

**Department of Agricultural & Applied Economics**  
**Microeconomics Qualifying Exam Retake**

July 27, 2016  
10:00 a.m. to 3:00 p.m.

Your **810 Code #** \_\_\_\_\_

Please provide complete answers to all questions. You have 5 hours to complete the exam; allocate your time accordingly. Please follow all instructions listed below:

- Number your responses to the questions clearly.
- Write the last 4 digits of your Student ID number at the top right of each response page.
- Write the page number in the lower right hand corner of each response page.
- Write your answers legibly and orderly. Illegible writing may cause your answers to not be correctly credited.
- Write only on one side of paper with a blue or black pen.
- Clearly box all final answers to numerical and algebraic problems

(1.1) On a single graph, carefully represent and label the following curves for a stylized firm: (i) Average Fixed Cost, (ii) Marginal Cost, (iii) Average Total Cost, (iv) Average Variable Cost, (v) Short Run supply Curve.

(1.2) A freshman student in a microeconomics course looking at your graph is confused about whether there is a relationship between the marginal cost curve and the average total cost curve. Explain to the student if or if not there is a relationship between the two.

(1.3) Theoretically define the firm's short run cost function; state and demonstrate two properties of this optimal value function.

(1.4) Consider a firm that uses labor  $L$  and capital  $K$  in its production process for output  $q$ . Given the production technology  $q=LK$ , and a market wage  $w=\$16$  and capital rental rate  $r=\$9$ , solve for the firm's least-cost combination of inputs for producing a level of output  $q=144$ .

(1.5) Assuming that capital is fixed in the short run at a level  $\bar{K} = 2$ , solve for the firm's short run total cost function.

(2.1) Consider a pure exchange economy with 2 people (A and B) and 2 commodities denoted  $x_1$  and  $x_2$ . The preferences of individuals A, and B are represented as:

$$U^A(x_1^A, x_2^A) = x_1^A + 2x_2^A \quad U^B(x_1^B, x_2^B) = 2x_1^B + x_2^B$$

Solve (note: you do not have to show any work if you do not want to) for the set of Pareto Efficient Allocations and illustrate your result assuming initial endowments are:

$$e_1^A = 10, e_2^A = 10, \quad e_1^B = 10, e_2^B = 10.$$

(2.2) Consider a pure exchange economy with 2 people (A and B) and 2 commodities denoted  $x_1$  and  $x_2$ . The preferences of individuals A, and B are represented as:

$$U^A(x_1^A, x_2^A) = \min\{x_1^A, x_2^A\} \quad U^B(x_1^B, x_2^B) = \min\{4x_1^B, x_2^B\}$$

where initial endowments are:

$$e_1^A = 30, e_2^A = 0, \quad e_1^B = 0, e_2^B = 20.$$

If the agents are not permitted to have negative consumption of either of the goods, solve for the Walrasian equilibrium.

(2.3) One of the core issues in politics at the local, state, national, and global level is the issue of efficiency vs. equality or "fairness". Against this backdrop, in the next several questions provide a clear explanation with graphs (1 page each max) of the issue appropriate for the level of student asking the question.

(2.3.a) A freshman student in a microeconomics course makes the following statement: "If I were running for president I would increase taxes on goods that rich people purchase like yachts,

luxury cars, mega-mansions, etc. and decrease taxes on goods that low income people purchase like budget cars, grocery staples, and smaller homes.” Explain from an efficiency vs. equality and “fairness” perspective why and why not the student’s proposal may or may not be a good idea.

(2.3.b) An intermediate undergraduate student makes the following statement: “In class we learned about the 1<sup>st</sup> and 2<sup>nd</sup> welfare theorems. If a society only cares about equality, it would be optimal to give each individual the same quantity of goods and services. That way everyone would have exactly the same, thus it would be perfectly equal and pareto optimal”. Explain and illustrate if or if not the student is correct.

(3.1) The **University 16 Cinema** has a constant marginal cost of production = \$2.50. Through experience, the Cinema estimates demand for daytime, matinee showings to be  $q_m = 51.25 - 2.5p_m$  and demand for prime-time, evening showings to be  $q_p = 203.125 - 1.25p_p$ . Can this firm engage in price discrimination? Why or why not?

(3.2) What is the profit-maximizing price strategy for this business? Explain.

(3.3) How much profit does **University 16 Cinema** earn under the optimal pricing strategy?

(4.1) Consider a game involving two players that works as follows. There is an initial pile of money with \$18. Player 1 gets to move first, then the second player, then the first player again, and finally player two gets to move again before the game ends. When it is a player’s turn, they have two possible actions: grab (G) money or share (S) money. If the player grabs money, the player gets 2/3 of the current pile of money, the other player gets 1/3 of the pile of money, and the game is over. If the player shares, then the current pile of money is multiplied by 3/2 and the next player gets to do their turn. In the last stage of the game in which player two makes their last decision, if the player chooses to share then the pile of money is multiplied by 3/2, player two gets 1/3 of the pile and player 1 gets 2/3 of the pile. Represent the game in extensive form.

(4.2) Represent the game in matrix form.

(4.3) Find all Nash equilibria of the game.