ECONOMICS TRIPOS PART I

Monday 13 June 2011 9.00 to 12.00

Paper 1

MICROECONOMICS I

*Answer **ALL SIX** questions from Section A, and **TWO** questions from Section B.*

Section A and B will each carry 50% of the total marks for this paper. Each question within each section will carry equal weight.

STATIONERY REQUIREMENTS	SPECIAL REQUIREMENTS
20 Page booklet x 1	Approved calculators allowed
Rough work pads	
Tags	

You may not start to read the questions printed on the subsequent pages of this question paper until instructed that you may do so by the Invigilator

SECTION A

1 Two players, A and B, play the following game. Each simultaneously chooses an integer between 1 and 3 inclusive. If they choose the same number, the result is a draw; otherwise the player naming the lower number wins. Each player strictly prefers to win than to draw and strictly prefers to draw than to lose. Represent this as a strategic game. Which strategies are weakly or strictly dominated? Is the game dominance solvable?

2 A consumer has preferences over two goods, X and Y, and her utility is given by $U(x, y) = ax^{2/3}y^{1/3}$, where $a > 0$ and x and y are the quantities she consumes of X and Y, respectively. The prices are p_X and p_Y, and her budget is 100. How much of each good does she consume?

3 In a two-good economy with two price-taking agents who have preferences which satisfy the non-satiation assumption, suppose that prices are such that one market clears. Explain why the other must also clear.

4 (a) Describe the following: normal good, inferior good, substitution effect, income effect.

(b) How are these concepts related to that of a Giffen good?

5 'Suppose that two profit-maximizing firms, each with constant marginal costs and zero fixed costs, compete against each other for one period. In Nash equilibrium, the firm with the lower marginal cost will capture the whole market.' Discuss.

6 'A monopolist will always choose a quantity in the elastic section of the demand curve.' Discuss.

SECTION B

7 (a) Under what conditions, and why, is competitive equilibrium Pareto-efficient?

(b) 'It is both undesirable and unnecessary for a government to intervene in markets to correct an unequal distribution of wealth'. Discuss.

8 A consumer lives for 3 years ($t = 1, 2, 3$) and earns 100 pounds at the start of each year. The interest rate is $i = 0.05$. Her utility is given by

$$U(c_1, c_2, c_3) = (c_1)^{1/3}(c_2)^{2/3}$$

where c_t is consumption in period t.

(a) What is the present value of her lifetime income?

(b) How much will she choose to consume in period 3, and why?

(c) Find the optimal values of c_1 and c_2.

(d) Suppose that the interest rate rises to $i = 0.10$. Find the new optimal values of c_1 and c_2. Explain why your results have changed.

(e) How do your answers to (c) and (d) change if utility were instead given by $U(c_1, c_2, c_3) = (c_1)^{2/3}(c_2)^{1/3}$?

9 Consider the following game. There are two players (A and B). First, A chooses either to invest 2 pounds or to invest nothing. If she invests nothing, the game ends and both players have zero payoff. If she does invest, they have 10 pounds to share between them. B chooses either to share this sum equally between them, or to give 1 pound to A and keep the rest for himself. Each player's payoff is equal to the amount of money he or she gains overall.

(a) Represent this as a game in strategic form and find the pure strategy Nash equilibria.

(b) Draw the extensive form and find the pure strategy subgame-perfect equilibria.

(c) Now suppose that the game is changed as follows. If B chooses to give only 1 pound to A, A can either accept the offer or reject it. If she rejects it, the 10 pound sum is no longer available to either of them. Repeat parts (a) and (b) for this new game.

(d) Briefly discuss your results.

10 Consider a monopolist who faces the following demand curve

$$z = a - 3p$$

where z is demand, p is price, and $a > 0$ is a constant.

(a) What is the monopolist's revenue? How does it differ from that of a firm in a perfectly competitive market?

(b) Assume that per unit cost of production is $c(z) = \lambda z$, where $\lambda > 0$ is a constant. What is the monopolist's profit? Derive its optimal choice of z.

(c) Explain why the monopolist's choice generates a deadweight loss.

(d) In a graph, show the deadweight loss generated by the monopolist. Comment on your graph.

(e) Now suppose that the monopolist can engage in perfect price discrimination. Discuss how this affects the size of the deadweight loss.

11 A steel company on a river site has a fixed price of 1 per unit of output and chooses output quantity q to maximize its profits. The cost of producing q units of output is $0.5q^2$. Downstream along the river is a fishery which chooses output quantity f to maximize its profits. Its output price is fixed at $p > 1$ and its cost of production is $fq^2 + 0.5f^2$.

(a) Why might the fishery's cost function take this form?

(b) For the game in which each simultaneously chooses quantity, plot the best-response functions and find the Nash equilibrium. Find the equilibrium profit of the two firms. What would the Nash equilibrium be if $p < 1$?

(c) Now suppose that the two firms merge under a single owner. Write down the first order conditions for the owner's profit-maximization problem. Is the output of steel higher or lower than before?

(d) Describe a tax which, in the separate-ownership case, would cause the firms to produce the amounts produced by a single owner.

(e) Briefly discuss your results.

12 An individual can consume two goods, X and Y, and her utility is given by

$$U(x, y) = x^{1/2} + y^{1/2}$$

where x and y are the quantities she consumes of X and Y, respectively. The prices are $p_X = 3$ and $p_Y = 6$, and the consumer has a budget of 100.

(a) Write down the consumer's problem, the associated Lagrangian, and derive the optimal choice of x and y. Now suppose that the budget increases to 200. What are the optimal x and y now? Discuss this result in terms of the income and substitution effects.

(b) Suppose that instead p_X rises to $p_X = 6$. What are the optimal x and y now? Discuss this result in terms of the income and substitution effects.

(c) In a graph, show the equivalent variation for the price change in (b).

(d) In a graph, show the compensating variation for the price change in (b). Why does this graph differ from that in part (c)?

END OF PAPER