Economics Placement-2017

Economics 105 is our standard one semester introduction to economics. This exam will help us decide who is prepared to pass out of Economics 105. Do not be discouraged if the exam is difficult to you, or if the material seems foreign. 105 covers lots of material, and is different from many high-school courses. Each question is allocated a number of points, and there are 170 total points on the exam. This is a three-hour exam, so you could allocate roughly one minute per point, and have 10 minutes left over. Please fill out the information below before you begin:

Name:

Economics Courses taken:

Math Courses taken:

If you have taken both microeconomics and macroeconomics in high school (or at the college level) and would like to try to pass out of our introductory economics course, Econ 105, you must complete the attached economics placement exam.

Do you want to try to pass out of Economics 105?

_______ Yes  If yes, turn the page and complete the attached placement exam.

_______ No  If no, you are done!  Send in this one page form by email to dowens@haverford.edu or by mail to David Owens 370 Lancaster Ave. Haverford, PA 19041.
Placement Exam – Economics –Summer 2017
Haverford College
3 hour exam

Please print out the exam, complete it and either: scan it back into the computer and send by email to dowens@haverford.edu; or mail to David Owens, Department of Economics, Haverford College, 370 Lancaster Ave, Haverford PA 19041

Name: _____________________________________________________

This exam is closed book and closed notes. You may use a calculator. There are three parts to the exam. The first is 15 multiple choice questions. The second is nine True/False/Explain problems, and the third is thirteen problems/short answer questions. Put all answers on the exam. If you run out of room for the problems, use the back sides of the pages. Be sure to put your name on this page as well as the beginning of both parts of the exam. At the end of the exam, sign the honor pledge.

You have 3 hours to do this exam. The points and suggested time for each set of questions are given in the exam. Good luck!

When you have completed the exam,

HONOR PLEDGE

Please do not sign until examination has been Completed:

I accept full responsibility under the Haverford Honor System for my conduct on the examination.

Signed ________________________________

Name: ___________________________________________
I. **Multiple Choice:** Please circle the correct answer. There is only one correct answer for each question. (*30 minutes and 30 points, 2 for each question.*)

1. Which of the following is true of short-run MC, AVC and ATC curves? (Assume diminishing marginal productivity of inputs.)
   I. The AVC *always* crosses the MC and ATC curves at their minimum.
   II. The AVC *usually* (not *always*) crosses the MC and ATC curves at their minimum.
   III. The MC curve *always* crosses the AVC and ATC curves at their minimum.
   IV. The MC curve *always* crosses the AVC curve at its minimum, but the ATC curve above its minimum.

2. Which of the following describes the relationship between the interest rate and investment in capital?
   I. Investment and the interest rate are not related.
   II. As the interest rate increases, investment increases.
   III. As the interest rate increases, investment decreases.
   IV. Ceteris paribus.

3. Which of the following statements is false?
   I. The Cournot duopoly is a sequential model in which one firm observes the other’s strategy before deciding on their own.
   II. Cartel collusion becomes more sustainable if it will continue for many years.
   III. Firms in a Cournot duopoly earn more profits than firms in a Bertrand duopoly, all else equal.
   IV. Monopolistically competitive firms cannot earn sustained economic profits in the long run.

4. Which of the following is true of a new chair produced domestically in 2014 and sold (still new) in 2015 for $100?
   I. It adds $100 to 2015 GDP.
   II. It adds $100 to 2014 private investment spending (I).
   III. It adds $100 to 2015 private investment spending (I).
   IV. It adds $100 to 2014 consumption expenditure (C).

5. Mr. Bellman retired in 2013 when the factory where he used to work shut down. His skills are now obsolete, and he stopped looking for work and started collecting retirement benefits. Mr. Bellman is:
   I. Not in the labor force.
   II. Structurally unemployed.
   III. Frictionally unemployed.
   IV. Employed.
6. Which of the following does NOT represent production counted in this year’s GDP:
   I. Jake buys a new Ford Focus that was built in Michigan.
   II. Fran, a carpenter, builds four porches, for which he charges $3,000 each.
   III. Lindsay, a professional housekeeper, cleans 250 houses.
   IV. Lindsay, a professional housekeeper, cleans her own house.

7. Consider a monopolist producing at the unit elastic point of the linear demand curve that it faces. This monopolist:
   I. Could increase profits by increasing production.
   II. Is currently maximizing profits.
   III. Is currently maximizing profits only if the marginal cost of production is zero.
   IV. Could increase revenue by decreasing production.

8. What is the annual interest rate of a one year $1000.00 bond that has a price of $800.00?
   I. 20 percent
   II. 80 percent
   III. 5 percent
   IV. 25 percent

9. Andy and Anna have a jewelry shop in which they make and sell necklaces and earrings. Anna can make 10 necklaces or 12 pairs of earrings in an eight hour day. Andy can make 12 necklaces or 16 pairs of earrings in an eight hour day.
   I. Specialization requires that Anna make necklaces and Andy make earrings.
   II. Specialization requires that Anna make earrings and Andy make necklaces.
   III. Specialization is not possible because Andy is more productive in both pursuits.
   IV. Specialization is not possible because no one has a comparative advantage in either pursuit.

10. In a recession an increasing number of discouraged workers will:
    I. Decrease the unemployment rate.
    II. Reduce the labor force participation rate.
    III. Increase the number of people out of the labor market.
    IV. All of the above.

11. As a management consultant to Mystic Transformers, you note that the wage rate they are paying is $8/hour and the rental rate on capital is $1/hour. Currently the marginal product of labor is 40 units and the marginal product of capital is 7 units. You recommend that the firm should:
    I. switch to a more labor intensive technology.
    II. switch to a more capital intensive technology.
    III. keep producing at the current technology.
IV. go out of business.

12. Putting an effective quota on a product (at an output level below the equilibrium output) will:
   I. hurt consumers because prices rise and quantity consumed falls.
   II. have an indeterminate effect on consumers because although there are less products consumed, they are bought at lower prices.
   III. help the producers because prices will be higher and quantities will not change much.
   IV. hurt producers because prices will fall.

13. The Coase theorem on efficient bargaining over externalities will break down when:
   I. There are costs to bargaining.
   II. Property rights are not defined.
   III. There are many parties involved.
   IV. All of the above.

14. If hot dogs and hot dog rolls are complementary goods and unionization of cattleman increases the cost of producing hotdogs, the equilibrium quantity of hot dog rolls will _____ while the equilibrium price of hot dog rolls will _____.
   I. increase; increase
   II. increase; decrease
   III. decrease; decrease
   IV. decrease; increase

15. Imposing a minimum wage (above the equilibrium wage) on the unskilled labor market will result in a _____ reduction in employment, the _______ the labor ______ curve.
    I. Greater; steeper, supply
    II. Smaller; steeper, demand
    III. Smaller; flatter, supply
    IV. Greater, steeper, demand
II. True/False/Explain: Determine whether each of the statements below is true or false, and give a brief (one or two sentences) explanation of your answer. Explain both true and false answers. (27 minutes and 27 points, 3 for each question.)

1. When the income effect and substitution effect of a wage increase are the same (in magnitude), the wage increase has no effect on the number of hours worked.

2. When the income and substitution effect of an increase in the price of restaurant meals is the same, the price increase has no effect on the quantity of restaurant meals demanded.

3. Imposing a tax on the hormone insulin, which is badly needed by people with diabetes, would create a large deadweight loss.

4. When engaging in third degree price-discrimination (charging different prices to different groups of consumers), a profit-maximizing firm charges higher prices to groups with more inelastic demand curves.

5. Income tax in the US is an example of a progressive tax.
6. Because they have a lower marginal tax rate, it is cheaper for a poor family in the US to donate to charity than it is for a rich family.

7. A positive externality accompanies the consumption of Widgets, which are manufactured by a profit-maximizing monopolist. A tax on the sale of Widgets would decrease deadweight loss.

8. The term frictional unemployment refers to unemployment that occurs in depressions and recessions.

9. A US $1 bill is an example of commodity money.
III. Problems and short-answer questions. Explain or justify your answers unless otherwise noted. (113 minutes and 113 Points)

1. **(12 Points)** Theo, Sofia, Ava and Sesame each currently have 2 Widgets and 1 Whatnot, which corresponds to point A on the graphs below. However, they each have different preferences over Widgets and Whatnots, as described. On the corresponding axes below, draw the indifference curve for each of them that includes point A and fits their preferences. *No explanation necessary.*

   a. Theo *only* consumes Widgets and Whatnots in a 1-to-1 ratio. He gets no extra utility from having more of one than the other.

   b. For Sofia, Widgets and Whatnots are always perfect substitutes. She is always indifferent between 1 Widget and 1 Whatnot.

   c. Ava has preferences over Widgets and Whatnots that fit the assumptions of non-satiation and diminishing marginal utility.

   d. Sesame only cares about Whatnots, and is completely indifferent towards Widgets.
2. **(12 Points, 4 each)** Answer the following:
   a. When the price of spaghetti increased from $1.29 to $1.39 per box, Fran cut his consumption from 10 to 8 boxes per month. What is the elasticity of this portion of Fran’s demand for spaghetti?

   b. A 20% increase in the price of running shoes causes Brittany to attend 15 yoga classes per month rather than 10. Are running shoes and yoga complements or substitutes for Brittany? Calculate the cross-price elasticity of Brittany’s demand for yoga classes with respect to the price of running shoes.

   c. A perfectly competitive firm originally employs 10 workers, and the elasticity of the firm’s demand for labor is -2.4. If wages increase from $12 to $15 per hour, how many workers will the firm employ?
3. (5 Points) Kooper’s firm operates in a perfectly competitive market, which is represented in the graphs below. The market is in a long-run equilibrium. Draw an appropriate market demand curve. No explanation necessary.
4. **(10 Points)** The chart below shows the short-run cost function for Mrs. Bellman’s cake shop, which operates in the perfectly competitive market in Newark, DE.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>115</td>
</tr>
<tr>
<td>2</td>
<td>125</td>
</tr>
<tr>
<td>3</td>
<td>133</td>
</tr>
<tr>
<td>4</td>
<td>139</td>
</tr>
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<td>5</td>
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<td>6</td>
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<td>7</td>
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<td>8</td>
<td>184</td>
</tr>
<tr>
<td>9</td>
<td>200</td>
</tr>
<tr>
<td>10</td>
<td>220</td>
</tr>
</tbody>
</table>

a. **(6 Points)** If Mrs. Bellman is motivated only by profit, how many cakes should she produce if the market price is $14? What if the market price is $9?

b. **(4 Points)** Now, assume that the market price is $9, but Mrs. Bellman is motivated by more than profit. Specifically, she gets a ‘psychic benefit’ that she values the same as $5 for each cake that she sells. How many cakes should she produce?
5. **(10 Points)** Casey and Michelle own the only two companies in Newport that make headbands for babies. The market demand curve and cost curves are shown in the graph immediately below.

![Graph showing demand and cost curves](image)

a. **(4 Points)** Assume that Casey and Michelle's companies operate as a *Cournot duopoly*. On the axes below, draw Casey's best response to Michelle's quantity, and Michelle's best-response to Casey's quantity of headbands. Also, indicate the equilibrium. *You do not need to calculate the equilibrium*, just indicate it on the graph. Refer to Michelle's quantity as \( q_M \), and Casey's quantity as \( q_C \).
b. (6 Points, 2 each) Now, assume Casey and Michelle's companies operate as a *Bertrand duopoly*. For each price that Michelle could choose, $p_M$, specify $p^*_C(p_M)$, Casey’s profit-maximizing response to $p_M$. *No explanation necessary.*

i. $p_M = \$6$

ii. $p_M = \$2$

iii. $p_M = \$0.75$
6. **(5 Points)** 1,000 units of each hoodads and whatzits were produced in the United States last year, and each sold for a market price of $1. However, the demand for hoodads was highly elastic, while the demand for whatzits was highly inelastic. How much did each contribute to last year’s US GDP? Which one probably contributed more to the country’s wellbeing?

7. **(9 Points)** The graph below shows a monopolist’s demand (D), marginal cost (MC) and average total cost (ATC) curves. On the same graph, show the monopolists quantity ($Q^M$), price ($P^M$), and profit ($\pi^M$). No Explanation Necessary.
8. (10 Points) Imagine an economy with infinitely many people. Each person knows her own healthcare costs $C$, but the $C$ of each individual is not visible to insurance companies. Insurance companies know, however, that $C$ is evenly spread out between $0$ and $200$ for each person per year. Each person is willing to pay 40% more than her own cost. What price will insurance companies charge for each policy, and what percentage of people will get insurance? Assume that the health insurance market is competitive, so companies earn zero profits.

![Diagram of healthcare costs range from 0 to 200]

9. (5 Points) The chart below shows the Consumer Price Index for the years 2008 to 2014. Use it to calculate the inflation rate for the year 2012. *No Explanation Necessary.*

<table>
<thead>
<tr>
<th>Year</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>96.2</td>
</tr>
<tr>
<td>2009</td>
<td>98.2</td>
</tr>
<tr>
<td>2010</td>
<td>100.0</td>
</tr>
<tr>
<td>2011</td>
<td>102.1</td>
</tr>
<tr>
<td>2012</td>
<td>102.4</td>
</tr>
<tr>
<td>2013</td>
<td>103.0</td>
</tr>
<tr>
<td>2014</td>
<td>103.4</td>
</tr>
</tbody>
</table>
10. **(9 Points)** In 2014, Fran and Justin were both single. Fran earned $36,500, while Justin earned $37,500.

<table>
<thead>
<tr>
<th>Married Couples Filing Jointly Taxable Income</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 - $18,150</td>
<td>10%</td>
</tr>
<tr>
<td>$18,150 - $73,800</td>
<td>15%</td>
</tr>
<tr>
<td>$73,801 - $148,850</td>
<td>25%</td>
</tr>
<tr>
<td>$148,850 - $226,850</td>
<td>28%</td>
</tr>
<tr>
<td>$226,850 - $405,100</td>
<td>33%</td>
</tr>
<tr>
<td>$405,100 - $457,600</td>
<td>35%</td>
</tr>
<tr>
<td>More than $457,600</td>
<td>39.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Single Taxpayers Taxable Income</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 – 9,075</td>
<td>10%</td>
</tr>
<tr>
<td>$9,075 – 36,900</td>
<td>15%</td>
</tr>
<tr>
<td>$36,900 – 89,350</td>
<td>25%</td>
</tr>
<tr>
<td>$89,350 – 186,350</td>
<td>28%</td>
</tr>
<tr>
<td>$186,350 – 405,100</td>
<td>33%</td>
</tr>
<tr>
<td>$405,100 - $406,750</td>
<td>35%</td>
</tr>
<tr>
<td>More than $406,750</td>
<td>39.6%</td>
</tr>
</tbody>
</table>

*Source: The Internal Revenue Service.*

_a. (6 Points) Calculate the amount of federal tax Fran and Justin each pay in 2014, and the average tax rate for each. (No explanation necessary. Assume no deductions or exemptions)
b. **(3 Points)** A public vote will determine whether or not a new park will be constructed. The initiative will increase local taxes by $200, and Fran and Justin have identical preferences over parks. Explain why Fran votes against building the park, while Justin votes for it.
11. **(11 points):** The following equations characterize a closed \((EX=IM=0)\) economy. For this problem, ignore feedback from the money market.

\[
AE = C + I + G \\
C = 10 + .7 \times (Y - T) \\
I = 20 \\
G = 20 \\
T = 20
\]

a. **(5 points):** Find the equilibrium level of output in the economy, \(Y_{EQ}\), assuming that the economy is closed, so \(EX=IM=0\).

b. **(3 points):** What size increase in \(G\) will lead to a $100 increase in \(Y_{EQ}\)?

c. **(3 points):** The government simultaneously increases \(G\) and \(T\). Taxes increase by 5, and \(Y_{EQ}\) increases by 5. By how much did \(G\) increase?
12. (4 Points) A US Treasury bill will yield $2,000 in the year 2020. How much will it be worth in 2017 if inflation is and the real interest rate are both expected to remain constant at 5%? (There is no risk to this asset).
13. **(11 Points)** Complete the following:

   a. **(4 Points)** Draw the IS and LM curves on the axis below. Be sure to label each axis.

   b. **(3 Points)** In words, describe why each curve is shaped in this way.

   c. **(2 Points)** Explain the significance of the point where the curves intersect.

   d. **(2 Points)** What happens to each curve when the government increases taxes?