UNIVERSITY COLLEGE LONDON

EXAMINATION FOR INTERNAL STUDENTS

MODULE CODE	:	**ECON2001**
ASSESSMENT PATTERN	:	**ECON2001A**
MODULE NAME	:	**Microeconomics**
DATE	:	**18 May 2016**
TIME	:	**10:00 am**
TIME ALLOWED	:	**3 hours**

This paper is suitable for candidates who attended classes for this module in the following academic year(s):

2014/15 and 2015/16

2015/16-ECON2001A-001-EXAM-278

TURN OVER

SUMMER TERM 2016

ECON2001: MICROECONOMICS

TIME ALLOWANCE: 3 hours

Answer ALL questions from Part A on the Multiple Choice Question sheet. Answer THREE questions from Part B, including at least ONE from Part B.I and at least ONE from Part B.II.

Part A carries 40 per cent of the total mark and questions in Part B carry 20 per cent of the total mark each.

In cases where a student answers more questions than requested by the examination rubric, the policy of the Economics Department is that the student's first set of answers up to the required number will be the ones that count (not the best answers). All remaining answers will be ignored.

PART B

Answer THREE questions from this section, including at least ONE from Part B.I and at least ONE from Part B.II.

PART B.I

B.I.1 Consider the following game in extensive form. Player 1 tosses a biased coin in private and then chooses one of two actions: $x = 1$ or $x = -1$. Player 2 sees the action player 1 picks (but not the outcome of the coin toss) and chooses one of two actions: $y = 1$ or $y = -1$. The game then ends. The players' payoffs are $(xy, -xy)$ for Player 1 and Player 2 respectively, if the coin showed Heads. The players' payoffs are $(-xy, xy)$ for Player 1 and Player 2 respectively, if the coin showed Tails. (The coin has a probability 1/3 of showing Heads when tossed.)

(a) Draw the extensive form of this game.

(b) List the pure strategies of both players in this game.

(c) What (mixed) actions must Player 1 use to make Player 2 believe that both outcomes of the coin toss are equally likely when they see $x = 1$ or when $x = -1$?

(d) Find a Nash equilibrium of this game where Player 1 chooses $x = +1$ for both outcomes of the coin toss. (You must describe all the actions Player 2 takes and why these are optimal.)

(e) Can you find a Nash equilibrium where Player 1 chooses $x = -1$ for both outcomes of the coin toss?

(f) Now consider the game where Player 2 can also see the outcome of the coin toss. How many pure strategies does each player have in this game? Find a subgame perfect equilibrium of this game.

B.I.2 A restaurant is planning to offer an all-you-can-eat lunchtime-special for students. If $0 \leq x \leq 2$ is the amount a student eats for lunch, the restaurant estimates that its potential customers are described by a uniform distribution on the interval $0 \leq x \leq 2$. A student, who eats an amount x for lunch and pays a price p, has a utility $x^2 - p$, but if they don't eaf lunch at the restaurant they have a utility equal to zero from eating on campus.

(a) Which student types (x's) go to the restaurant when price for the deal is p?

(b) What is the demand function of the restaurant?

(c) If the cost of serving a customer who eats x is $4cx$, what are the total costs of the restaurant when they set the price p?

(d) What are the restaurant's revenues when it sets the price p?

(e) Suppose $c = 1/6$ and competition forces the restaurant to set a price that gives it zero profit—what price does it set?

(f) Suppose $c > 0$ and the restaurant is a monopolist and is free to choose the price that maximises profit—what price does it set?

(g) The restaurant learns which customers have $x > 1$ and bars them from the deal. How does your answers above change?

B.I.3 A firm has decided to sell two size packages of biscuits. The firm's package for singles is sold at price p and contains x biscuits. Its package for families is sold at price q and contains y biscuits. Suppose that singles get utility $\sqrt{x} - p$ from a package that contains x biscuits at price p and families get utility $2\sqrt{y} - q$ from a package that contains y biscuits at price q. If families or singles don't buy a packet of biscuits they have zero utility.

(a) What conditions must (x, p) and (y, q) satisfy to ensure that families and singles buy biscuits and buy the packages the firm has designed for them?

(b) Show that if families don't want to buy the singles' package and the singles get positive utility from the singles' package, then families must get positive utility from their package. Then write down the 3 remaining constraints.

(c) Now suppose that p and q are increased together by the firm, what constraint starts to bind?

(d) Now suppose that q is increased alone by the firm, what constraint starts to bind?

(e) The firm's profits from selling the packages (x, p) and (y, q) are $\alpha(p - cx) + (1 - \alpha)(q - cy)$, where $\alpha > 0.5$. Use your answers to parts (B.I.3c) and (B.I.3d) of this question to write this as a function of p and q only.

(f) Hence solve for the optimal prices of these packages and interpret what you find.

PART B.II

B.II.1 An economy consists of two individuals, Axel and Bjørn. Axel has risk-free wealth of W. Bjørn also has wealth W but there is a probability π that his wealth will be wiped out where $1 > \pi > 0$.

The two agree a contract under which Bjørn will pay Axel a premium γK in return for a promise from Bjørn to give Axel K in the event that Axel's wealth is lost. Each individual treats the premium rate γ as fixed when deciding how much insurance K to buy or sell.

With probability $1 - \pi$ their wealth levels are therefore $W + \gamma K$ and $W - \gamma K$ whereas with probability π their wealth levels are $W + (\gamma - 1)K$ and $(1 - \gamma)K$.

Each individual is an expected utility maximiser with logarithmic within-state utility $v(W) = \ln W$.

(a) Explain what is meant by risk aversion and why both individuals are averse to risk given these preferences.

(b) Insurance sold by Axel K_A and insurance bought by Bjørn K_B are therefore the solutions to

$$\max_{K_A} \{(1-\pi)\ln(W + \gamma K_A) \;+\; \pi \ln(W + (\gamma - 1)K_A)\}$$

and

$$\max_{K_B} \{(1-\pi)\ln(W - \gamma K_B) \;+\; \pi \ln((1-\gamma)K_B)\}\,.$$

Show that chosen K_A and K_B are $K_A = (\pi - \gamma)W/\gamma(\gamma - 1)$ and $K_B = \pi W/\gamma$.

(c) Explain why a Walrasian equilibrium in this economy is a premium rate γ^* such that $K_A = K_B$. Show that the equilibrium is $\gamma^* \;=\; 2\pi/(1+\pi)$.

(d) What does it mean for insurance to be actuarially fair? Is equilibrium insurance in this economy actuarially fair? Discuss.

B.II.2 Individuals consume two goods, wine q_1 and cheese q_2, at prices p_1 and p_2. Total budget is denoted y.

Preferences are captured by the indirect utility function

$$v(y, p_1, p_2) = (y/p_1) + \ln(y/p_2).$$

(a) i. Write down and explain Roy's identity.

ii. Use Roy's identity to find the Marshallian demands and hence the budget shares of the two goods as functions of y, p_1 and p_2.

(b) i. Explain what a Laspeyres price index is.

ii. Suppose the price of wine goes from p_1^A to $p_1^B = \alpha_1 p_1^A$ and the price of cheese goes from p_2^A to $p_2^B = \alpha_2 p_2^A$ where $\alpha_1 > \alpha_2$. Show that the Laspeyres price index for someone with initial total budget of y is

$$L = \frac{\alpha_1 y + \alpha_2 p_1^A}{y + p_1^A}.$$

Is this higher for richer or poorer households? Discuss the reasons for this.

(c) Discuss whether the Laspeyres index is likely to overstate or understate the true rise in the cost of living. What difficulties would arise in calculating a true cost of living index for these preferences?

B.II.3 Individuals in an economy consume two goods, corn q_1 and cloth q_2. Prices of corn and cloth, p_1 and p_2, are both equal to 1. Individual incomes are y.

Individual preferences are described by the direct utility function

$$u(q_1, q_2) = q_1 + \ln q_2.$$

(a) Find the Marshallian demands for the two goods.

(b) The government is considering raising revenue by taxing corn at rate t. Assume that neither pretax prices nor income are affected by the nature of taxation of corn. In order to protect the poorest citizens the government decides to tax corn consumption only if it is above a threshold E. There are two alternative proposals:

- Minister A believes that if corn consumption exceeds E then the tax paid T should be levied on the whole of corn consumption, $T = tq_1$.
- Minister B believes that if corn consumption exceeds E then the tax should be levied only on the excess of corn consumption over E, $T = t(q_1 - E)$.

Which, if either, proposal gives rise to a convex individual budget set? Illustrate by drawing budget sets under each proposal.

(c) Suppose that the proposal of Minister B is adopted.

i. Show that an individual chooses to consume $q_1 < E$ if $y < 1 + E$.

ii. Show that an individual chooses to consume $q_1 > E$ if $y > 1 + t + E$.

iii. What happens to an individual if $1 + E < y < 1 + t + E$?