DEPARTMENT OF ECONOMICS
SAN JOSE STATE UNIVERSITY
MASTER'S COMPREHENSIVE EXAMINATION

MAY 4, 2018
6:00 P.M. TO 9:30 P.M.
PROCTOR: HUMMEL & LIU

INSTRUCTIONS:

1. Answer ONLY the specified number of questions from the options provided in each section. Do not answer more than the required number of questions. Each section takes one hour.
2. Your answers must be on the paper provided. No more than one answer per page. Do not answer two questions on the same sheet of paper.
3. If you use more than one sheet of paper for a question, write "Page 1 of 2" and "Page 2 of 2."
4. Write ONLY on one side of each sheet. Use only pen. Answers in pencil will be disqualified.
5. Write **------ END -----** at the end of each answer.
6. Write your exam identification number in the upper right-hand corner of each sheet of paper.
7. Write the question number in the upper right-hand corner of each sheet of paper.

Section 1: Microeconomic Theory—Answer Any Two Questions.

1A. (Rietz) Answer the following questions for a consumer with utility function $U(x, y) = x^{1/3} y^{2/3}$ and a budget constraint $I = p_x x + p_y y$, where "I" is the total amount of income the consumer has available to spend, p_x is the price of x and p_y is the price of y.

a. What is the marginal utility of x? of y?

b. In one to two sentences, define the economic meaning of the term "marginal utility."

c. What is the marginal rate of substitution for the given utility function?

d. In one to two sentences define the economic meaning of the term "marginal rate of substitution."

e. Using the Lagrange multiplier method, find the (Marshallian) demand curves for x and y. Use lambda, λ, as the Lagrange multiplier.

f. In a sentence or two, define the economic meaning of the Lagrange multiplier.

1B. (March) Suppose a monopolist faces market demand (D_m) of $P(q) = a - bq$ and whose cost is $C(q) = cq$ where c is a positive constant.

a. What the marginal revenue of the monopolist?

b. What is the monopoly price?

c. What is the monopolist's output at the price found in part (**b**)?

d. What would be the market clearing price and quantity under perfect competition?"

(over)

1C. (Liu) Suppose it is thought that variable *y*—say, the quantity demanded—depends upon variable *x*—say, price or income. Suppose that we observations (x_i, y_i) of both variables at i= 1, 2, 3. Then the technique of linear regression seeks to fit a linear function to the data:

$$y = b_0 + b_1 x$$

Of course, an exact fit is possible only if there exist numbers b_0 and b_1 for which $y_i = b_0 + b_1 x_i$ for i = 1, 2, 3. This is rarely possible. Generally, however b_0 and b_1 may be chosen, one has instead:

$$y_i = b_0 + b_1 x_i + e_t, \qquad i = 1, 2, 3$$

where e_t is an error term. Obviously, one hopes that the errors will be small, on average. So the parameters b_0 and b_1 are chosen to make the errors "as small as possible." This is done by minimizing sum of squared errors:

$$\sum_{i=1}^{3} (y_i - b_0 + b_1 x_i)$$

Derive the ordinary least squares estimates of b_0.