BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF ECONOMICS

BACHELOR OF SCIENCE HONOURS DEGREE IN ECONOMICS

ADVANCED ECONOMIC THEORY I (EC 401)

EXAMINATION   **DURATION: 3 HOURS**

INSTRUCTIONS TO CANDIDATES

1. **Answer four (4) questions**
2. **The paper carries six questions**
3. **All questions carry equal marks of 25 each**
4. **The use of cellphones is not allowed in the exam**

Question 1

An insurance agent (interviewed in Jonathan Clements, "Dare to Live Dangerously: Passing on Some Insurance Can Pay Off, "Wall Street Journal, July 23, 2005, D1) states, "On paper, it never makes sense to have a policy with low deductibles or carry collision on an old car." But the agent notes that raising deductibles and dropping collision coverage can be a tough decision for people with a low income or little savings. Collision insurance is the coverage on a policyholder's own car for accidents where another driver is not at fault.

(a) Suppose that the loss is $4,000 if an old car is in an accident. During the six-month coverage period, the probability that the insured person is found at fault in an accident is 0.4. Suppose that the price of the coverage is $150.

   (i) Should a wealthy person purchase the coverage?   **[5 marks]**

   (ii) Does your answer depend on the policyholder's degree of risk aversion?

   [5 marks]

   (iii) Does the policyholder's degree of risk aversion depend on his or her wealth?

   [5 marks]

(b) The agent advises wealthy people not to purchase insurance to protect against possible small losses. Why?   **[10 marks]**

Question 2

(a) In the battle of the sexes game, the husband likes to go to the mountains on vacation, and the wife prefers the ocean, but they both prefer to take their vacations together. This is their pay-off matrix in terms of utils:

		Husband			
		Mountains		*Beach*	
Wife	*Mountains*	2	1	-1	-1
	Beach	-1	-1	1	2

(i) Determine the Nash equilibria. **[4 marks]**

(ii) Discuss whether this game and equilibrium concept make sense for analyzing a couple's decisions. **[4 marks]**

(b) Suppose that Panasonic and Zenith are the only two firms that can produce a new type of 3D TV. The payoff matrix shows the firms' profits (in millions of dollars):

		Panasonic			
		Enter		*Do not enter*	
Zenith	*Enter*	-40	-40	250	0
	Do not enter	0	250	0	0

(i) If both firms move simultaneously, does either firm have a dominant strategy? Explain. **[4 marks]**

(ii) What are the Nash equilibria given that both firms move simultaneously? **[4 marks]**

(iii) The U.S. government commits to paying Zenith a lump-sum subsidy of $50 million if it enters this market. What is the Nash equilibrium? **[4 marks]**

Question 3

A computer assembly firm's production function is:

$q = 0.1LK + 3L^2K - 0.1L^3K$

(a) Determine the short-run production function if capital is fixed at K=10.

[5 marks]

(b) Determine the formulas for the marginal product of labour and the average product of labour. [5 marks]

(c) Draw and explain two figures, one above the other. In the top figure, show the relationship between output (total product) and labour. In the bottom figure show the MP_L and AP_L curves. [10 marks]

(d) Determine the values of labour for which this production function is valid.

[5 marks]

Question 4

An incumbent firm, Firm 1, faces a potential entrant, Firm 2 that has a lower marginal cost. The market demand curve is $p = 120 - q_1 - q_2$. Firm 1 has a constant marginal cost of $20, while Firm 2's is $10.

(a) What are the Nash-Cournot equilibrium price, quantities, and profits if there is no government intervention? [10 marks]

(b) To block entry, the incumbent appeals to the government to require that the entrant incur extra costs. What happens to the Nash-Cournot equilibrium if the legal requirement causes the marginal cost of the second firm to rise to that of the first firm by $20? [10 marks]

(c) Now suppose that the barrier leaves the marginal cost alone but imposes a fixed cost. What is the minimal fixed cost that will prevent entry? [5 marks]

Question 5

To discourage people from breaking the traffic laws, society can increase the probability that someone exceeding the speed limit will be caught and punished, or it can increase the size of the fine for speeding.

(a) Explain why either method can be used to discourage speeding. [5 marks]

(b) Which approach is a government likely to prefer, and why? [10 marks]

(c) Suppose that most people will not speed if the expected fine is at least $500. The actual fine for speeding is $800. How high must the probability of being caught and convicted be to discourage speeding? **[10 marks]**

Question 6

Jill possesses $160,000 worth of valuables. She faces a 0.2 probability of a burglary, where she would lose jewellery worth $70,000. She can buy an insurance policy for $15,000 that would fully reimburse the $70,000. Her utility function is:

$U(X) = 4X^{0.5}$

(a) What is the actuarially fair price for the insurance policy? **[5 marks]**

(b) With the aid of calculus, advise Jill whether she should buy the actuarially fair insurance policy or not. **[10 marks]**

(c) What is the most that she is willing to pay for an insurance policy that fully covers it against loss? **[10 marks]**

END OF PAPER