

**ECON 001**  
**Fall 2021**  
**Final**  
**December 21, 2021**  
**Time Limit: 120 Minutes**

**Name (Print):** \_\_\_\_\_

**Penn ID number:** \_\_\_\_\_  
**(8 digits)**

- 
- This exam contains 11 pages (including this cover page) and 16 questions. Check to see if any pages are missing.
  - The exam is scheduled for 1 hour.
  - The total score is 24 points.
  - This is a closed-book, closed-note, no calculator exam.
  - Answer each multiple-choice question by filling in the bubble for the answer you select. Make sure that the bubble is clearly filled in, or it will be marked incorrect.
  - Write your answers to the short answer questions in the spaces provided for them. Do not write your answers outside of the boxes.
  - Do not remove any pages or add any pages. No additional paper is supplied
  - Show your work when asked. Label all graphs carefully.
  - This exam is given under the rules of Penn's Honor system.

**My signature certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination.**

Please sign here \_\_\_\_\_ Date \_\_\_\_\_

## Multiple Choice Questions (best 12 out of 13: 9 points)

1. (1 point) Aaron is spending the weekend at his aunt's house in the Jersey Shore. Once there, he has three choices for how to spend his day. He can go to the beach with his friends, at a benefit of \$20 and no cost, he can see the new Boss Baby movie for \$15 but values it at \$25, or he can go to a picnic, where he will spend \$20 on food but would be willing to spend up to \$35 to go. What is the opportunity cost of going to the movies?

- \$25
- \$20
- \$35
- \$10

2. (1 point) When Sally goes to the store each week, she purchases 4 packages of cookies and 3 pints of ice cream. This week the price of cookies increased, and she only purchased 2 pints of ice cream. Which of the following must be true?

- I. Ice cream is a normal good for Sally
- II. Ice cream is an inferior good for Sally
- III. Cookies and ice cream are complements for Sally
- IV. Cookies and ice cream are substitutes for Sally

- I and IV
- II and III
- I and III
- III only
- IV only
- II and IV

3. (1 point) Every week, Sarah spends \$30 to buy apples or oranges, and she views 2 oranges as a perfect substitute for 1 apple. To buy fruits, Sarah has two options:

- She can walk to Trader Joe's at no cost, where prices of apples and oranges are \$5.5 and \$2.5 respectively, or
- She can take an Uber for \$6 round trip to go to Aldi, where the prices of apples and oranges are \$3 and \$2 respectively.

Which of the following is correct?

- Sarah prefers to shop at Aldi
- Sarah prefers to shop at Trader Joe's
- She is indifferent between shopping at Aldi and at Trader Joe's
- Not enough information.

4. (1 point) Bob owns a food truck selling sandwiches in a competitive market. Bob's total costs are  $TC(q) = 16 + 8q + q^2$  and his marginal costs are  $MC(q) = 8 + 2q$ . If the market price is  $P = \$10$ , which of the following statements are true?

- I. Bob shuts down his food truck immediately (in the short run)
  - II. Bob makes a negative profit
- Only I

- Only II
- Neither I nor II
- Both I and II

5. (1 point) Suppose the market for coffee in Philadelphia is perfectly competitive and in a long run equilibrium. A new study comes out in The Daily Pennsylvanian that shows that higher coffee consumption leads to higher scores on tests. How does this study affect the new **long run** equilibrium?
- The quantity of coffee produced by each coffee shop increases
  - The price of coffee increases
  - The average total cost (ATC) of the coffee shops increases
  - None of the above is true
6. (1 point) The market for chocolate chips bagels is characterized by a downward-sloping demand and a perfectly inelastic supply. Suppose the government imposes a binding price floor. Which of the following statements are true above the market outcome?
- I. The outcome will be inefficient because too few bagels will be exchanged
  - II. The outcome will be inefficient because producer surplus will be too large
  - III. The outcome will be efficient because the supply is perfectly inelastic
- Only I
  - Only II
  - Only III
  - I and II
  - II and III
  - I, II and III
7. (1 point) Belgium and France produce waffles and éclairs. The French labor force is six times as large as the Belgian labor force. A French worker can produce either 1 waffle or 3 éclairs per hour. A Belgian worker can produce either 2 waffles or 2 éclairs per hour. Suppose France and Belgium trade pastries on the world market at a price of 1 waffle for 4 éclairs. Which of the following are true?
- I. France has absolute advantage in éclair production over Belgium.
  - II. Belgium has comparative advantage in éclair production over France.
  - III. France should specialize in éclair production.
  - IV. Belgium should specialize in waffle production.
  - V. Belgium has absolute advantage in waffle production over France.
- I and V, only.
  - I, III, IV, and V, only.
  - I, II, IV, and V, only.
  - I, IV, and V, only.
  - All of the above
8. (1 point) Al and Edward live in Central City. The park near their homes has fallen into disarray and so the government is considering a plan to have it regularly landscaped. Al's benefit from the landscaping is  $MB^A = 80 - 20q$ , while Edward's is  $MB^E = 30 - 10q$ , where  $q$  is the number of visits by the landscaping crew per month. If it costs \$50 per visit, what is the efficient number of visits  $q_E$  per month?

- $q_E = 30/20$
- $q_E = 2$
- $q_E = 0$
- $q_E = 3$

9. (1 point) Sky Rover is a single price monopoly that produces flying cars. It faces a downward sloping demand and increasing marginal cost. The production of Sky rover cars generates rocket gas, which purifies the air and has a positive externality bystanders. Suppose the government can give Sky Rover a per-unit subsidy equal to the marginal external benefit it generates. Which of the following is true:

- Sky Rover will produce the efficient quantity with the subsidy and consumer surplus will be higher than with no subsidy.
- Sky Rover will produce the efficient quantity with the subsidy and consumer surplus will be lower than with no subsidy.
- Sky Rover will produce less than the efficient quantity with the subsidy and consumer surplus will be higher than with no subsidy.
- Sky Rover will produce less than the efficient quantity with the subsidy and consumer surplus will be lower than with no subsidy.
- None of the above.

10. (1 point) The market for cereal is monopolistically competitive. Which of the following is true in long-run equilibrium?

- Relative to the short-run, a firm's average cost curve increases until it is tangent to the firm's demand.
- Relative to the short-run, a firm's demand becomes more elastic.
- Firms choose to produce the quantity at which their marginal cost equals the market price.
- A firm's demand curve is tangent to its marginal cost curve.

11. (1 point) What is true about the following game? (*in each cell, the first payoff goes to Row and the second payoff goes to Column*)

		Column	
		<i>L</i>	<i>R</i>
Row	<i>T</i>	1, 1	-1, 2
	<i>B</i>	2, -1	0, 0

- I. The game has a dominant strategy equilibrium.
  - II. (B; R) is a Nash equilibrium.
  - III. The game has a Nash equilibrium that is Pareto Efficient
  - IV. The game has more than one Nash equilibrium
- I only
  - II only
  - III only
  - IV only
  - I and II
  - II and IV
  - II and III
  - III and IV

12. (1 point) Jeffery and Walter both work as personal assistants to Sam Elliott. Both currently supply 30 hours of labor per week. In a moment of generosity, Mr. Elliott increases both of their pay by twenty percent. Given this increase Jeffery decides to work 25 hours per week and Walter decides to work 33 hours per week. Which of the following statements is correct?

- I. For Walter, leisure *must be* a normal good
  - II. For Jeffery, leisure *can be* an inferior good
  - III. The cost of leisure *must be* higher for Walter than for Jeffery
- I only
  - II only
  - III only
  - I and II
  - I and III
  - II and III
  - I, II and III
  - None

13. (1 point) Suppose the Duke of Arrakis institutes a child tax credit, which provides subsidies to low-income households with children. As a result of this policy:

- I. The income Lorenz curve will move further away from the 45 degree line
  - II. The (income) Gini coefficient will decrease
- I only
  - II only
  - I and II
  - Neither I nor II

## Short Answer Questions (16 points total)

To get any point you must show your work

14. Consider a world with only two countries: Malaysia and Indonesia. The Malaysian market (domestic) for palm oil can be described by a downward sloping demand  $P = 30 - 2Q_D$  and an upward sloping supply  $P = 6 + Q_S$ . The quantity is measured in million pounds.

(a) When international trade is not allowed (*Show your work in the box below*):

- The autarky price for the palm oil is \_\_\_\_\_ dollars per pound.
- Consumer surplus is \_\_\_\_\_ million dollars
- Producer surplus is \_\_\_\_\_ million dollars.

(b) Suppose the price for palm oil when trading with Indonesia is  $P_W = \$10$  per pound. With free trade:

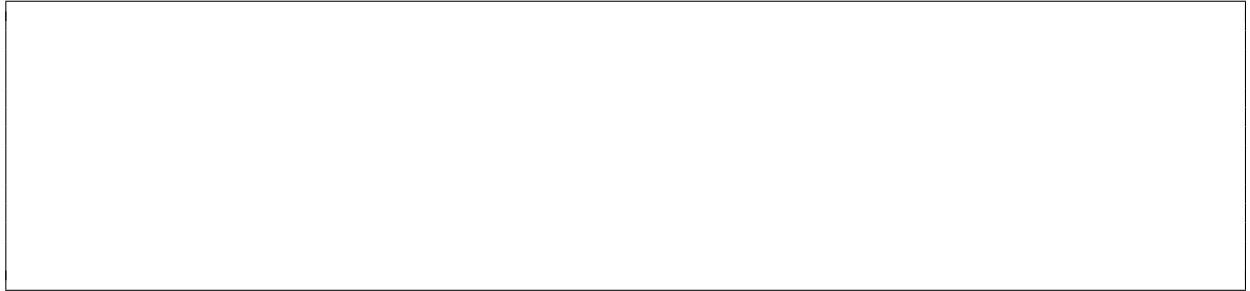
- Imports are \_\_\_\_\_ million pounds of palm oil.
- Compared to autarky (*increases/ decreases/ does not change*):
  - Domestic consumer surplus in Malaysia \_\_\_\_\_
  - Domestic producer surplus in Malaysia \_\_\_\_\_

(c) The Malaysian government decides to impose a tariff of \$2 per pound. With the tariff:

- Imports are \_\_\_\_\_ million pounds of palm oil.
- The government's tariff revenue is \_\_\_\_\_ million dollars.
- Compared to free trade (*increases/ decreases/ does not change*):
  - Domestic consumer surplus in Malaysia \_\_\_\_\_
  - domestic producer surplus in Malaysia \_\_\_\_\_

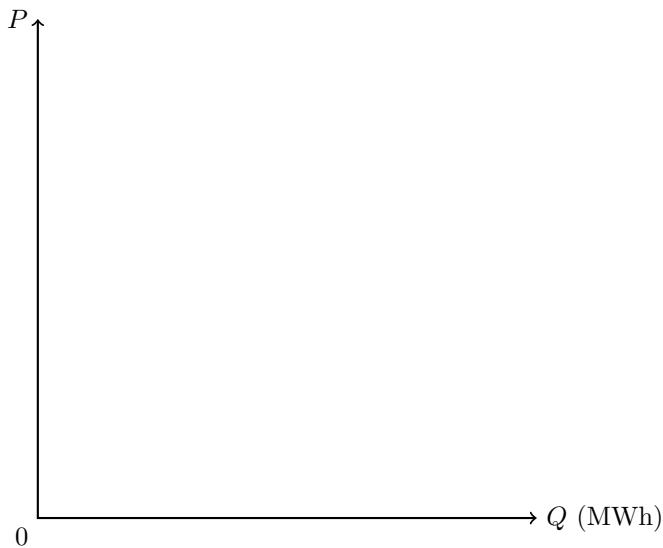
(d) Suppose the world price is still  $P_W = \$10$  per pound, and there is still a \$2 tariff. A technological advancement for processing palm oil in Malaysia increases Malaysia's domestic supply (*it shifts out*). The new domestic supply is  $P = Q_S$ .

- The new prevailing price in Malaysia is \_\_\_\_\_ dollars per pound.
- Malaysia \_\_\_\_\_ [NewQuantity] to/from Indonesia.



15. Suppose PEKO is a natural monopoly for electricity in University City. The market demand for electricity is given by  $P = 10 - 0.1Q$  where units of  $Q$  are in MWh and the price is in dollars. Assume its fixed cost and marginal cost are given by  $FC = \$100$  and  $MC = \$2$ , respectively.

- (a) Plot the market demand ( $D$ ), marginal cost ( $MC$ ), and marginal revenue ( $MR$ ) on the graph below. Label all intercepts.



- (b) Fill-in the blanks and label  $Q_M$ ,  $P_M$  and  $Q_E$  on the graph above:

- The monopoly quantity is  $Q_M =$  \_\_\_\_\_
- The monopoly price is  $P_M =$  \_\_\_\_\_ dollars
- The efficient quantity is  $Q_E =$  \_\_\_\_\_
- The deadweight loss generated by the monopoly is  $DWL =$  \_\_\_\_\_

- (c) Suppose the government is considering granting a per-unit subsidy to the firm in order to restore efficiency, without imposing any price regulation. *Show your work in the box below.*

- The government should grant a subsidy  $s =$  \_\_\_\_\_ dollars per unit
- The government expenditure would be equal to \_\_\_\_\_ dollars.

(d) The government realizes that a per-unit subsidy by itself is too costly and now considers regulating it with marginal cost pricing.

i. Explain why the government should subsidize PEKO to achieve efficiency.

ii. Suppose the subsidy is a per-unit subsidy (*Show your work in the box below*):

- The government should grant a subsidy  $s =$  \_\_\_\_\_ dollars per unit
- The government expenditure would be equal to \_\_\_\_\_ dollars.

(e) Suppose environmentalists are strongly against the above policies because they think that power plants producing electricity emit pollutants which contribute to global warming. Suppose the marginal external cost generated by PEKO is \$4 per MWh.

i. Fill-in the blanks (*Show your work in the box below*):

- The socially efficient quantity is  $Q'_E =$  \_\_\_\_\_
- The total external cost at the socially efficient quantity is equal to \_\_\_\_\_ dollars

ii. Should a per-unit tax or subsidy be introduced to achieve a socially efficient quantity? If so, find its amount.



iii. Now suppose that PEKO can perfectly price discriminate. Should a per-unit tax or subsidy be introduced to achieve a socially efficient quantity? If so, find its amount.

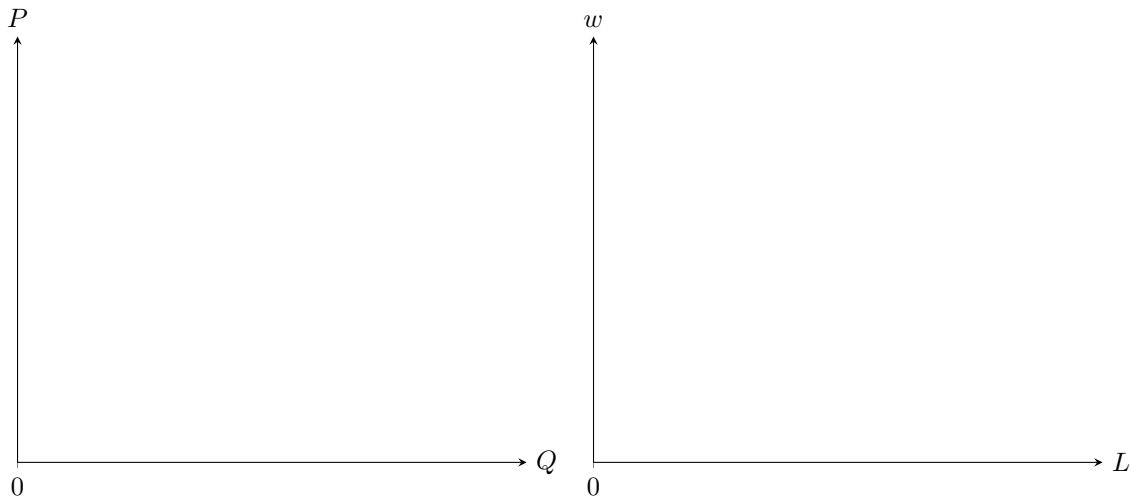
16. The perfectly competitive market for automobiles is characterized by an upward-sloping supply curve  $Q_S = P + 4$  and a downward-sloping demand curve  $Q_D = 8 - P$ . Consider the labor market for automobile workers. Suppose the marginal revenue product of labor is given by  $MRP_L = 60 - L$ .

(a) Find the marginal product of labor for each worker as a function of  $L$  (*Show your work in the box below*):  
 $MP_L =$  \_\_\_\_\_

(b) Suppose the labor market is perfectly competitive, with a market labor supply  $S_L$  given by  $w = 2L$  and a market labor demand  $D_L$  given by  $w = 60 - L$ . Fill-in the blanks:

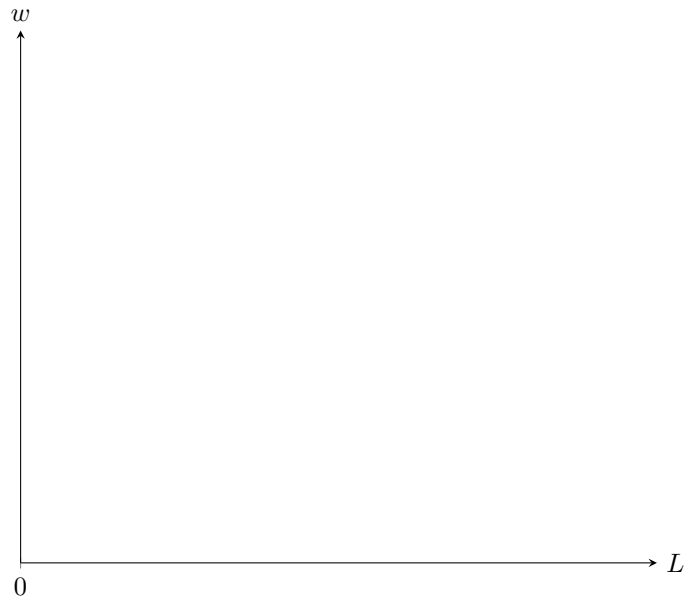
- The competitive equilibrium level of employment is  $L =$  \_\_\_\_\_
- The competitive equilibrium wage is  $w =$  \_\_\_\_\_

(c) Suppose that gasoline prices rise, causing demand for automobiles to fall. On the two graphs below, draw (1) the effect of this change on the output market, (2) the effect on the labor market, and (3) the feedback effect of the change you drew in (2) on the output market. Explain in words the effect of this change in the output market on prices and quantities in both markets.



(d) Suppose now that automobile manufacturers coordinate to make the labor market for automobile workers a monopsony. In the graph below, draw the marginal revenue product of labor  $MRP_L$ , labor supply  $S_L$ , and

marginal cost of labor  $MC_L$ . Make sure to label all intercepts.



Fill-in the blanks and label  $w_m$  and  $L_m$  on the graph above:

- The monopsony equilibrium level of employment is  $L_m =$  \_\_\_\_\_
- The monopsony equilibrium wage is  $w_m =$  \_\_\_\_\_
- The monopsony equilibrium level of unemployment is \_\_\_\_\_

(e) Congress is considering imposing a minimum wage of \$30. Describe in words the effects of the minimum wage:

- On employment and unemployment
- On the deadweight loss, if any.