ECONOMICS TRIPOS PART I

Monday 8 June 2009 9 to 12

Paper 1

MICROECONOMICS I

*Answer **ALL six** questions from Section A, and **two** questions only 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
20 Page Booklet
Rough Work Pads
Tags

SPECIAL REQUIREMENTS
Approved calculators allowed

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 Describe two cases in which it is *not* true that utility maximisation implies that the relative price should be equal to the marginal rate of substitution.

2 Two players 1 and 2 play the following simple card game. Each has two cards, an ace and a king. They simultaneously play a card. If the two cards played are different, i.e. one ace and one king, then 1 pays £1 to 2. If both play a king then 2 pays £1 to 1. If both play an ace, 2 pays £2 to 1. Find all the Nash equilibria of the game.

3 Is the effect of an increase in the wage on labour supply always ambiguous?

4 A seller S has an object which is worth v to a buyer B. B makes a price offer of p to S which S then either accepts or rejects. The price p may be either 3 or 1. If S accepts p then S's payoff is p and B's payoff is $v - p$. If S rejects p then both get zero payoff. For the case $v = 2$ represent this as a game in extensive form. Describe the strategies in full and find the subgame-perfect equilibrium strategies. Do the same for $v = 4$. If, by making a small payment, S could, at the start, increase v from 2 to 4, would she do so?

5 If there are decreasing returns to individual factor inputs, does it follow that the technology as a whole exhibits decreasing returns to scale?

6 'In the Prisoner's Dilemma each player has a strictly dominant strategy, so the outcome will be Pareto-inefficient even if the game is repeated'. Comment.

SECTION B

7 Consider a monopoly with a downward sloping linear demand curve and a constant marginal cost. Illustrate graphically or algebraically what the effect of a production subsidy s would be on price, quantity, consumers' surplus and profit. Would such a policy be welfare improving?

8 Consider the following two-person exchange economy. There are two goods, x and y. Agent A has 5 units of x and none of y, while agent B has 4 units of y and none of x. A's utility function is

$$u_A(x_A, y_A) = (x_A)^{\frac{1}{3}}(y_A)^{\frac{2}{3}}$$

and B's is

$$u_B(x_B, y_B) = (x_B)^{\frac{2}{3}}(y_B)^{\frac{1}{3}}.$$

(a) Explain what is meant by a competitive equilibrium.

(b) Find the competitive equilibrium prices and allocations.

(c) Does Walras' Law hold in this example, and if so why?

(d) Is the equilibrium stable? Justify your answer diagrammatically.

9 Describe the income and substitution effects from a reduction in the interest rate. Will consumers spend more in the current period?

10 A large number of people each simultaneously decide whether to attend an event. For each person, not attending the event gives payoff 1, while attending gives utility $6\,x\,(1-x)$, where x is the proportion of people attending (you should treat x as a continuous variable ranging between 0 and 1 inclusive).

(a) Sketch the payoff function and give an explanation of why it might take this form.

(b) Find the Nash equilibria of the game. For each equilibrium, show either that it is stable or unstable.

(c) If the government were to choose the proportion attending in order to maximize the sum of people's utilities (i.e. achieve the social optimum), what proportion would it choose?

(d) How do the equilibria found in part (b) differ from the social optimum? Give an economic explanation for the difference.

(e) How might the government bring about the social optimum?

11 Suppose that a firm has two different plants. The cost functions for these two plants are

$$c_1(w, r, y) = \tfrac{1}{2}\, y\, (w + r)$$

and

$$c_2(w, r, y) = 2\, y\sqrt{wr},$$

where y is output, w is the cost of labour l and r is the cost of capital k.

(a) Write down the corresponding technologies.

(b) How much labour and capital does a cost-minimising firm need to produce one unit in each plant?

(c) Will a cost minimising firm shut down one plant?

12 (a) Describe the Hotelling model of electoral competition between two candidates for political office.

(b) Suppose that, instead of simply wanting to win the election, each candidate is interested in the policy platform which is implemented after the election. Candidate A announces a platform x_A, which is a number on the interval $[0, 1]$, candidate B simultaneously announces a platform x_B, and each voter votes for the platform closest to her preferred position. However, if candidate A wins she will (regardless of the platform which she announces during the election) implement her preferred position of $\frac{1}{4}$ and if candidate B wins he will implement his preferred position of $\frac{3}{4}$. In the event that the election is tied, the implemented position is $\frac{1}{2}\,(x_A + x_B)$. Each candidate chooses the election platform so as to make the implemented policy as close as possible to her preferred position.

(i) Show that there cannot be a Nash equilibrium in which $x_A < \frac{1}{2}$ and $x_B < \frac{1}{2}$.

(ii) Show that there cannot be an equilibrium in which $x_A < \frac{1}{2} < x_B$ or $x_B < \frac{1}{2} < x_A$.

(iii) Show that there is a unique Nash equilibrium.

END OF PAPER