Name: **Key**

Econ 304—Bethany College

**Exam 04**

* There are 110 possible points on this exam. The test is out of 100.
* You have one hour 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.*

*5 points each*.

1. Economists often argue that the government must provide public goods. Why?
	1. So the tragedy of the anti-commons can be mitigated
	2. So they can force people to pay for them
	3. So everyone can use them
	4. **B & C**
	5. None of the above

*Option (B) is clearly the case—as mentioned we have to combat free riders—but that also leads us to option (C). If we don’t force people to pay for them, then we will get either (a) get a lot of free riders and the good will be doomed or (b) need to create a monopoly to combat free riders (such as patents) which creates deadweight loss. Either way, we want everyone to use the good.*

1. It is impossible, in the long run, to give money away because of:
	1. Median Voter Theorem
	2. **Rent seeking**
	3. Incentives of bureaucrats
	4. A & C
	5. None of the above

*Giving money away encourages people to seek out this “free” money, thus incurring a cost on all seekers. We conveniently call this rent seeking.*

1. According to double marginalization, which of the following industry structures will make more total profit than two inter-related monopolies?
	1. **A single monopoly**
	2. Three inter-related monopolies (triple marginalization)
	3. Perfect competition
	4. B & C
	5. None of the above

*For option (B) and (C), the industry would get less total profit. Each required monopoly externalizes a cost onto other monopolies when it raises its price, so prices are too high for profit maximization. Perfect competition, of course, returns zero economic profit.*

1. Which of the following is a public good?
2. Higher education
3. **Flood control systems**
4. Health insurance
5. A & C
6. None of the above

*It’s not practical to exclude certain people from using a city’s flood control system and each additional person benefiting from it costs zero.*

1. Consider the following game:

|  |  |
| --- | --- |
|  | Dog |
| Right | Left |
| Cat | Right | -3 , 3 | 1 , X |
| Left | X , -4 | -2 , 2 |

What could X be to ensure there is no Nash Equilibrium?

* 1. -4
	2. **-1**
	3. 5
	4. A & C
	5. None of the above

*If X = -4, Cat wouldn’t change from Right to Left when Dog played Right. If X = 5, Dog wouldn’t change from Left to Right when Cat played Right. Of the three, only -1 does both.*

1. Which of the following is ***not*** an assumption of price discrimination?
2. Uniform costs
3. Price setting power
4. Distinguishable units
5. B & C
6. **None of the above**

*All of these are assumptions of price discrimination.*

1. Suppose a perfectly competitive firm has a total revenue equation of 16Q and a total cost curve of 10 + 0.5Q2. What is the profit maximizing output?
2. 3
3. 6
4. 8
5. **16**
6. None of the above

*So MR = 16 and MC = Q. Set MC = MR and the profit maximizing output is 16.*

1. Which of the following outcomes is a prediction of the market for lemons?
	1. The consumers will usually pay more than what the good is worth.
	2. The price consumers are willing to pay will fall to zero.
	3. The market will unravel so nothing is sold.
	4. **B & C**
	5. None of the above

*People are only willing to pay the average of what’s available, so high quality products aren’t sold. That brings down the average so even less is up for sale. This continues until we have no market at all since no one is willing to pay anything more than zero.*

1. Walras assumed a pure exchange economy to construct his theory of general equilibrium. Which of the following is ***not*** an assumption of a pure exchange economy?
	1. There is no production
	2. Each consumer knows the price of each good
	3. **Prices are change for whenever there’s a new endowment**
	4. A & B
	5. None of the above.

*We assume prices are constant.*

1. Why is the yield curve usually concave?
	1. Investors are being compensated for sacrificing flexibility.
	2. Investors are being compensated because there is more near-future knowledge than far-future knowledge.
	3. Investors are being compensated because risk premiums are not zero.
	4. **A & B**
	5. None of the above

*Not only is the yield curve upward sloping because of this flexibility, since we know more about the near-future we are more likely to want more flexibility sooner rather than later, causing it to be concave. Option (C) doesn’t make much sense—the risk premium is the difference between the risk-free rate and the asset. But since the asset is the risk-free rate, it’s also zero. Even if it wasn’t, it’s not clear why it would matter here.*

1. In CAPM, what is used to calculate an asset’s β?
	1. Risk premium of the asset
	2. Risk premium of the market
	3. Risk premium of a risk-less asset
	4. **A & B**
	5. None of the above

*Both of these risk premiums are used to determine beta (the asset in the numerator and the market in the denominator). The risk premium on a riskless asset is zero.*

1. An example of rational irrationality is:
2. A protectionist voting against tariffs
3. A senator not knowing how a bill becomes a law
4. **Making sure a black cat doesn’t cross your path**
5. A & C
6. None of the above

*This common superstition is completely irrational (at the very least, because in the U.K., black cats are lucky) but it is cheap to engage in it. Option A is a case of someone who clearly likes tariffs on some level—they are a protectionist, after all—but doesn’t engage in the cheap action to indulge in it. Option B may seem like rational ignorance, but this is a senator: they have a strong incentive to know how the government works so it’s not even rational ignorance. Regardless, it doesn’t apply here.*

*That black cats are considered unlucky in the U.S. leads to another form of rational irrationality: black cats don’t get adopted nearly as often. So if you ever adopt a cat, I suggest you get a black one (and because they are not as popular, probability suggests you’re more likely to get a particularly playful and affectionate one).*

1. Suppose the government offered a $10,000,000 contract for a technology firm to improve the United States’ Internet security infrastructure. Which of following ways could that rent be sought?
2. Industry representatives take bureaucrats on week-long “fact finding” trips.
3. Industry CEOs spend most of the $10 million it received from the government as bonuses to themselves and equipment to help with other projects; the actual additional security is largely window dressing.
4. Government workers earn a higher degree so they can be promoted to a decision-making position.
5. **A & C**
6. None of the above

*Option A is the natural result of rent seeking. Option C is the natural result of others rent seeking—bureaucrats also want the gains industry attempts to swoon with them. Option B is not rent seeking, but rather a principle agent problem that comes once the rents are achieved.*

1. Which of the following is an example of a club good?
2. Computer hardware
3. **Hiking trails in remote areas**
4. A community garden
5. Sidewalks
6. None of the above

*Only this option is nonrivalrous but excludable; that the trails are remotely located makes it practical to exclude people. Sidewalks are a public good—nonrivalrous and nonexcludable—and a community garden is a commons—nonexcludable and rivalrous. Obviously, computer hardware are private goods.*

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

6 points each.

1. One of Arrow’s standards for a perfect voting system is independence of irrelevant alternatives (IIA), or that all possible alternatives of all voters should be allowed.

*False. IIA refers to the requirement that the social ordering between two alternatives should only depend on those two alternatives; adding an additional alternative or modifying the preference of third alternative shouldn’t change that result.*

1. An Edgeworth box contains nothing but Pareto efficient points.

*False. The contract curve is nothing more Pareto efficient points. The Edgeworth box is all possible allocations of an endowment.*

1. If two firms in a Cournot oligopoly have different marginal costs, each firm will charge the same price.

*True. Recall that firms in a Cournot oligopoly, like a Stackelberg oligopoly, use the same demand curve. While how much each firm produces will be different, their price will be the same.*

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

10 points each.

1. Consider a Stackelberg model with two Firms (A and B) share the following demand curve:

P = 17 – 1.5Q; Q = QA + QB

Assume the marginal cost of Firm A is 2 and the marginal cost of Firm B is 5. Firm A goes first. What is the equilibrium ***profit*** for each firm?

*Since Firm A goes first, we maximize for Firm B (backward induction).*

*MRB = 17 – 1.5QA – 3QB = 5*

*QB = 4 – 0.5QA*

*Now we insert that equation into the demand curve for A…*

*PA = 17 – 1.5QA – 1.5(4 – 0.5QA) = 11 – 0.75QA*

*Then multiply by QA and take the derivative to get marginal revenue…*

*MRA = 11 – 1.5QA = 2*

*QA = 6; QB = 1*

*P = 17 – 1.5(7) = 17 – 10.5 = 6.5*

*ПA = (6.5 – 2)6 = (4.5)6 = 25*

*ПB = (6.5 – 5)1 = (1.5)1 = 1.5*

1. Provide an example of rent. Who would do the rent-seeking in your example? What does it mean for the rents to be dissipated?

*We discussed many examples of rents, but it’s nice to point to a new one. For example, many cities and towns have laws concerning the licensing of concession stands, even if the stand selling nothing but lemonade and cookies. Such stands can and have been shut down if they do not pay the proper fees and get the proper paperwork.[[1]](#footnote-1)*

*Existing food vendors are the main beneficiaries of these rents so they do a lot of the rent-seeking. No doubt, it was these vendors who pressured the mayor in Appleton, WI to shut down a child’s lemonade stand during a city festival (the reason for this rule is to protect paying vendors’ profits), an example of rent-seeking.[[2]](#footnote-2) That so many people found this objectionable but the police did it anyway is a testament to the influence of these vendors.*

*Other beneficiaries of rent include the politicians who gain from being wined and dined (both figuratively and literally) and thus seek those bonuses when trying to get into office; officials with the city who enforce the laws are surely encouraged to fulfill these rules through precuniary or nonprecuniary transfers and thus officials willing to enforce these laws compete with one another to gain these positions of power; and food and other suppliers of these vendors who benefit from the increased in business and thus will bribe/encourage officials to maintain and enforce these rules.*

*Rent dissipation is when the additional profits from the rent are spent trying to achieve the rent, across all possible rent-seekers. Police cannot enforce all laws, for example, so other rent-seekers attempting to ply officers to enforce their protectionist policies will spend resources to win them over. Their money will be ultimately wasted and, in total, full dissipation means there’s no net gain across all industries.*

1. Sketch the contract curve of the Edgeworth Box below. Suppose Alpha is a struggling lobbyist and Beta is a middle class entrepreneur. Using only the provided indifference curves as a guide, where should we prioritize the allocation under Nozick, Rawls, and Utilitarianism? (HINT: Utilitarianism may be a possible range, rather than a point(s), on the contract curve.)

*For Nozick, the priority should go to the entrepreneur since the lobbyist (probably) relies on government payouts for his/her job and the entrepreneur (probably) does not. For Rawls, the priority should go for the lobbyist since the lobbyist has a greater need for income. In utilitarianism, the best area is the place enclosed by the green circle since all points there will have a total utility of greater than 12, the highest you can achieve elsewhere*.

Waterα

Powerα

0

100

0

100

Powerβ

Waterβ

100

100

0

0

**0**

**4**

**6**

**12**

**0**

**5**

**8**

**12**

**6**

**3**

**1**

**11**

1. In Spengler (1950), Spengler developed a model of double marginalization. The profit (and maximizing profit) for the retailer is:

$$∏\_{r}=\left(p-p\_{m}\right)\left(1-p\right); ∏\_{r}^{\*}=\left(\frac{1-p\_{m}}{2}\right)^{2}$$

And the profit (and maximizing profit) for the manufacturer is:

$$∏\_{m}=\left(p\_{m}-c\right)\left(\frac{1-p\_{m}}{2}\right);∏\_{m}^{\*}=\frac{\left(1-c\right)}{8}^{2} $$

With a profit maximizing price of:

$$p\_{m}=\frac{1+c}{2}$$

What is the profit to the retailer? What is the combined profit of both monopolies? If the two monopolies was one monopoly, what would be profits?

*So our first task is to find the profit for the retailer. That’s just a matter of combining the manufacturer’s price with the retailer’s profit:*

$$∏\_{r}^{\*}=\left(\frac{1-\frac{1+c}{2}}{2}\right)^{2}=\left(\frac{\frac{1-c}{2}}{2}\right)^{2}=\frac{\frac{\left(1-c\right)^{2}}{4}}{4}=\frac{\left(1-c\right)^{2}}{16}$$

*Now we add the two profits to find the total profit:*

$$∏\_{ni}^{\*}=\frac{\left(1-c\right)}{8}^{2}+\frac{\left(1-c\right)^{2}}{16}=\frac{3\left(1-c\right)^{2}}{16}$$

*The last step is a little tricky. We have to find the profit for a single firm which means its profit function is:*

$$∏\_{i}=\left(p-c\right)\left(1-p\right)$$

$$\frac{∂∏\_{i}}{∂p}=\left(1-p\right)-\left(p-c\right)=0$$

$$1-p=p-c$$

$$1+c=2p$$

$$\frac{1+c}{2}=p$$

$$∏\_{i}=\left(\frac{1+c}{2}-c\right)\left(1-\frac{1+c}{2}\right)=\left(\frac{1-c}{2}\right)\left(\frac{1-c}{2}\right)=\frac{\left(1-c\right)^{2}}{4}$$

*Note profit has increased and the price to the consumer is the same as the price to the manufacturer (and thus will be cheaper with one monopoly).*

1. Consider the game below of a robot playing chess against a human. Each can choose a general strategy at the beginning of the game. What is the mix strategy Nash equilibrium for ***each*** player?

|  |  |
| --- | --- |
|  | Robot |
| Aggressive | Defensive |
| Human | Aggressive | 3 , -3 | -1 , 1 |
| Defensive | -1 , 1 | 2 , -2 |

*Recall that to solve this kind of problem, we have to find the p (probability) which puts the other player indifferent to his/her/its options. For the Human:*

*Let p= probability of selecting Aggressive:*

*-3p + 1(1 – p) = 1p + -2(1 – p)*

*(The left side is the Robot’s expected payoffs for selecting Aggressive and the right is the Robot’s expected payoffs for selecting Defensive.)*

*-3p – p +1 = p + 2p – 2*

*3 = 7p*

*3/7 = p*

*And for the Robot (q equals Aggressive):*

*3q – 1(1 – q) = -1q + 2(1 – q)*

*3q – 1 + q = -q + 2 – 2q*

*7q = 3*

*3/7 = q*

1. No, seriously. Here’s a list of lemonade stands shutdown by city police: <http://www.mofreedom.org/2011/07/the-government-war-on-kid-run-concession-stands/> [↑](#footnote-ref-1)
2. Seriously. <http://www.fox11online.com/dpp/news/appleton-pd-shut-down-lemonade-stand> [↑](#footnote-ref-2)