DO NOT BEGIN WORKING
UNTIL THE INSTRUCTOR TELLS YOU TO DO SO.
READ THESE INSTRUCTIONS FIRST.

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 and GU ID carefully and legibly at the top of this page.

3. You have 2 hours to complete the exam. All answers are to be recorded on the ParScore sheet. No work in this booklet will be assessed.

4. 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.

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

6. 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.
Part I: [10 points out of 130 total]

1) [1 point] Write your GU ID number on the ParScore sheet.
2) [1 point] Shade in the circles corresponding to your GU ID number
3) [1 point] Write your name in the correct spaces on the ParScore sheet.
4) [1 point] Shade in the circles corresponding to the letters of your name
5) [3 points] Under “TEST FORM” shade in the letter corresponding to the Version at the top right of this page: "A", "B", "C", or "D".
6) [3 points] Under “SUBJ Score” fill in the 3-digit number at the top left of the front page of this booklet.

Part II: [120 points out of 130 total] 

***ANSWER THESE QUESTIONS ON YOUR PARSCORE SHEET***

1. If the market interest rate is 5 percent, what is the present discounted value of a perpetuity paying $50 per year, every year, with the first payment coming one year from today?
   
   a) $1000
   b) $47.62
   c) $950
   d) $97.62

2. If the market interest rate is 5 percent, what is the present discounted value of a perpetuity paying $50 per year, every year, with the first payment coming 12 years from today?
   
   a) $557
   b) $530
   c) $555
   d) $585

3. If the market interest rate is 5 percent, what is the present discounted value of a financial instrument that pays you $50 per year, forever, starting next year, with the exception of year 17. I.e. it pays you $50 every year except for the payment 17 years from today, which is zero.
   
   a) $977
   b) $978
   c) $564
   d) $542
4. A small town has eight (8) taxis. Each of the taxis has an individual daily supply curve as follows:

\[ q_i^S = P \]

where \( q_i^S \) is the supply from one of the eight.

The town has 20 potential taxi customers. 10 of the customers have individual daily demand as follows:

\[ q_i^D = 10 - 0.1 \times P \]

where \( q_i^D \) is the demand by one of the 10.

The other 10 customers have demand as follows:

\[ q_i^D = 14 - 0.1 \times P \]

What is the equilibrium daily quantity of taxi rides in the town?

a) 192  
b) 24  
c) 200  
d) 48  
e) 96

5. In the game depicted at right, which box or boxes contain the Nash equilibria?

a) (a)  
b) (a) and (d)  
c) (b) and (c)  
d) (d)  
e) None

6. Wine and spaghetti are complements. Spaghetti and tacos are substitutes. Spaghetti is a normal good. From these three facts you can infer that:

a) Tacos are a normal good.  
b) Wine is a normal good.  
c) Wine and tacos are complements.  
d) Wine and tacos are substitutes.  
e) None of the above.
7. Low-income families in the USA can get help with their winter heating bills from a federal program known as LIHEAP (Low Income Home Energy Assistance Program). For the sake of simplicity assume the program works as follows:

A family of four has a monthly budget of $800. LIHEAP will pay 25¢ of every $1.00 the family spends on heating, up to a maximum subsidy of $100. (The most LIHEAP will pay is $100 per month, or 25% of a $400 heating bill.)

What is the opportunity cost of an extra $1 worth of heat for an eligible family spending $50 per month on heat?

a) $0  
b) $0.25  
c) $0.50  
d) $0.75  
e) $1.00

8. For the low-income family described above, what is the maximum dollar amount of heat it can purchase in a month, including LIHEAP benefits?

a) $825  
b) $875  
c) $900  
d) $950  
e) $1100

9. Sarah loves shoes, and buys two types: left shoes and right shoes. They are sold separately, and for Sarah they are perfect complements. Given her budget and current shoe prices, Sarah’s best affordable combination of shoes is $L$ left and $R$ right shoes.

Suppose left shoes become cheaper and right shoes more expensive, and Sarah can afford to buy exactly as much of each as before, with no funds left over. Is Sarah better off, worse off, indifferent, or is it impossible to tell?

a) better off  
b) worse off  
c) indifferent  
d) it is impossible to tell

10. Suppose the current price of bananas is $1 per banana, and 2000 bananas are sold each day if there are no taxes. Assuming neither demand nor supply is perfectly inelastic, a new tax of 10 cents per banana would raise how much revenue?

a) More than $200 in revenue.  
b) Exactly $200 in revenue.  
c) Less than $200 in revenue.  
d) It depends on the relative elasticities of supply and demand.
11. Refer to figure 1. In the **short run**, if the price of the good is 2, how many units does the firm produce?

a. 0  
b. 10  
c. 20  
d. 30  
e. 40

12. Which of the following is an **assumption** about **perfect competition**?

a) Marginal cost equals marginal revenue.  
b) Indifference curves are not bowed outward away from the origin.  
c) Buyers and sellers have symmetric information about products.  
d) All of the above.  
e) None of the above.

13. If the price of an **inferior good** increases, which of the following is true?

a) People will demand **more** of it.  
b) People will demand **less** of it.  
c) People will demand **more** of it if the income effect outweighs the substitution effect.  
d) People will demand **more** of it if the substitution effect outweighs the income effect.
14. The figure at right depicts a budget constraint. Suppose that Goods X and Y are **NOT** perfect substitutes. Which of the depicted points represent possible optimal consumption combinations?

   a) Any single one of the four points.
   b) None of the four points.
   c) (C).
   d) (B) or (C) only.
   e) (A) or (D) only.

15. We discussed two potential definitions of progressivity:

   i) average tax rate increases with income
   ii) marginal tax rate increases with income.

Suppose an individual with pre-tax income \( Y \) pays a total tax of \( T = 1000 + 0.10(Y) \).

This tax scheme is ....

   a) progressive under definition (i) but not (ii).
   b) progressive under definition (ii) but not (i)
   c) progressive under both definition (i) and (ii)
   d) not progressive under either definition

16. Suppose a society has three individuals. Each earns an annual income of $50,000.

What is the Gini coefficient for this society?

   a) 0.00
   b) 0.33
   c) 0.50
   d) 0.67
   e) 1.00

17. Dick owns a rooster whose crowing annoys Dick's neighbor Jane. Suppose that the benefit of owning the rooster are worth $500 to Dick and that Jane bears a cost of $700 from the crowing. Assuming Dick has the legal right to keep the rooster, a possible private solution to this problem is that

   a) Dick pays Jane $200 for her inconvenience.
   b) Jane pays Dick $200 to get rid of the rooster.
   c) Dick pays Jane $650 for her inconvenience.
   d) Jane pays Dick $650 to get rid of the rooster.
   e) There is no private solution that would improve this situation.
18. Tony is a wheat farmer, but also spends part of his day teaching guitar lessons. Farmer Tony has more students requesting lessons than he has time for if he is to also maintain his farming business. Farmer Tony charges $25 an hour for his guitar lessons. One spring day, he spends 10 hours on his farm planting seeds that cost him $130. He expects that the seeds will yield $300 worth of wheat.

Tony's economic profit equals

a) −$80.
b) +$80
c) +$130.
d) +$170.

19. Arik's Gyros House sells gyros. The cost of ingredients (pita, meat, spices, etc.) to make a gyro is $2.00. Arik pays his employees $60 per day. He also incurs a fixed cost of $120 per day. Calculate Arik's **average fixed cost** per day when he produces 50 gyros using two workers?

a) $ 2.00  
b) $ 2.40  
c) $ 3.20  
d) $ 4.40  
e) $ 6.80

20. The fundamental reason the production possibilities curve has a downward slope is

a) workers are inefficient.  
b) resources are of low quality.  
c) resources are fixed and therefore tradeoffs must be made.  
d) it has empirical support but why it is so is still a mystery.  
e) inputs to production are specialized.

21. Many gift shops along the beach shut down during the winter because

a) revenues cannot cover fixed costs  
b) marginal revenue does not equal marginal cost  
c) costs are minimized by shutting down  
d) revenues are maximized by shutting down  
e) revenues cannot cover variable costs
22. Suppose skilled workers pay to take a certification course to demonstrate their ability. This is an example of:

   a) Adverse selection
   b) Moral hazard
   c) Signaling
   d) Screening

23. Derek and Alex are the only two residents of a small country called Bronx. One of the goods they enjoy is gadgets. The price of gadgets is $2 per gadget. (The supply curve is completely elastic at P=2). Derek's demand for gadgets is

   \[ Q_{\text{Derek}} = 12 - 1.5P \]

   Alex's demand for gadgets is

   \[ Q_{\text{Alex}} = 12 - 3P \]

   Suppose gadgets are a public good (nonrival and nonexcludable). What is the efficient quantity of gadgets for Scooter and Karl to collectively demand?

   a) 0
   b) 7
   c) 9
   d) 10
   e) 15

24. An industry contains ten (10) firms, each with identical market shares. What is the value of the Herfindahl index?

   a) 0
   b) 0.40
   c) 10
   d) 400
   e) 1000

25. Consider the following story: "When Joe didn't have car insurance, he drove very cautiously because he knew he would have to pay for any damage to his car. Now that he has car insurance, he drives like a maniac because he knows that even if he gets into an accident, his insurance will cover it."

   a) Adverse selection
   b) Moral hazard
   c) Signalling
   d) Screening
26. The picture at right shows the demand and marginal revenue a monopoly cable TV provider in a town of 50,000 households.

Suppose the government requires the cable company to set price equal to average total cost, and a fine of $10,000 per month if the cable company stops providing service. In the long run, how many households would have cable TV service under this form of price regulation?

a) 0  
b) 5,000  
c) 20,000  
d) 35,000  
e) 50,000

27. The income elasticity of oatmeal is negative. The cross-price elasticity between oatmeal and cold cereal is positive. The cross price elasticity of between oatmeal and raisins is negative. Which of the following increases the demand for oatmeal?

a) An increase in the price of raisins.  
b) An increase in income.  
c) A decrease in population size.  
d) An increase in the price of cold cereal.

28. What is the best economic characterization of Health Care?

a) private good.  
b) natural monopoly.  
c) common resource.  
d) public good

29. Consider the market for used yachts. Each seller either has a "plum" (high quality) or a "lemon" (low quality). Suppose that only sellers know whether a yacht is a lemon or a plum. Buyers are willing to pay $10,000 for a plum, and $6000 for a lemon. Sellers have the same valuation as buyers (willing to sell plums for $10,000 and lemons for $6000). What will be the equilibrium price of yachts that sell?

a) $6000  
b) $7000  
c) $8000  
d) $9000  
e) $10,000
30. In the figure, at 200 units, average variable cost (AVC) equals....
   a) 4.
   b) 6.
   c) 200.
   d) 400.
   e) 800.

31. Consider a 10 percent tax on interest income from savings. In theory, what is the effect of this tax on the supply of savings?
   a) People desire to save less. (Savings decrease.)
   b) People desire to save more. (Savings increase.)
   c) We cannot tell in theory whether savings increase or decrease.

32. Suppose a tax is imposed on suppliers in a market, as depicted. The decline in producer surplus that results from the tax can be represented by areas....
   a) e f j
   b) d e
   c) a b c d
   d) f e
   e) b c d

33. Along the straight-line supply curve depicted at right, the price elasticity of supply ....
   a) is higher at point A than at B.
   b) is lower at point A than at B.
   c) is the same at both A and B.
   d) It is not possible to tell, given the information in the graph.
34. An allocation of goods and services is not efficient if

   a) Trades are possible that make both parties better off.
   b) Consumer surplus is below its maximum possible level.
   c) The distribution of goods is highly unequal.
   d) The demand for an important consumer product is highly inelastic.

35. Imagine the city of Washington DC decides to increase the gasoline tax. Who will bear most of the economic incidence of this tax increase?

   a) Consumers, because demand for gasoline is elastic.
   b) Suppliers, because consumers do not have good substitutes for gasoline.
   c) Consumers, because demand for gasoline is inelastic.
   d) Suppliers, because it is easy to obtain gasoline supplies from outside DC.

36. Which of the following is an example of a positive externality?

   a) Your neighbors enjoy listening to your garage band.
   b) Soot from a nearby power plant leads you to buy more window cleaner.
   c) The person next to you takes a cell phone call during a concert.
   d) Your family decides to eat more vegetarian meals.

37. Ironworks is a company in Toledo Ohio that is currently producing 700 tons of sulfur dioxide (SO₂) per year. The following table gives the marginal cost to Ironworks of reducing emission of SO₂ by one ton. The table shows that the firm’s marginal cost increases as it undertakes more pollution reduction. The table also gives the Environmental Protection Agency’s estimates of the marginal social benefit of reducing SO₂ emissions by Ironworks.

<table>
<thead>
<tr>
<th>SO₂ Reduction in Tons</th>
<th>MC per ton of SO₂ reduction</th>
<th>Social MB per ton of SO₂ reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>$50</td>
<td>$250</td>
</tr>
<tr>
<td>200</td>
<td>100</td>
<td>$200</td>
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<tr>
<td>300</td>
<td>150</td>
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<td>400</td>
<td>200</td>
<td>$100</td>
</tr>
<tr>
<td>500</td>
<td>250</td>
<td>$50</td>
</tr>
</tbody>
</table>

The socially optimal level of SO₂ reduction per year is ________ tons. To achieve the social optimum, government should tax Ironworks _______ for each ton of SO₂ that it emits.

   a) 200, $100
   b) 300, $150
   c) 400, $150
   d) 500, $100
38. Suppose there are three companies near the Potomac River. Each produces 1600 tons of chemical pollution into the river. The Environmental Protection Agency determines that the total amount of pollution per year should be 2400 tons and will distribute pollution credits to the companies for free. Each company has 8 units of credit. Each credit allows a company to emit 100 tons of chemical waste per year, and companies can buy and sell the credits.

The equilibrium permit price will be _____ and the pollution reduction that each firm undertakes is ______________.

<table>
<thead>
<tr>
<th>Waste Reduction</th>
<th>Marginal Cost per Ton of Waste Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm 1</td>
<td>Firm 2</td>
</tr>
<tr>
<td>200</td>
<td>$100</td>
</tr>
<tr>
<td>400</td>
<td>100</td>
</tr>
<tr>
<td>600</td>
<td>100</td>
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<td>800</td>
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</tr>
<tr>
<td>1000</td>
<td>200</td>
</tr>
<tr>
<td>1200</td>
<td>300</td>
</tr>
</tbody>
</table>

a) $150; Firm 1 reduces by 600, Firm 2 by 800, and Firm 3 by 1000.
b) $150; Firm 1 reduces by 800, Firm 2 by 600, and Firm 3 by 400.
c) $200; Firm 1 reduces by 1000, Firm 2 by 800, and Firm 3 by 600.
d) $200; Firm 1 reduces by 600, Firm 2 by 800, and Firm 3 by 1000.

39. The figure at right depicts Lorenz curves for two economies: A and B. Which economy has more unequal incomes?

a) Economy A
b) Economy B
c) A and B have equal Gini coefficients.
d) One cannot tell the relative inequality of A and B from the figure.
40. Barbara initially consumes the quantity of pens and pencils shown as B in figure 2. After the prices of both goods change, she buys combination A. 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) Barbara's preferences cannot be determined from the information given.

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.

Happy Holidays