

**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 3: Applied Economics—Answer Any Two Questions.**

**3A.** (Econ 221: Holian) Consider two firms engaged in a simultaneous output determination game. Inverse demand for the output is given by  $P = 12 - Q$ , where  $P$  is price, and  $Q$  is total output (i.e.  $Q = q_1 + q_2$ , where  $q_i$  is the output of firm  $i$ .) Firm 1 has total cost function given by  $C_1 = 2 + 2q_1$  and Firm 2 has a total cost function given by  $C_2 = 4 + 4q_2$ . How much output will each firm produce in equilibrium?

**3B.** (Econ 212: Haight) Consider economic growth in the developing world.  
**a.** Explain the role of agriculture generally in development. Is it important? Why?  
**b.** Draw the Fei-Ranis Two-Sector Labor Surplus Growth Model. What are its implications? How does it differ from the Neo-classical Two-Sector Growth model?

(over)

**3C.** (Econ 232: Foldvary) Given that:

- 1) economic (Haig-Simons) income equals consumption plus the real change in net worth, measured per year, including the implicit income from owner-occupied goods, and that
  - 2) economic consumption is the using up of economic value, including all depletions of net worth, and flows of services even when the stock is not depleted, measured per year, and that
  - 3) one possible source of consumption is borrowing,
- compare and contrast the theoretical deadweight loss from a flat-rate tax on all economic income versus a flat-rate tax on all economic consumption, aside from the difficulty of calculating the amounts.

**3D.** (Econ 138: Liu) Answer all parts of this question:

- a. Write down an ARIMA (3, 1, 1) model using backshift notation.
- b. Assuming we have observations up to time  $T$ , use the model in part (a) to illustrate the steps to calculate point forecasts for period  $T+1$  and  $T+2$ .
- c. When fitting an ARIMA model to a set of (non-seasonal) time series data, what are the procedures and associated R commands?
- d. What are the common problems with classical decomposition?

**3E.** (Econ 250: Deyo) Illustrate the cobweb model, labeling everything. Then answer the following:

- a. What are the three types of expectations associated with this model? Explain.
- b. Relate the implications of this model to firms seeking high-skilled immigrant labor. What factors would influence the trade-off between domestic and immigrant labor in this type of market? Are there other models that might inform the analysis of these trade-offs? Discuss.
- c. Congress passes a law dictating a binding *maximum* wage for this market. What are the implications for the supply of labor in this market? What long-run effects can you anticipate? Discuss.