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

MAY 7, 2021
6:00 P.M. TO 9:30 P.M.
PROCTOR: PROCTORU

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. (Liu) A monopolist is faced with the demand function f (Q) = $a + b * Q$, denoting the price when output is Q. The monopolist has a constant average cost c per unit produced. a > 0, c > 0, and b < 0.

(a) Find the profit function Π (Q).
(b) Prove that the first-order condition for maximal profit at $Q^* > 0$ is:
$f(Q^*) + Q^* * f'(Q^*) = c$
(c) Find how the monopolist's choice of optimal production Q^* is affected by changes in c.
(d) How does the optimal profit react to a change in c?

1B. (Hajikhameneh)

The following game is a version of the Prisoners' Dilemma.

		Suspect 2: Fink	Suspect 2: Silent
Suspect 1	Fink	0,0	4,-1
	Silent	-1,4	1,1

(i) Find the Nash Equilibrium.

(ii) Suppose the stage game is repeated infinitely many times. Compute the discount factor required for their suspects to be able to cooperate on silent each period.

1C. (Hajikhameneh)

A firm produces output q using a production function $f(L,K) = \frac{1}{12}L^{\frac{1}{3}}K^{\frac{2}{3}}$ where L is labor and K is capital.

Capital K is fixed at a level $\overline{K} = 8$, and its price is $r = 10$. Denote the price of labor as w, and the price of output as p.

(i) For $w = 1$, calculate the firm's short-run total cost function $STC(q)$, short-run average cost function $SAC(q)$, and short-run marginal cost function $SMC(q)$?

(ii) If this a price-taking firm and the market price is $\overline{p}$, calculate the firm's profit function $\pi = (q, \overline{p})$? What is the optimal level of output $q^*(\overline{p})$?

(iii) At the input prices (r, w), calculate the firm's long-run total cost function $LTC(q, r, w)$, long-run average cost function $LAC(q, r, w)$, and Long-run marginal cost function $LMC(q, r, w)$?