**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. (Econ 201 – Chiu) Nathan's preferences for sauce (x_s) and pasta (x_p) are described by the utility function $U(x_s, x_p) = \min(x_s, x_p)$. He has an income of $M = 6$, and the price at the store for a unit of pasta is $p_p = 1$ and the price for a unit of sauce is $p_s = 2$.

    a) What is the maximum amount of utility Nathan can derive given this scenario?
    b) Suppose there is a promotion where if you buy 2 units of sauce you get 1 unit of sauce free. Does this change the maximum amount of utility Nathan derives? Explain why or why not.

1B. (Econ 201 – Hajikhameneh) Find and describe the Bayesian–Nash equilibrium in the following game. There are two players in this game; Player 1 and 2. The top and bottom payoffs belong to Player 1 and Player 2, respectively.
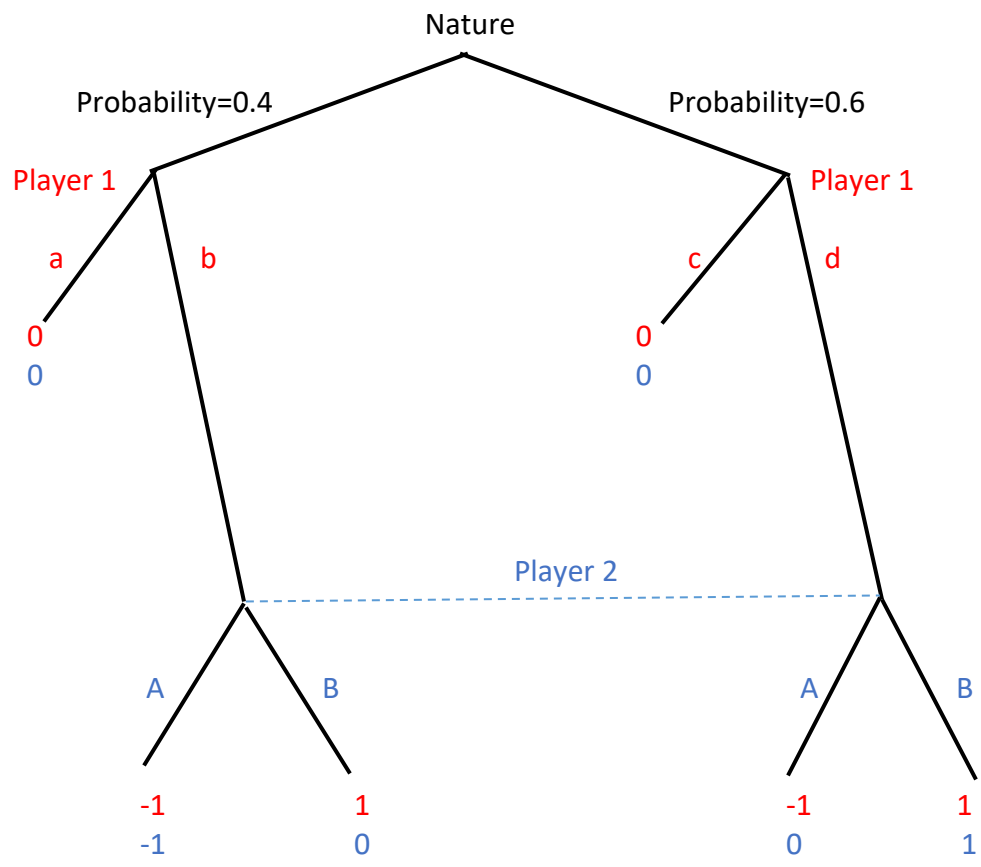
1C. (Econ 104)

a) A firm's production function is given by
$$Q = KL$$
Unit capital and labor costs are \$2 and \$1 respectively. Use Langrage multiplier to find the maximum level of output if the total cost of capital and labor is \$6.

b) Repeat part (a) when the total cost constraint is changed to $7.
c) Estimate the change in the optimal value of Q if the total cost constraint is changed to $7.
d) Verify that the value of the Lagrange multiplier in part (a) is approximately the same as the change in the optimal value of Q when the right-hand side of the constraint is increased by one unit.

(over)