1. Please read and sign the following statement: "In keeping with the Georgetown Honor System, I assure that this exam is the product of my own work, that I will not make use of unauthorized resources or collaborate with any other student."

   (signature) _________________________________

2. Please write your name, GU ID # (9 digits), and seat carefully and legibly at the top of this page.

3. IMPORTANT: Please fill out a ParScore sheet follows.

   - Under “ID NUMBER” fill out your GU ID # (9 digits) number and corresponding bubbles, right-justified.
   - Write your name and shade the appropriate bubbles.
   - Under “CODE” enter “AA” for the 12:30 exam, “BB” for the 2pm exam.
   - Under “TEST FORM” shade in the letter corresponding to the Version at the top right of this page.
   - Under “SUBJ Score” fill in the number at the top left of this page.

4. You have 1 hour to complete the exam, which consists of

   I. 6 short-answer questions (30 points)
   II. 15 multiple-choice questions (30 points)

   The exam is worth 60 points, so allocate your time accordingly.

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5. You may refer to one 3x5 card with your written notes and use a calculator, but you may not use any other notes or references.

6. If you have a question during the exam, stay seated and raise your hand.

7. When you are done: If there are fewer than 10 minutes left in the exam period, please wait patiently and quietly until the exam period is over. If you have finished more than 10 minutes early, you may quietly bring this exam booklet to the place indicated by the instructors.

   Read the questions carefully. I have tried to be clear. Good luck.
BONUS: 5 easy extra points.

Make sure you have completed the instructions on the front page completely and accurately.

Part I: [30 points out of 60 total].

1. **[3 pts]** A small town has five (5) taxi cabs. Each of the taxi cabs has an identical supply curve as follows:

   \[ q_i^S = 2 \times P - 20 \]

   The town has 100 potential tax customers. Each of the customers has demand as follows:

   \[ q_i^D = 2 - 0.05 \times P \]

   What is the equilibrium quantity of taxi rides in the town? \[ Q^* = \] _______________

2. **[3 pts]** A farmer produces two crops: Sheep and Flowers. The flowers grow in the soil, and the sheep graze on the land. The problem is, sheep eat the flowers and become sick. Sheep are bad for flowers, and flowers are bad for sheep.

   On the axes, sketch what you think the farmer's PPF might look like.

   [Be clear and careful. Neatness counts.]
3. [10 pts] For this problem, do not worry if prices and quantities are not "realistic." Suppose that the market for photocopies in Washington DC is perfectly competitive, and is given by the following equations:

\[ Q^D = 72 - P \quad \quad Q^S = 5P \]

where \( Q^D \) is the daily demand for copies in DC and \( Q^S \) is the total supply curve of all copy stores together in DC.

a) What is the equilibrium price and quantity of copies in DC?

\[ P^* = \quad \quad \quad \quad Q^* = \quad \]  

Now, consider the cost schedule for Kinky's Kopies, a typical copy store in DC:

\[ TC = 2q^2 + 18 \quad \quad MC = 4q \]

where \( q \) (lower-case \( q \)) is the number of copies made by the single store.

b) What is Kinky's fixed cost? _______________

c) Assuming Kinky's behaves as a profit maximizing firm in a perfectly competitive market, how many copies will it produce?

_____________

d) What is the total revenue of Kinky's? _______________

e) What is the total cost for Kinky's? _______________

f) What is Kinky's average total cost (ATC) and marginal cost (MC)?

\[ ATC = \quad \quad \quad \quad MC = \quad \]  

g) What is the profit of Kinky's? _______________

h) If all of the other copy stores in this perfectly competitive market in DC have identical cost curves and behave exactly like Kinky's Kopies, how many copy stores will there be in long-run equilibrium?

_____________
4. **[4 pts]** For each of the four games below, circle all of the Nash equilibria. (Player #1's payoff is in the upper right of each cell; player #2's payoff is in the lower left. Payoffs are in positive dollars.)

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5. **[6 points]** For these three questions suppose the market interest rate is 5%.

a) What is the present discounted value (PDV) of a financial instrument that pays you $100 per year, forever, starting with a first payment next year?

b) What is the present discounted value of a financial instrument that pays you $200 per year, forever, starting next year, with the exception of year 20. I.e. it pays you $200 every year except for the payment 20 years from today, which is zero.

c) What is the present discounted value (PDV) of a financial instrument that pays you $100 per year, for 20 years, starting with a first payment 11 years from today, and ending with a last payment 30 years from today?
6. [4 pts.] Abe is entitled to food stamps. Each month he earns $500 in income from his job, and gets $500 in food stamps from the government. The food stamps can only be spent on food.

a) On the axis below, draw Abe's budget constraint. Carefully label any intercepts, slopes, and kink points.

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Food

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<th>All other goods besides food</th>
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b) Now suppose that there is a black market for food stamps, and each $1 of stamps sells on this black market for $0.50. On the axes below draw Abe's budget constraint. Again, carefully label all slopes, kink points, and intercepts. (Note, let's assume Abe can buy or sell food stamps on the black market.)

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Food

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PART II. Multiple Choice [2 points for each correct answer. Wrong answers and blank answers receive zero points.]

Please shade in the appropriate circle on the ParScore Sheet. No work written in this section will be graded.

1) Moving from point B to point A, right and down the (curved) demand curve shown on the right, the price elasticity of demand...
   
   a) increases.  
   b) decreases.  
   c) remains constant.  
   d) cannot be discerned from the information given.

2) The figure at right depicts three demand curves, which are parallel straight lines. At price $P_0$, which demand curve has the highest price elasticity of demand?
   
   a) Demand curve A.  
   b) Demand curve B.  
   c) Demand curve C.  
   d) They all have the same elasticity at $P_0$.  
   e) It is impossible to tell, given the information here.

3) When the price of ice cream rose 25%, the quantity of ice cream sold fell 10%, and the sale of chocolate syrup also fell 15%. This set of facts indicates that:
   
   a) The demand for ice cream is price elastic.  
   b) The demand for chocolate syrup is price elastic.  
   c) The cross-price elasticity between ice cream and chocolate syrup is negative, so the two are complements.  
   d) The cross-price elasticity between ice cream and chocolate syrup is positive, so the two are substitutes.
4) Suppose you have $500 budget to host a dinner. The price of food is $10 per item, and drinks cost $2 each.

What is the slope of the budget line depicted at right? (In absolute value.)

   a)  50
   b)  1.0
   c)  0.20
   d)  5
   e) cannot be discerned from the information given.

5) Barbara initially consumes the quantity of pens and pencils shown as A in figure 2. After the prices of both goods change, she buys combination B. From figure 2 and these facts, it must be true that . . .

   a) Barbara prefers A to B.
   b) Barbara prefers B to A.
   c) Barbara is indifferent between A and B.
   d) Barbara considers pens and pencils to be perfect substitutes.
   e) None of the above.

6) As a firm’s output increases:

   a) average variable cost approaches average total cost.
   b) average fixed cost increases.
   c) marginal cost reaches a maximum, and then decreases.
   d) average variable cost reaches a maximum, and then decreases.
7) The figure at right depicts Harold's choices between goods X and Y. He tells you that when his budget is B1 he would choose combination A, and when his budget is B2 he would choose combination B.

What can you tell for sure about Harold's preferences?

a) X and Y are substitutes.
b) X and Y are complements.
c) X and Y are both normal.
d) X is normal; Y is inferior.
e) X is inferior; Y is normal.

8) Suppose a tax is imposed on suppliers in a market, as depicted below.

The decline in consumer surplus that results from the tax can be represented by areas:...

a) b c d
b) g h
c) a b c d
d) d e
e) f e
9) Which of the following is an assumption about perfect competition?

a) Marginal cost = price.
b) Economic profits are zero.
c) No barriers to entry.
d) Firms operate at the minimum point on their long run average cost curves.
e) All of the above

10) Consider a consumer choosing between two goods, X and Y. As depicted in the graph, the price of X falls, and the consumer chooses to switch from $X^1$ to $X^2$, consuming less X. Is X a normal good or an inferior good for this consumer?

a) X is normal for this consumer.
b) X is inferior for this consumer.
c) There is no way to tell if X is normal or inferior for this consumer.

11) In the figure at right, at 200 units, average variable cost (AVC) equals....

a) 4.
b) 6.
c) 200.
d) 400.
e) 800.

12) Suppose you win two free tickets to an NFL football game in London. You look on-line and find you can sell your free tickets to a ticket consolidator for $100 each ($200 total). Round trip plane tickets to London cost $1000 ($500 each, round trip). You and your friend can share a hotel room for $400.

Sitting here in Washington, DC. What is the opportunity cost, to you and your friend, for both of you to travel to London to attend the game?

a) $0
b) $200
c) $1,200
d) $1,400
e) $1,600
13) When Comfy Cots produces 40 cots per day, its average variable cost is $600, its average total cost is $800, and its marginal cost is $700.

When Comfy Cots increased production from 39 to 40 cots per day:

a) its average total cost remained constant.
b) its average total cost rose.
c) its average total cost fell.
d) there is no way to tell whether average total cost rose or fell.

14) The figure at right depicts Sara's budget between Lobsters and Steaks. It also labels two particular combinations of those goods (A and B). Which of the following statements must be true, given the picture?

a) Sara prefers point A to point B.
b) Sara prefers point B to point A.
c) Sara prefers lobster to steak.
d) Sara prefers steak to lobster.
e) There is no way to tell whether Sara prefers point A or point B.

15) A firm operating in long-run equilibrium in a perfectly competitive market will have economic profits equal to ________________.

a) zero.
b) total fixed costs.
c) the interest rate times the value of capital invested.
d) the present discounted value of future income streams.

If there are fewer than 10 minutes left in the exam period, please wait patiently and quietly until the exam period is over. If you have finished more than 10 minutes early, you may quietly bring your coding sheet and this exam booklet to the place indicated by the instructors.

Have a great weekend. No discussion section this week or homework this weekend.