CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTER OF SCIENCE IN AGRIBUSINESS MANAGEMENT

AGBM 861: ADVANCED ECONOMICS FOR AGRIBUSINESS

STREAMS: AGBM **TIME: 3 HOURS**

DAY/DATE: MONDAY 14/04/2025 **2.30 P.M. – 5.30 P.M.**

INSTRUCTIONS

(i) Answer ANY THREE questions
(ii) Do not write on the question paper
(iii) Show your working clearly

Question One

Suppose Cheese (C) and Watches (W) in Switzerland are produced using only labor and the production functions are:

$$C = 10\sqrt{Lc}$$

$$W = \propto Lw$$

Lc and Lw represent labor devoted to the production of cheese and watches, respectively, and $\propto > 0$ is a constant. Suppose labor supply in the country is fixed at L = 400, and the utility function of the representative Swiss consumer is U(C,W)=√CW. Note that this utility function implies that the marginal utility of a Swiss consumer from one extra unit of watch consumption is higher if she has more cheese to consume, which is a natural assumption about Swiss preferences for Cheese and Watches.

i. Suppose $\propto = 1$. That is, one unit of labor can produce one watch. Derive and draw the Swiss production possibility frontier for watch and cheese production.

(5 marks)

ii. *Now make no assumptions on the value of* $\propto$. Suppose Switzerland didn't sell or buy any Cheese or Watches to other countries. What would be the equilibrium price ratio and equilibrium quantities of Cheese and Watches in the Swiss domestic market? (Note: Your

answers will depend on $\propto$, which you should treat as an unknown for now. Of course, the solution will require finding the point of tangency between the PPF and the highest feasible indifference curve). **(5 marks)**

iii. How do the equilibrium quantities change when $\propto$. increases? How does the price ratio change? Notice that you can interpret $\propto$. as a productivity parameter: when $\propto$. rises, watchmakers get more watches with the same amount of Lw. In light of this interpretation of $\propto$., explain the intuition behind your mathematical results. **(3 marks)**

iv. Assume now that Switzerland can trade with other countries – specifically, France. Suppose the French price ratio is $\frac{pc}{\text{pw}} = 1$. At the French price ratio, how much would Swiss consumers want to consume and how much would Swiss producers want to produce of each good? Find consumption bundle (C_c,W_c) and production bundle (C_p,W_p). In your solution assume $\propto$. > 1/4. For what values of $\propto$., will Switzerland want to export Cheese to France? How about Watches? **(4 marks)**

v. Consider the expressions for the optimal consumption and production bundles under trade with France that you found in part (4). How are Swiss exports affected by a rise $\propto$? Provide an intuitive explanation. How are Swiss consumption of both goods affected by a rise in $\propto$? Provide an intuitive explanation. **(3 marks)**

Question Two

Consider the following two-person game.

Player 1\Player 2	L	R
T	6,3	0,0
B	4,0	4,3

a) Are there any pure strategy equilibria of this game? If there are find them, if there are not explain how you know there are not. **(5 marks)**

b) If Player 2 plays L with probability ¼, and R with probability ¾, what is Player 1's best response? **(5 marks)**

c) Find Player 1's best reply correspondence as a function of Player 2's mixed strategy and draw the graph of the best value of σ_1(T) as a function of σ_2(L). Draw your graph neatly and be as accurate as you reasonably can. (Hint: As a test of your answers,

check that your graph is consistent with your answer to the previous question.)

(10 marks)

Question Three

A consumer faces income constraint and has CES preferences of the following form:

$$U(x, y) = x^{\delta}+y^{\delta}$$

a) Find the consumer's demand for x as a function of prices and income. **(10 marks)**

b) Are these preferences homothetic? Explain why and why not. **(5 marks)**

c) Calculate the consumer's income elasticity of demand. **(5 marks)**

Question Four

Ann and Bertha are two roommates who derive utility from the consumption of two goods with which they are initially endowed: cookies (c) and Milk (m). Utility functions are given by;

$$U_a(c_a, m_a) = \frac{1}{3} lnc_a + \frac{2}{3} lnm_a$$

and

$$U_b(c_b, m_b) = \frac{1}{2} lnc_b + \frac{1}{2} lnm_b$$

Ann is initially endowed with 8 cookies and 4 gallons of milk, while Bertha owns 4 cookies and 8 gallons of milk.

i. What are Ann and Bertha's uncompensated (Marshallian) demands for cookies and milk) **(5 marks)**

ii. Find the equilibrium allocation and price ration (p_c/p_m). [hint: it is a good idea to normalize p_m=1]. **(5 marks)**

iii. Derive an equation for the contract curve (that is, a set of Pareto efficient allocations) (**4 marks)**

iv. Sketch an Edgeworth box showing endowments, competitive equilibrium prices and consumption choices, and indifference curves through the endowments and through the equilibrium consumption choices. Indicate the area of mutually beneficial alternative allocations. **(6 marks)**

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