MICROECONOMICS
MIDTERM EXAMINATION SPRING 2011
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VERSION A

INSTRUCTIONS: PLEASE FILL ALL REQUESTED INFORMATION OF THIS PAGE AND WAIT FOR THE SIGNAL TO BEGIN. YOU ARE NOT ALLOWED TO USE A CALCULATOR. THE USE OF CLASS NOTES, TEXTBOOKS IS NOT PERMITTED. PLEASE WRITE LEGIBLY. READ THE QUESTIONS CAREFULLY AND PROVIDE CONCISE BUT JUSTIFIED ANSWERS. YOU HAVE 1 HOUR AND 15 MINUTES. ALWAYS LABEL YOUR AXIS AND CURVES. SHOW ALL YOUR WORK. KEEP PAGES STAPLED TOGETHER!

GOOD LUCK!

NAME:_____

TAs NAME:_____

Professor's Name (Please circle) Collard-Wexler, Skreta

Lecture Time: :

1. [*4pts*] What is the difference between the Engle curve and the demand curve?

2. [*4pts*] The nominal ("current-dollar") price of a pound of bananas in 1960 was $0.10. Calculate the 1960 price of a banana in terms of 2007 dollars given that the CPI was 29.6 in 1960 and 207.3 in 2007.

3. [*4pts*] Feb 8, 2011, NYT: *"The United Nations' food agency issued an alert on Tuesday warning that a severe drought was threatening the wheat crop in China, the world's largest wheat producer, ..."* How may this piece of news affect the market of wheat in the US? Will American consumers be affected and how? Briefly analyze and graph the situation.

4. [$4pts$] Suppose the utility function of bagels and coffee is $U(B,C) = 6BC^3 + C$. What is the MRS of B for C? Suppose that $MRS_{B \text{ for } C} = 2$ what does this mean?

5. [$4pts$] Give TWO examples of goods that are perfect substitutes.

6. [$4pts$] True, False, Explain: A Giffen good is necessarily an inferior good.

7. [*4pts*] Define economies and diseconomies of scale. Suppose that the $TC(Q) = 5Q^2$. Does this cost function exhibit economies or diseconomies of scale or neither?

8. [*4pts*] Why are short-run marginal cost curves increasing?

9. [*4pts*] Suppose that there is a production technology for dams given by $Q = AK^{0.5}L^1$. Does this production function exhibit increasing, constant, or decreasing returns to scale?

10. [*4pts*] True or false, explain. The law of diminishing marginal returns implies that when the use of an input increases with the other input fixed, we will always end up with a negative marginal product for the variable input.

QUESTION 1 (25 POINTS) Consider a high school student, Freddy, whose preferences for entertainment activities- watching movies (m) and playing squash (s) - are represented by the utility function:
$$U(m, s) = m^{1/3} s^{2/3.}$$

Freddy's allocated monthly budget for entertainment is \$120 and the prices of the two goods he cares about are \$10 for movies and \$20 for squash.

1.1 *(5pts)* Find the formula for the indifference curve passing through $U = 1$ (hint: if $m = 1$ and $s = 1$ what's the utility...). Draw it on a well-labeled graph. Do we have a case of perfect substitutes, perfect complements, or neither?

1.2 *(5pts)* What are the two conditions for utility maximization? Write them down.

1.3 *(5pts)* What is Freddy's optimal consumption of movies and squash?

1.4 *(5pts)* Suppose Freddy's budget for entertainment decreases to $60. Compute his new consumption of movies and squash. Are squash and movies normal, or inferior goods?

1.5 *(5pts)* Suppose the price of movies increases to $20 (with a budget of $120 as before). Draw the new and old budget set on a well labeled graph. Show the income and substitution effects of this price change on a graph (and indicate what they are on the graph).

QUESTION 2: (35 POINTS) Electricity in Arizona is produced by burning coal (C) and by storing the energy released by sunlight (S). The production function of electricity is given by

$$Q_E = F(C, S) = C^2 \cdot S,$$

2.1 [$5pts$] Does this production function exhibit constant, increasing or decreasing returns to scale? Explain your answer.

2.2 [$5pts$] What is the marginal rate of technical substitution of coal generators (C) for solar generators (S)?

2.3 [5*pts*] In the short-run the number of coal generators in Arizona is fixed and equal to 10. Suppose, further, that the price paid for coal is 10, whereas the price paid for solar generation is 50. How many solar generators will Arizona employ to produce Q units of electricity?

2.4 [5*pts*] What is the cost function for electricity in the short-run? What are the fixed costs? The variable costs?

2.5 [10*pts*] In the long-run the state of Arizona can decide the number of coal and solar generators optimally. How many of each will it employ as a function of target output Q in order to minimize costs? (remember, the price paid for coal is 10, whereas the price paid for solar generation is 50)

2.6 [5*pts*] What is the cost function of electricity in Arizona? What is it's average and its marginal cost function?