Midterm Exam

Because of claims of planned cheating, you will have to sign each section of the exam. To pick up your exam and receive a grade, you will have to sign again and show ID. No exceptions!

Follow all instructions carefully. There are 4 sections to the exam. Think before writing; be brief and concise. Do explain your answers and graphs, but excess verbiage will not be rewarded. Some questions are harder than others. If a question seems too hard, move on to another one and then return to the harder questions later. Do not panic, the exam will be curved.

No books, no notes, no calculators.

There are seventy points on the exam, so you should take about one minute per point, leaving a few minutes to read instructions and proofread your answers.

Unless indicated otherwise, all questions refer to perfectly competitive markets and all changes are short-run. You should explain each answer clearly and concisely. All graphs should be labeled and reasons should be given for each answer.

On each bluebook you use, write your name, your TAs name and the exam section number.

NO SECTIONS THIS WEEK!

Answer Section I one on the next page, NOT IN A BLUE BOOK. Answers sections II, III and IV in separate bluebooks.
Section I: Short Definitions. 10 points total (2 points each). Define the following terms in one or two sentences each. Answer this section on this sheet and turn it in with your bluebooks.

1. Variable Cost

2. Inferior Good

3. Income elasticity of demand

4. Increasing returns to scale

5. Consumer Surplus

Extra Credit (1 point) Yes / No (circle one): I am in the correct room (A-K in Davies, L-Z in SSS 114).
Section II. Answer this section in a SEPARATE BLUE BOOK labeled “Part II”. Both print and sign your name and your teaching fellow’s name on the bluebook. Be sure to explain each answer, clearly and briefly.

This section has 20 points total, 10 points per question.

1. The Country of Whim makes both Widgets and Foobars.

   (a) (1 points) Draw a PPF for the country that exhibits diminishing marginal returns

   (b) (3 points) Have you drawn the curve with a positive or negative slope? Why? Have you drawn the PPF as a straight line or as “bowed” curve? Why?

   (c) (2 points) Draw a second PPF for another nation and one point on each PPF such that the Country of Whim has a comparative advantage in Widgets.

   (d) (4 points) Starting from the points you drew in part (c), describe a trade between the two nations that would increase the total amount of both goods consumed by both nations. Why does this work?

2. Consider the supply and demand for milk.

   (a) (2 points) Draw a supply and demand diagram indicating the equilibrium price and quantity of milk.

   (b) (2 points) Why wouldn’t a higher than equilibrium price persist in the market?

   (c) (2 points) Now suppose that the government puts a price floor on milk. Assume the price floor is higher than the market equilibrium price. What happens to the quantity of milk consumed?

   (d) (2 points) Indicate the lost “economic surplus” (the “dead-weight loss”) that results from the price floor.

   (e) (2 points) Graph what would happen to the dead-weight loss if the demand for milk was more elastic than in your prior graph (but the equilibrium price and quantity, without the price floor was the same.) As the demand curve becomes more elastic, what happens to the size of the dead-weight loss?

Section III. Answer this section in a SEPARATE BLUE BOOK labeled “Part III”. Both print and sign your name and your teaching fellow’s name on the bluebook. Be sure to explain each answer, clearly and briefly.

This section has 20 points total, 10 points each question.

1. Bucky Badger consumes beer and bratwurst. Assume that both goods are normal goods.

   (a) (3 points) What condition (involving marginal utilities) holds at Bucky’s optimal consumption point? Why?

   (b) (2 points) Graph the effect of an increase in Bucky’s income.

   (c) (3 points) Graph the substitution effect of an increase in the price of beer.

   (d) (2 points) Graph the income effect of that same price increase.

2. John Eli’s life is divided into two periods, first as a student and then as a worker. John’s income in period 1 is 0 and in period 2 is $Y$. John’s utility is $U_1(C_1) + U_2(C_2)$, where $C_1$ is first-period consumption and $C_2$ is second period consumption. Consumption and income are both measured in dollars. John can borrow or save at an interest rate of $r$.

   (a) (3 points) What is the present (period 1) value of John’s income?

   (b) (3 point) What is John’s two-period budget constraint? What is the “price” of first and second period consumption?

   (c) (4 points) Use a graph to show John’s optimal consumption in the two periods. Also show how much John is borrowing in the first period.
1. The New Haven Power Company makes electricity from two inputs: natural gas \((G)\) and equipment \((E)\).

   (a) (3 points) First assume that equipment \(E\) is fixed in the short run. Show graphically how to derive the company’s short-run demand for natural gas (as a function of the price of natural gas, \(r_G\)).

   (b) (4 points) Now assume that the company can choose both inputs. Graph the optimal input choice conditional on the output of electricity, \(Q\), the price of natural gas and the price of equipment, \(r_E\).

   (c) (3 points) How do you use your last graph to find the cost of producing those \(Q\) units of output?

   (d) (2 points) If New Haven Power can sell electricity at a fixed price of $5 per unit, what equation describes the amount of electricity that the company should produce? Graph this answer.

   (e) (3 points) Now consider a second company, Quinnipiac Power. Say that these two companies supply all of New Haven’s electricity and both sell electricity at a fixed price set by the government. What is the supply curve for electricity in New Haven?

   (f) (5 points) If both companies buy inputs in the same market, is it possible for them to lower costs by trading inputs (holding the total amount of each input fixed). Why or why not?