UNIVERSITY OF CAMBRIDGE

ECT1
ECONOMICS TRIPOS PART I

Monday 6 June 2016 9:00-12:00

Paper 1

MICROECONOMICS

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.

Write your **candidate number** (not your name) on the cover of each booklet.

If you identify an error in this paper, please alert the **Invigilator**, who will notify the **Examiner**. A **general** announcement will be made if the error is validated.

Write legibly.

STATIONERY REQUIREMENTS
20 Page booklet x 1
Rough work pads
Tags

SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAMINATION
Calculator - students are permitted to bring an approved calculator

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. 'In an exchange economy with two agents and two goods, if one of the agents sets the prices and the other acts as a price taker, then the outcome will be Pareto-inferior to the competitive-equilibrium allocation'. Comment.

2. John and Mary have identical Cobb-Douglas preferences for music compact discs (CDs) and a composite good called "all other goods". Mary chooses to pay a £20 annual membership fee to the MegaCD music club so that she can buy as many CDs as she wants, at a price of £6 per CD. John has the same subscription option available, but strictly prefers to buy CDs at Etchemvee music store for £8 each, with no membership fee. (Mary also has the Etchemvee option available, but prefers the MegaCD membership). Can you determine whose income is higher? Explain.

3. Suppose that a household purchased bundle X^0 when prices were P^0 (where X and P represent the vectors of quantities and prices, respectively, of n goods). Now prices change to P^1, and the equilibrium bundle becomes X^1. If $P^0X^1 = P^0X^0$, what is the sign of the expression $P^1(X^1 - X^0)$? Explain.

4. Three people sharing a flat are considering whether to buy a wireless router which costs £100. If their reservation values add up to £120, is it Pareto-efficient for them to buy it? If any cost must be split equally and each person's reservation value is known only to her, is it possible for them to reach the Pareto-efficient decision for all possible combinations of values? Explain.

5. If the agents who are affected can bargain over the level of production of an externality, will the outcome depend on initial property rights? Discuss.

6. Suppose that the widget industry is perfectly competitive. Each producer has the long-run average cost function: $AC(Q) = 40 - 6Q + \frac{1}{3}Q^2$. The market demand curve for widgets is given by: $D(P) = 2200 - 100P$. What is the long-run equilibrium price in this industry, and at this price, how much would an individual firm produce? How many active producers are there in the long-run competitive equilibrium? Explain.

SECTION B

7. In an exchange economy with two goods and two agents, agent A's utility is given by the function $ln(x_A) + 3ln(y_A)$ and agent B's utility is given by the function $3ln(x_B) + ln(y_B)$, where x_i and y_i are agent i's consumption of good x and good y respectively, for $i = A, B$, and ln is the natural logarithm. A's endowment is 3 units of x and 1 of y, while B's endowment is 2 units of each.

   (a) Draw the Edgeworth Box for this problem and derive the equation of the contract curve.

   (b) Find the competitive equilibrium prices and allocation.

   (c) Explain why, if one market clears, the other must clear too.

   (d) Now suppose that B's utility function is $3x_B + y_B$, everything else being the same. Using a diagram, find the competitive-equilibrium price.

8. Suppose the only two goods you care about in the world are mangoes (x) and chocolate (y) and your utility function is given by $u(x, y) = xy$. You have no income, and the only thing in the world you possess is a large box you have just inherited from your rich uncle who passed away last week. You open the box, and much to your delight, you find it contains 9 cases of mangoes and 3 slabs of chocolate. Currently, mangoes sell for £1 per case, and chocolate sells for £9 per slab. Just as you receive the inheritance, the Supreme Leader of your country announces that he is going to lift the current ban on imports of chocolate. As a consequence of this announcement, the price of chocolate immediately falls to £4 per slab.

   (a) Determine the income and substitution effects of a decrease in the price of chocolate from £9 to £4. Are chocolates a normal or inferior good for you? Explain.

   (b) How much would you have been willing to pay the Supreme Leader in order for him not to lift the import ban against chocolates? Explain.

9. Discuss the following critiques of the model of rational self-interested maximizing behaviour. Be careful to draw distinctions, if any, between the two critiques.

   (a) It ignores the importance of social norms, and other social constraints on action.

   (b) It ignores behavioural biases, such as those described in Tversky and Kahneman (1974, *Science*).

10. Answer both parts:

(a) Suppose that a firm's long-run cost function can be written in the following form: $C(w, r, Q) = Q^{\frac{1}{\alpha+\beta}} f(w, r)$ where $\alpha, \beta > 0$, and f is some function of w and r, which represent the factor prices for the two inputs. Given this cost function, is it possible to say something about whether the firm's production function has economies or diseconomies of scale? Explain your answer.

(b) Suppose that a firm produces output Y using only labour L as an input. Suppose that the amount of labour required to produce a given level of Y can be expressed as: $L = A + bY$, where $A, b > 0$ and A can be interpreted as the 'fixed' amount of labour needed in order to begin production. Is it possible to say something about whether the firm's production function has economies or diseconomies of scale? Explain your answer.

11. Two neighbouring firms (1 and 2) each have the same production function, given by $y_i = ln(L_i)$, where y_i is output and L_i is labour input for firm i $(i = 1, 2)$ and ln is the natural logarithm. Firm 1's cost function is $\frac{1}{2}c_1 L_1^2$ and firm 2's cost function is $\frac{1}{2}c_2 L_2^2 + \delta e^{2y_1}$, where c_1, c_2 and δ are strictly positive constants. The output price is p_1 for firm 1 and p_2 for firm 2.

(a) Discuss why the cost functions might take this form.

(b) For each firm, find the profit-maximizing production plan.

(c) Show that if each firm maximizes its own profits, the outcome will be Pareto-inefficient from the firms' point of view. Is there over-production or under-production? Explain the reason for this inefficiency.

(d) Describe a tax which will remove this Pareto inefficiency. In the absence of government action, what other solutions might the firms adopt?

(e) If the government were to impose a tax of the kind you described in part (d), and then gave the revenue raised to the two firms, would the outcome be Pareto-efficient from the point of view of the two firms? Explain your answer.

12. 'Competition based on low wages in poor countries is unfair because it reduces the wages of workers in rich countries'. Discuss the extent to which the Ricardo model of trade gives support to this statement.

END OF PAPER