Name: **Key**

Econ 301

**Exam 04**

* There are 110 possible points on this exam. The test is out of 100.
* You have two hours to complete this exam, but you should be able to complete it in less than that
* Please turn off all cell phones and other electronic equipment.
* You are allowed a calculator for the exam. This calculator cannot be capable of storing equations. This calculator cannot double as a cell phone.
* Be sure to read all instructions and questions carefully.
* Remember to show all your work.
* Recall basic logic. “Water is wet” is a true statement. “Water is wet and leopards have stripes” is a false statement.
* *Please print clearly and neatly.*

**Part I: Multiple Choice.** *Choose the best answer to the following.*

3 points each.

1. Consider a demand curve: Q = 12 – P2. When P = 2, what is the elasticity of demand?
   1. -2, elastic
   2. -2, inelastic
   3. -0.5, elastic
   4. -0.5, inelastic
   5. **None of the above**

*When P = 2, Q = 8. The derivative is -2P, or -4. -4 8 2 / 8 = -1.*

1. Which of the following is an example of a sunk cost?
2. Buying forested land which you intend to turn into a camping ground
3. Purchasing specialized equipment which can only be useful with your business model
4. Researching a new drug
5. **B & C**
6. None of the above

*In both cases, the cost in question cannot be retrieved. Forested land, however, can be easily resold.*

1. If a risk adverse person spends $10 to gamble, which of the following games could such a person be playing?
   1. If two coins are flipped and if both are heads, she’d win $16.
   2. If a six-sided die is rolled and on a “1” or a “2”, she’d win $30.
   3. If two four-sided dice are rolled and if both are “1”s or both are “2”s, then she’d win $80.
   4. B and C
   5. **None of the above**

*First calculate the expected values: $4 ($16x0.5x0.5), $10 ($30/3), and $10 ((1/16 + 1/16)x$80), respectively. For a risk averse person, the individual would want an expected payoff* greater *than $10.*

1. If the marginal product of labor is 10 and the marginal product of capital is 5, what is the marginal rate of technical substitution?
   1. 0.5
   2. **2**
   3. 15
   4. 50
   5. None of the above

*Since MRTS =MPL / MPK.*

1. Suppose you calculated an optimal bundle for an indifference curve. How would you know if it is a corner solution?
2. The bundle doesn’t pass through the individual demand curve.
3. **The marginal rate of substitution doesn’t equal the ratio of prices.**
4. The Engel Curve slopes down.
5. A & C
6. None of the above

*Which is just a fancy way of saying that the budget constraint isn’t tangent to the indifference curve.*

1. If the supply side pays more of a tax than the demand side, what must be true?
2. The supply curve is more elastic than the demand curve
3. The supply curve is more inelastic than the demand curve
4. The supply side will receive more of a subsidy than the demand side
5. **B & C**
6. None of the above

*If the supply curve is relatively more inelastic, it will shoulder more of a tax. But, if you put a subsidy in that same supply and demand setup, you will notice supply also gets more of the subsidy.*

1. If you make zero economic profit, what must be true?
   1. Your accounting profit equals your opportunity cost
   2. Your marginal cost equals your marginal revenue
   3. Your price equals your average total cost.
   4. **A & C**
   5. None of the above

*By definition, zero economic profit is when accounting profit equals opportunity cost. Since ATC includes opportunity cost (along with other costs), if your price equals ATC, you also have zero economic profit.*

1. What is the Herfindahl-Hirshman Index used to calculate?
   1. Deadweight loss
   2. **Industry concentration**
   3. Monopoly profits
   4. A & C
   5. None of the above

*By squaring the market share of each firm in an industry and adding them, the HHI creates a number which reflects the level of concentration.*

1. Where and what does the marginal cost curve always intersect?
   1. **The minimum point of the average total cost curve**
   2. The highest point of the marginal revenue curve
   3. Halfway through the demand curve
   4. B & C
   5. None of the above

*As we mathematically proved in Lecture 19.*

1. Which of the following is an example of a Type I error?
2. Passing on a good investment
3. Letting the guilty go free
4. **Approving a damaging drug**
5. A & B
6. None of the above

*Because you reject the null (the drug should not be on the market) when you should have failed to reject it.*

1. In *The Use of Knowledge of Society*, Hayek emphasizes the importance of what kind of knowledge?
   1. Scientific
   2. Economic
   3. **Local**
   4. Entrepreneurial
   5. None of the above

*Hayek emphasizes the use of local knowledge in economics.*

1. Assume the demand curve for an industry is P = 1 – Q. Which of the following total cost functions would result in a natural monopoly?
   1. TC = 100 + Q
   2. TC = 10 + Q2
   3. TC = 1 + Q3
   4. **A & B**
   5. None of the above

*First, make it all ATC by dividing by Q and then take the derivative. For (a), the derivative is -100/Q2; it will always be downward sloping over the demand curve. For (b), the derivative is (Q2 – 10)/Q2; since Q will at most be 1 and it is -9 at 1 (and it is always downward sloping from 0 to 1), then (b) also results in a natural monopoly. But in (c), where the ATC derivative is (2Q3 – 1)/Q2, the slope at 1 is +1 so it is not a natural monopoly.*

1. Which of the following is ***not*** a requirement of perfection competition?
   1. Perfect information
   2. Large number of buyers and sellers
   3. Identical goods
   4. A & B
   5. **None of the above**

*All of these are requirements, in addition to freedom of entry and exit.*

1. How are monopolies like monopsonies?
   1. Both result in higher-than-normal prices.
   2. Both create deadweight loss.
   3. Both generate a lower output.
   4. **B & C**
   5. None of the above

*By producing or asking for a lower-than-optimal output, monopolies and monopsonies create deadweight loss. But only monopolies result in a higher-than-normal price.*

**Part II: True/False.** *Answer true or false and justify your answer.*

6 points each.

1. If a price-consumption curve slopes up, the good in question is a normal good.

*False. If a price-consumption curve slopes up, the goods on the axes are complements.*

1. Regulatory capture describes a scenario when a government agency prioritizes private industry as the expense of the public interest.

*True. The regulated industry integrates itself with the agency so the agency does the bidding of the industry it is supposed to regulate rather than working in the public interest.*

1. The short-run shutdown point is ultimately determined by a company’s sunk costs.

*True. Since sunk costs are not economic costs, the firm shouldn’t consider them if it is going to shut down for the short-run. Thus ice cream stores and resort hotels stay open during the winter.*

**Part III: Short Answer.** *Answer the following.*

10 points each.

1. Suppose the demand curve for cigarettes is QD = 42 – 0.5PD and the supply curve for cigarettes is QS = 10 + 3PS. Consider an excise tax of 8. Calculate the price demanders pay, the price suppliers receive, the new quantity in this market, the deadweight loss, the government tax revenue. Remember to show all your work and print clearly and neatly.

*PD – PS = 8*

*42 – 0.5(8+PS) = 10 + 3PS*

*38 – 0.5PS = 10 + 3PS*

*28 = 3.5PS*

*PS = 8*

*PD = 16*

*QG = 34*

*Govt Revenue: 8(34) = 272*

*42 – 0.5P = 10 + 3P*

*32 = 3.5P*

*P\* = 9.14*

*Q\* = 37.43*

*DWL = (3.43)(8)(0.5) = 13.72*

1. Consider the following utility function: U = (XY)3; the following prices: Px = 3 and Py = 2; and the following income: I = 6. Using a Lagrangian, calculate how much of X and Y the consumer with this utility function determines. Remember to show all your work.

*L = (XY)3 – 𝜆(3X + 2Y – 6)*

*Y = 1.5X*

*3X + 3X = 6*

*X = 1; Y = 1.5*

1. Consider the following cost function: Q = 2K0.75L0.25; the following prices: r = 4 and w = 1; and you wish to make 100 units. Using a Lagrangian, calculate how much of K and L will minimize the costs of production. Remember to show all your work.

*𝜃 = 4K + L – 𝜆(2K0.75L0.25 – 100)*

*8/3K = 2L; 4/3K = L*

*2K0.75(4/3K)0.25 = 100*

*K = 50/1.07457 = 46.53*

*L = 62.04*

1. Suppose the total cost function of a monopoly is TC = 60 + Q2 and its demand curve is P = 120 – Q. Find the profit maximizing quantity and the amount of profit or loss the firm is making. Use integration to determine the deadweight loss. Remember to show all your work.

*MC = 2Q*

*MR = 120 – 2Q*

*120 – 2Q = 2Q; QM = 30*

*ATC = (60 + 900)/30 = 32*

*PM = 120 – 30 = 90*

*(90 – 32)30 = 1,740 = ΠM*

*120 – Q = 2Q; Q\* = 40*

*4800 – 2400 – 3600 + 1350 = 150 = DWL*

1. Consider a perfectly competitive market and a firm with a TC = 50 + Q2 and a price of 10. How much revenue/loss is this firm making? What will price have to be so that there is zero economic profit?

*MC = 2Q*

*10 = 2Q, Q\* = 5*

*(50 + 25)/5 = 15*

*Π = (10 – 15)5 = -25 (The firm is losing -25.)*

*(50 + Q2)/Q = 2Q*

*50 + Q2 = 2Q2*

*5√2 = Q; 10√2 = P, or the price and quantity where the firm will make zero economic profit.*