmland and find that you can supply up to **TWO** unit of rice at a price of \$60, but that at any higher price you would be unable to sell any rice. In order to maximize your profit (or minimize your losses), how many units of rice should you sell? What would be your total profit (or loss)?

1.b. Suppose you are a farmer with variable cost \$30/unit. Let \$P be the unit price at which you expect to sell your rice, and suppose that you believe that you will be able to sell **TWO** units of rice at this price. What is the smallest value of P such that you would be willing to enter the rice market?

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- 1.c. Plot the long run market demand curve and market supply curve.
- 1.d. Suppose that the market price of rice is \$110/unit. How many units of rice will be supplied in the market? How many units of rice will be demanded in the market?
- 1.e. What are the long run market equilibrium price, market equilibrium quantity, consumer surplus, producer surplus, and social welfare?
- 1.f. Suppose that the international rice market price is \$70/unit. Allowing free trade, what are the long run market equilibrium price, market equilibrium quantity, consumer surplus, producer surplus, and social welfare? In this free trade market equilibrium, how many units of rice are imported?
- 1.g. Suppose that the international rice market price is \$70/unit. By collecting a specific tariff of \$15/unit, what are the long run market equilibrium price, market equilibrium quantity, consumer surplus, producer surplus, tariff revenue, and social welfare? In this free trade market equilibrium, how many units of rice are imported?

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2. Facing the problem of air pollution generated by industry, the regulator's goal is to bring about the optimal level of abatement while at the same time minimizing cost to the industry. Environmental toxicologists, engineers, and economists have estimate the benefits society derives from reducing air pollution as follows:

Table 3. Benefits from Reducing Air Pollution

Tons of Pollution Abated	Total Benefit	Marginal Benefit	Tons of Pollution Abated	Total Benefit	Marginal Benefit
1	100	100	11	825	50
2	195	95	12	870	45
3	285	90	13	910	40
4	370	85	14	945	35
5	450	80	15	975	30
6	525	75	16	1000	25
7	595	70	17	1020	20
8	660	65	18	1035	15
9	720	60	19	1045	10
10	775	55	20	1050	5

There are two firms, A and B, each emits 10 units of air pollution each year. The firms' abatement costs are private information of firms as follows:

Table 4. Cost of Abatement

A			B		
Tons of Pollution Abated	Total Cost	Marginal Cost	Tons of Pollution Abated	Total Cost	Marginal Cost
1	3	3	1	5	5
2	9	6	2	15	10
3	18	9	3	30	15
4	30	12	4	50	20

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5	45	15	5	75	25
6	63	18	6	105	30
7	84	21	7	140	35
8	108	24	8	180	40
9	135	27	9	225	45
10	165	30	10	275	50

- 2.a. Suppose that the regulator collects air pollution tax of \$25/ton from both firms. How many tons of air pollution will firm A abate? How many tons of air pollution will firm B abate? What is the social welfare derived from the abatement of air pollution?
- 2.b. What is the optimal tax rate that provides the highest social welfare derived from the abatement of air pollution?
- 2.c. Suppose that the government attempts to use marketable pollution permits to derive achieve the social optimum. Firms are allowed to emit one ton of air pollution for each permit held and are allowed to trade his permits to the other firm in the market. How many air pollution permits should be issued to achieve the social optimum? What would be the equilibrium price of an air pollution permit? At the social optimum, how many tons of air pollution should be abated by firm A and by firm B?

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3. Suppose you are a monopoly movie theatre operator with a constant marginal cost of \$150. Providing consumers' willingness to pay for seeing a movie is distributed as follows:

Table 5. Consumers' Willingness to Pay for Movie

Willingness to Pay	450	400	350	300	250	200
	(A)	(A)	(A)	(B)	(B)	(B)
Number of Consumer	3	5	3	5	3	2

- 3.a. Plot the market demand curve, marginal revenue curve, and marginal cost curve using the information provided.
- 3.b. What are the market equilibrium price, equilibrium quantity, consumer surplus, producer surplus, and social welfare?
- 3.c. Suppose that the government collect a specific tax of \$50/movie from movie theatre operator. What are the market equilibrium price, equilibrium quantity, consumer surplus, producer surplus, tax revenue, and social welfare after tax?
- 3.d. Suppose that the movie theatre operator can divide his customers into two groups, A and B, and maximizes his profit by multi-market price discrimination. What are the market equilibrium prices, equilibrium quantities in market A and in market B? **Note: no tax involved here.**

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4. Two identical firms compete in the market. The relationship between their output level and profit is illustrated as follows:

Table 6. Relationship between Output Level and Profit

		Firm B' Output Level						
		0	1	2	3	4	5	6
Firm A's Output Level	0	0	0	0	0	0	0	0
	1	11	10	9	8	7	6	5
	2	20	18	16	14	12	10	8
	3	27	24	21	18	15	12	9
	4	32	28	24	20	16	12	8
	5	35	30	25	20	15	10	5
	6	36	30	24	18	12	6	0

For example, given firm B produces 2 units of output in the market, firm A will obtain a profit of \$25 if it produces 5 units of output in the market. Similarly, if firm B produces 3 units and firm A produces 4 units of output in the market, firm A will obtain a profit of \$20.

4.1. Suppose that firm A and firm B collude successfully in the market. If firm A and firm B divide the market share equally, how many units should firm A produce?

4.2. Suppose that firm A and firm B choose their output level simultaneously without collusion. How many units should firm A produce under Cournot Nash equilibrium?

4.3. Suppose that firm A (leader) chooses its output level before firm B (follower). How many units should firm A and firm B produce under Stackelberg equilibrium?