ECON 001
Fall 2018
Final Exam
December 13, 2018
Time Limit: 120 Minutes

Name (Print): _____

Recitation Section: _____

Name of TA: _____

- This exam contains 12 pages (including this cover page) and 17 questions. Check to see if any pages are missing.

- The exam is scheduled for 2 hours.

- This is a closed-book, closed-note exam, no calculator exam.

- Answer each multiple choice question by writing the correct answer on the line at the right margin of the corresponding question. Make sure that your answer is clearly written or it will be marked incorrect.

- Write your answers to the short answer questions in the spaces provided below them. If you don't have enough space, continue on the back of the page and state clearly that you have done so.

- Do not remove any pages or add any pages. No additional paper is supplied

- Show your work when applicable. Use diagrams where appropriate and label all diagrams carefully.

- You must use a pen instead of a pencil to be eligible for remarking.

- 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 _____

Question	Maximum	Grade
MC (Q1-14)	39	
1st SA (Q15)	20	
2nd SA (Q16)	21	
3rd SA (Q17)	20	
Total	100	

Multiple Choice Questions (best 13 out of 14: 39 points)

1. (3 points) Doug spends all his money on books and beer. When Doug quit his job and moved to the United States to attend graduate school, his income fell by 50%. Fortunately, beer (an inferior good) is 50% cheaper in the USA. The price of books (a normal good) is the same as in his home country. Which of the following is true?

   A. Doug consumes less of both goods.
   B. Doug consumes more of both goods.
   C. Doug consumes less beer and more books.
   D. Doug consumes fewer books but more beer.

   1. —————————

2. (3 points) Suppose that milk and cookies are complements. A technological innovation in the cookie industry has affected the equilibrium price of cookies. Which of the following can be said about the new equilibrium in the milk market?

   A. Equilibrium price will increase.
   B. Equilibrium price will decrease.
   C. Equilibrium quantity supplied will decrease.
   D. Both equilibrium price and equilibrium quantity will decrease.

   2. —————————

3. (3 points) The market for pumpkins is perfectly competitive. The price is equal to P= 5$. In the short run, Jack is growing 100 pumpkins and his Fixed Cost amounts to 300$. How much is his Variable Cost?

   A. At least 500$
   B. Exactly 500$
   C. At most 500$
   D. Zero

   3. —————————

4. (3 points) The market for sugar is initially in equilibrium with a perfectly inelastic demand line ($Q_D = 10$) and an upward-sloping supply line ($Q_S = P$). Suppose that the government sets a price floor at \$12. Compute the change in Producer Surplus (PS) and the size of Deadweight Loss (DWL).

   A. PS increases by 20, DWL is 0.
   B. PS increases by 22, DWL is 0.
   C. PS increases by 20, DWL is 2.
   D. PS increases by 22, DWL is 2.
   E. PS remains the same, DWL is 0.

   4. —————————

5. (3 points) When a new tax was recently imposed on craft beer in Pennsylvania, it was noted that the price per can went up only by a small fraction of the applied per unit tax. Which of the following MUST be true?

   I. The revenue from the tax is at most twice the price change multiplied by the total quantity.

   II. The market for craft beer is controlled by a single firm.

   III. Demand is relatively elastic compared to supply.

   IV. Supply is relatively elastic compared to demand.

   A. I, II and IV   B. I and IV   C. II and III   D. III only   E. IV only

5. _____

6. (3 points) Suppose that demand for wheat is downward sloping and the supply is upward sloping. There are no externalities in this market. If the government removes existing subsidies on wheat, which of the following statements is true?

   A. Consumer Surplus increases, but Producer Surplus decreases. Total Surplus increases.
   B. Consumer Surplus decreases, but Producer Surplus increases. Total Surplus increases.
   C. Consumer Surplus and Producer Surplus decrease, so Total Surplus decreases.
   D. Consumer Surplus and Producer Surplus decrease, but Total Surplus increases.

6. _____

7. (3 points) Suppose, in a given year, that Country A can produce 100 apples and 200 bananas per acre, while Country B can produce 200 apples and 300 bananas per acre. Suppose the two countries trade with each other. Which of the following are true?

   I. Country A has comparative advantage in banana production

   II. There is no mutually beneficial exchange at a price of 1 banana per apple

   III. Country B has comparative advantage in apple production

   IV. The two countries would gain from trading with each other at a price of 1 banana per apple

   A. Only II   B. Only IV   C. I and III   D. I, II and III   E. I, III and IV

7. _____

8. (3 points) Consider the perfectly competitive market for soda in the city of Philadelphia where demand is downward sloping and supply is upward sloping. Suppose that equilibrium price is $3 and equilibrium quantity is 100 in this market. A recent scientific study shows that soda consumption leads to obesity, which can be expensive for society. Suppose that the study result is correct, and that the size of this externality is a constant $1 per unit. The Mayor wants to impose a tax on soda to achieve the socially efficient quantity of soda. If the goal is achieved, how large would be the tax revenue?

   A. Exactly $100
   B. At least $100
   C. Less than $100
   D. Not enough information to tell

8. _____

9. (3 points) ABC Inc is the only seller on the local flower market. It faces a downward sloping demand curve. Consumption of flowers will create positive externality: the flower in your yard will make the whole neighborhood happier. ABC Inc has a upward sloping marginal cost curve and sets a single price that maximizes the firm's profit. Consider comments below:

   I. The quantity such that market demand intersects the firm's marginal cost curve is socially efficient.

   II. ABC Inc produces less than the socially efficient quantity.

   III. ABC Inc generates a deadweight loss

   Which of the above is (are) unambiguously correct?

   A. Only I   B. I and II   C. II and III   D. I and III   E. I, II and III

   9. _____

10. (3 points) ABC Inc is the only seller on the local flower market. It faces a downward sloping demand curve $P = 10 - Q$, where P is the market price. ABC Inc has a constant marginal cost $MC = 2$. If the firm is able to perfectly price discriminate instead of charging a single price:

   A. Profit increases by 4
   B. Profit increases by 16
   C. Profit increases by 32
   D. Not enough information

   10. _____

11. (3 points) Aleem and Zaaheer are in charge of buying the food for Christmas lunch this year but forgot to co-ordinate what to buy. Aleem is supposed to buy the meat and Zaaheer is supposed to buy the sides. As Christmas is going to be hot this year the following payoff matrix fully describes the game where they cannot communicate.

		Zaaheer	
		Salad	Vegetables
Aleem	Seafood	$2, 2$	$0, 0$
	Turkey	$0, 0$	$1, 1$

   What is (are) the Nash Equilibrium (-ia) of this game and how many Pareto Efficient outcomes are there?

   A. (Seafood, Salad); 1
   B. (2, 2); 1
   C. (Turkey, Vegetables); 1
   D. (Seafood, Salad) and (Turkey, Vegetables); 2
   E. (Seafood, Salad) and (Turkey, Vegetables); 1
   F. (2,2) and (1,1); 2

   11. _____

12. (3 points) Suppose a monopsonist facing an upward sloping labor supply curve. What is the impact of a decrease in the output demand?

    A. Increase in monopsonist wage and increase in employment
    B. Increase in monopsonist wage and no change in employment
    C. No change in monopsonist wage and increase in employment
    D. Decrease in monopsonist wage and decrease in employment

    12. _____

13. (3 points) The government decides to construct greenbelt to make the city look more beautiful. The marginal cost of the greenbelt is $2000Q + $4000 (the unit of Q is acre). Suppose there are 1,000 people in the city, each values the greenbelt at $10 per acre. How many acres of greenbelt will the government construct?

    A. 0.5
    B. 1
    C. 2
    D. 3

    13. _____

14. (3 points) The government of an economy decides to increase the income tax rate from 10% to 20% for everyone. What is the immediate impact?

    A. The Gini ratio increases and income inequality increases
    B. The Gini ratio increases and income inequality decreases
    C. The Gini ratio decreases and income inequality increases
    D. The Gini ratio decreases and income inequality decreases
    E. The Gini ratio stays the same and so does income inequality
    F. Not enough information

    14. _____

Short Answer Questions (61 points total)
To get any point you must show your work.

15. Suppose that the labor market for widget workers is characterized by a downward-sloping labor demand curve and an upward-sloping labor supply curve.

    For parts (a) - (c), assume that the labor and output market for widgets is perfectly competitive.

    (a) On the graphs below, draw the market labor supply and demand curves on the left hand side, and an individual widget firm's labor demand and the individual supply curve on the right hand side. Label the equilibrium market wage w^* and market employment L^*, as well as the individual firm's employment l^*. Is there unemployment? Explain.
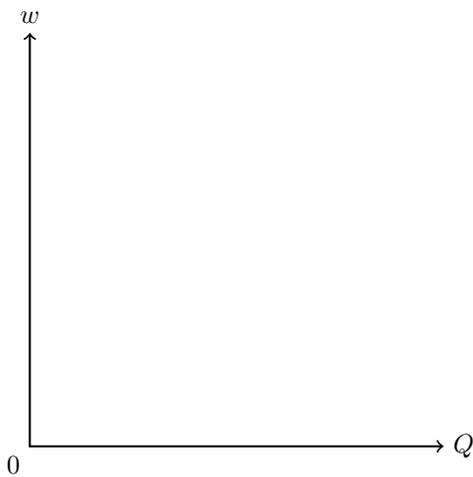

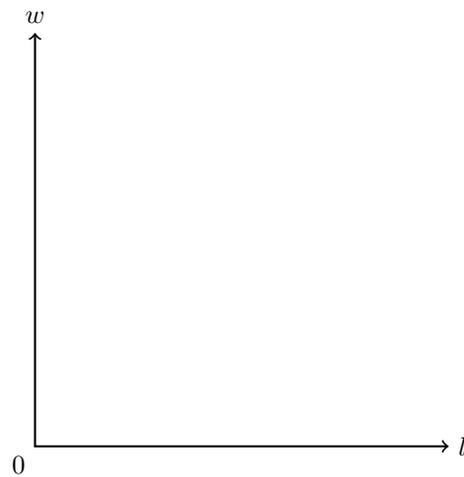Figure 1: **Market for labor**

Figure 2: **Individual Firm**

    (b) Assume that the labor market for widgets is in the equilibrium described in part (a). Congress proposes imposing a minimum wage above the current equilibrium wage. How does this minimum wage regulation affect the wage and the levels of employment and unemployment? Explain in words and show graphically on the graphs above.

(c) The minimum wage legislation fails, and the market remains in the equilibrium described in part (a). A new policy change lowers the cap of visas for immigrant workers in the widget labor market, causing workers to immediately exit the labor supply.

Explain *in words* how this change in the labor market affects:

- the price and quantity of widgets in the widget market
- the wage, employment, and unemployment levels in the labor market

(You can use the space below the graphs to answer)

Show the first- and second-round effects (i.e. the "feedback effect") below, where the left graph represents the (labor market) for widget workers, and the right graph represents the (output) market for widgets.
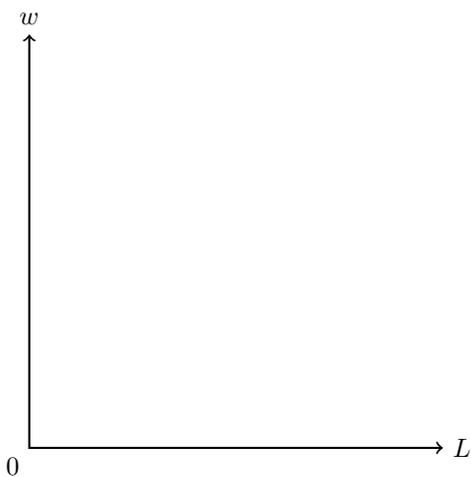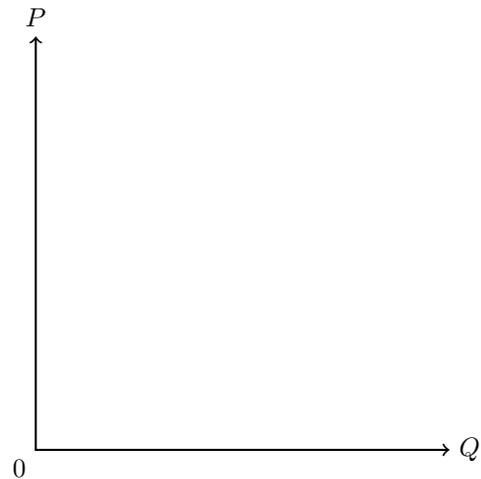
Figure 3: **Labor market for widget workers**   Figure 4: **Market for widgets**

Suppose for the remainder of the question that all the widget firms unite into an employers' organization and coordinate their actions in the labor market so that now they behave as a single employer.

(d) Draw the employer's individual labor supply and demand and marginal cost curves on the graph below. Label the monopsony wage and employment. Is the monopsony efficient? Explain.
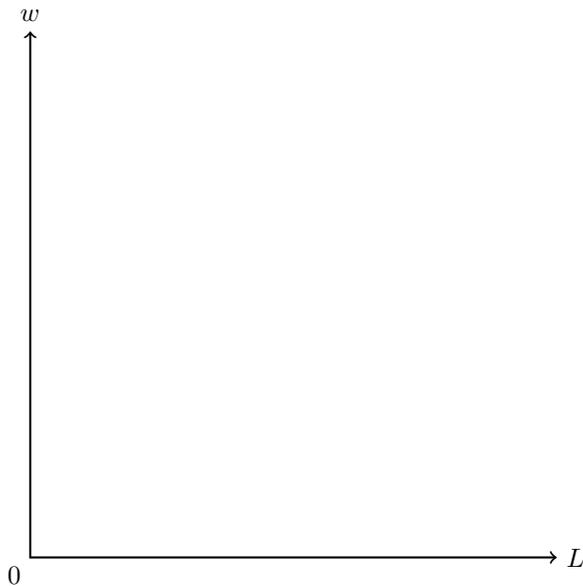
(e) Congress again proposes a minimum wage, above the monospony wage. They argue that when widget firms behave as a single employer, such a minimum wage will always increase employment and decrease unemployment. Are they correct? Explain.

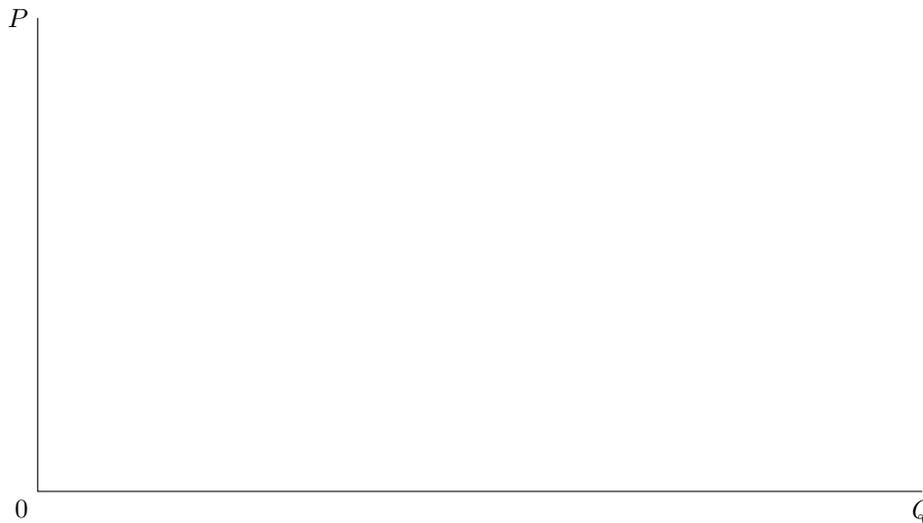16. Consider the market for electricity in the U.S. Assume that the market is initially characterized by a demand $P = 20 - Q_d$ and a supply $P = Q_s$ (units of Q are in MWh and the price is in $\$$).

(a) What is the equilibrium price P^* and quantity Q^* in the electricity market?

(b) On the graph below, draw the market demand and market supply, and label the equilibrium price P^* and quantity Q^*.

(c) Find the total surplus in equilibrium. Is the market efficient? Explain.

Power plants producing electricity typically emit nasty pollutants, including sulfur dioxide and nitrogen oxides, which contribute to global warming. Suppose that every MWh of electricity produced causes damage to the environment equivalent to a constant $\$4$ per MWh.

(d) On the graph above, draw the social marginal cost SMC. Calculate the socially efficient quantity and label it on the graph.

(e) Calculate the social surplus generated by the electricity market. Compare it to the total surplus found in part (c): what does the difference represent?

Suppose the government imposes a tax on electricity production to restore social efficiency.

(f) Explain how the per-unit tax should be determined and calculate it.

(g) Assume this new per-unit tax is implemented. Find:
- the new quantity
- the new prices (sellers' price P_s and buyers' price P_b)
- the government revenue from the tax
- the deadweight loss generated by the tax.

(h) At what level of production would pollution be zero ? Is this efficient ?

17. Thomas and Jack are two brothers who want their parents to build a pool in their backyard. If the pool is built, none of the brother will be excluded from using it, and the use by one brother won't affect the use by the other. The cost of building the pool is constant at $MC = \$40$ per square meter, and there is no fixed cost. The brothers' individual marginal benefits (MB) are:

- Thomas: $MB_T = 30 - 0.2Q$
- Jack: $MB_J = 30 - 0.3Q$,

where Q is the size of the pool, in square meters.

(a) On the graph below, draw the marginal cost MC, as well as Thomas' and Jack's marginal benefits. Label Thomas' MB_T and Jack's MB_J. Make sure to label all intercepts.

$\$$

0 → Q

(b) Suppose the parents are planning to build a $10m^2$ pool.

   i. Find the *total* willingness to pay of each brother for that size. *Hint: the total willingness to pay is the area below the marginal benefit curve.*

   ii. Suppose the parents want to share the total cost of building the $10m^2$ pool equally between the brothers. How much will each brother be charged, and will they accept or reject the parents' offer? Why?

(c) Their parents are reconsidering the size of the pool.

  i. Find the social marginal benefit and draw it on the graph above. Label it SMB.

  ii. Find the socially efficient size of the pool (in square meters). Was $10m^2$ too small or to large compared to the socially efficient size? Why?

  iii. The parents want the cost of the pool to be divided between the brothers based on the benefit they receive. Evaluate this option.

(d) The parents are considering another option to finance the pool. The brothers' yearly allowance is \$4,000 each. The year the parents build the pool, they decide to take a percentage x of the brothers' allowance to finance the construction of the socially efficient pool size. What is the minumum percentage x necessary? What is the total amount that each brother will contribute?