Final Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PPA 897, Fall 2022

Professor John McPeak

The total exam is worth 30 points. Each numbered question is worth 2 points, and each sub question within a numbered question is worth an equal share of the 2 points.

1. Taxes.
	1. Show the impact of a specific tax of size τ placed on consumers. Note the price paid by consumers, the price received by producers, the equilibrium quantity, the deadweight loss, and the tax revenue. Contrast this outcome to the pre-tax price quantity pair.
	2. Show the impact of an ad valorem tax rate α placed on consumers. Note the price paid by consumers, the price received by producers, the equilibrium quantity, the deadweight loss, and the tax revenue. Contrast this outcome to the pre-tax price quantity pair.
	3. Explain the concept of consumer incidence in reference to your answer to part b of this question
2. Monopoly. The inverse demand curve is p=39-q. The inverse supply curve is p=3+2\*q
	1. What is the equilibrium price quantity pair if the market is perfectly competitive?
	2. What is the equilibrium price quantity pair if the supplier to this market is a monopolist?
	3. Draw these two outcomes on a single graph.
	4. Fill in the following table

|  |  |  |
| --- | --- | --- |
|  | Perfect Competition | Monopoly |
| Consumer Surplus |  |  |
| Producer Surplus |  |  |
| Deadweight Loss |  |  |
| Total Social Welfare |  |  |

3) The demand curve is given to you as q=55-5\*p.

* 1. Fill out the following table (use the relatively higher price / relatively lower quantity pair for the denominator in the elasticity calculation)

|  |  |  |
| --- | --- | --- |
| Price | Quantity | Elasticity |
| 1 |  | ------------------------ |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| 6 |  |  |

* 1. Draw this demand curve with price on the y-axis and quantity on the x – axis. Identify the range over which this curve is elastic or inelastic.

4) Circle the correct answer.

|  |  |
| --- | --- |
| **Statement** | **The statement is** **(circle the correct answer)** |
| Coase’s solution to the problem of negative externalities is to reduce emission quantity to where the marginal social cost of the emission equals the marginal cost of abatement.  | True False |
| A Gini coefficient for the distribution of income increases from 0.4 to 0.5 over a ten-year period. This indicates income inequality is increasing over the ten-year period. | True False |
| Economic efficiency is a necessary but not sufficient condition for technological efficiency.  | True False |
|  The societal supply curve in the presence of a negative externality adds the marginal cost of the externality to the marginal cost to the private firm. | True False |
| A benefit – cost ratio that is equal to or greater than zero indicates the proposed ‘with’ scenario is an economically efficient use of societal resources. | True False |
| Economic efficiency is achieved when a market arrives at a Pareto optimal outcome. | True False |
| The cross price elasticity for a substitute is a positive number. | True False |
| A public good is excludable and non-rival. | True False |
| The free rider problem leads to over-provision of a public good. | True False |
| The bisection rule is used to calculate the marginal cost curve of a monopolist. | True False |

5) Budget Constraints. There are two goods, food (f) and other (o). The price of food is pf, the price of other is po. Income is Y. Hence the budget constraint is pf\*f+po\*o=Y.

* 1. Draw the budget constraint and indifference curves for a consumer showing the optimal bundle with the original budget line and after the consumer has received food stamps of cash value FS. Use indifference curves for a person who is made equally well off if given food stamps or if given the amount that the food stamps are worth in cash.
	2. Draw the budget constraint and indifference curves for a consumer showing the optimal bundle with the original budget line and after the consumer has received a matching grant of size S for each unit of food purchased at price pf.

6) Briefly describe first how each of the following can justify government policy response, and then identify a potential policy response that addresses the problem.

a. Ticketmaster currently has a market share of over 70% of the market for ticketing and live events in the United States.

b.Salmon populations are declining in the Canadian Pacific fishery due to too many fishing boats operating in the fishery.

c. A study in the Lancet Planet Health (Southerland et al., 2022) states that globally, “Approximately 86% ,,,of urban inhabitants lived in urban areas that exceeded WHO’s 2005 guideline annual average $PM\_{2.5} (\frac{10μg}{m^{3}})$ resulting in an excess of 1.8 million …deaths in 2019”. $PM\_{2.5}$ is particulate matter and is used as a measure of air pollution.

d. The uninformed demand curve for tobacco products is to the northeast of the informed demand curve.

7) Production functions.

a) Draw the production function Q=f($L,\overbar{K}$) noting areas that are not feasible, not efficient and at the frontier of technological efficiency.

b) Show what technological progress looks like on a production function such as the one you drew for (a)

c) Draw an isoquant of the production function Q=f($L,K$) noting areas that are not feasible, not efficient and at the frontier of technological efficiency for producing a target production level Q’.

8) Market structure and externalities. The inverse demand curve is given as p=64-q. The inverse supply curve is p=20+q.

1. What is the equilibrium price quantity pair if the market structure is perfectly competitive?
2. If there is a marginal externality generated by production of the good equal to 2\*q (MCE=2\*q), what is the socially optimal price quantity pair?
3. What size specific tax τ placed on producers can be used to replicate the socially optimal outcome?
4. On a single graph, draw the outcomes for parts a, b, and c of this problem.
5. Public goods. Over the past few years, people have come to rely on HEPA air purifiers. The City of Syracuse is trying to decide how many of these units to place in the public areas of City Hall. Ben has a MWTP for these defined by $800-$100q. Helen has a MWTP for these defined by $300-$50\*q. Joe has a MWTP for these defined by $270-$10\*q

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1. If the cost per unit of an air purifier is $300 and no effort is made to avoid the free rider problem, what number of air purifiers will be provided and who will provide them?
2. How much less is this than the socially optimal number of air purifiers?

10) Cost.

a. Complete the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Total Output | Fixed Cost | Total Cost | Variable Cost | Average Variable Cost | Average Fixed Cost | Average Cost | Marginal Cost |
| 0 |  | 10 | ------- | ------ | ----- | ------ | --------- |
| 1 |  |  |  |  |  |  | 16 |
| 2 |  |  |  | 15 |  |  |  |
| 3 |  |  | 45 |  |  |  |  |
| 4 |  | 73 |  |  |  |  |  |
| 5 |  |  |  |  |  |  | 20 |

b. Is this short run or long run cost information? Why?

c. If market price for the output produced is 18, what level of output is profit maximizing for a firm if the market structure is perfectly competitive?

11) Game Theory. California and Arizona are negotiating over water use from the Colorado River. There is a study that has been done looking at the Net Present Value of agricultural products produced using Colorado River water for irrigation under the Status Quo use and under a New Management Plan. Values are expressed in present value and are in billion dollars. One option is to keep doing what they are doing (Status Quo). The New Management Plan option would improve water conservation and address current concerns that the water level in the lakes and reservoirs has been declining over the past 15 years.

|  |  |
| --- | --- |
| California | Arizona |
|  | Status Quo | New Management Plan |
| Status Quo | 80 80 | 100 74 |
| New Management Plan | 74 100 | 1. 95
 |

1. Describe the full set of best responses and identify the Nash Equilibrium.
2. If the states who depend on Colorado River water can’t agree to a management plan by 2024, the Federal Government has announced they will impose the New Management Plan. If the Federal Government does this, would the outcome Pareto Improve on the Nash Equilibrium and be Pareto Optimal?

12) Policy Outcomes. Draw a supply and demand curve for each and illustrate the impact of the policy on the market.

1. The market is fast food restaurant meals, and the policy change is an increase in the minimum wage of workers who work in these restaurants.
2. The market is chicken meat, and poultry supplies have been negatively impacted over the past year by an outbreak of a fatal variant of Newcastle disease (a disease transmitted among poultry).
3. The market is restaurants in the area north of Syracuse where Micron has just announced they will be building a semiconductor manufacturing plant that will employ 9,000 people.

13) Public goods and voting.

A community of five people is voting to decide on public good provision for a New Year’s Day 2023 celebration. There are three proposals:

Proposal A: City pays for skating rink admission for all five families and as much cocoa as the families can drink. Total cost is $2,500 ($500 each)

Proposal B: City rents snowmaking machines from area ski hills and make snow on a city hill and rent sleds for community members to use to sled down the hill. Total cost is $4000 ($800 each).

Proposal C: Buy plane tickets and Radio City entrance tickets for all community members to fly to New York City and attend a holiday celebration show by the Radio City Rockettes. Total cost is $10,000 (2,000 each)

 This table records each household’s WTP for each proposal.

|  |  |  |  |
| --- | --- | --- | --- |
| **Household** | **Proposal A- skate** | **Proposal B-sled** | **Proposal C-Rockettes** |
| Frosty | $800 | $700 | $1,400 |
| Dasher | $400 | $800 | $1,000 |
| Nicholas | $200 | $900 | $4,500 |
| Elsa | $700 | $1,000 | $1,200 |
| Rudolph | $400 | $200 | $3,300 |

* + 1. Each household votes for each proposal. They can vote yes to more than one proposal. How will each household vote? (circle)

|  |  |  |  |
| --- | --- | --- | --- |
| **Household** | **Proposal A - skate** | **Proposal B-sled** | **Proposal C-Rockettes** |
| Frosty | Yes No | Yes No | Yes No |
| Dasher | Yes No | Yes No | Yes No |
| Nicholas | Yes No | Yes No | Yes No |
| Elsa | Yes No | Yes No | Yes No |
| Rudolph | Yes No | Yes No | Yes No |

b) If you sum up the willingness to pay and subtract from that the costs, what is the social demand for each project minus the cost of each project?

|  |  |  |
| --- | --- | --- |
| Proposal A- skate | Proposal B – sled | Proposal C – Rockettes |
|  |  |  |

c) Did voting lead us to select the proposal that had the highest value in your answer to b? Explain why or why not.

14) Benefit Cost.

Onondaga County has proposed building an aquarium in Syracuse’s Inner Harbor. The present value cost of building the aquarium is estimated to be 85 million dollars in year t=0. It is estimated that the aquarium will have a revenue of 50 million dollars per year in t=1, t=2, and t=3 (there is no revenue in year 0 since it will be under construction). Operating costs of the aquarium in t=1, t=2, and t=3 are estimated to be 15 million dollars per year. Future dollars are expressed in real terms, and the real discount rate is 5%.

a.Does the aquarium pass a benefit cost test?

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Benefit | Cost | Benefit-Cost |
| t=0 |  |  |  |
| t=1 |  |  |  |
| t=2 |  |  |  |
| t=3 |  |  |  |

b. The Center for Policy Research (CPR) of the Maxwell School has conducted research on the proposal, and they report there is some uncertainty about the revenue. They estimate there is a 50% chance revenue will be 50 million dollars a year and a 50% chance it will be 40 million dollars a year. Does the aquarium still pass a benefit cost if the analysis includes this information?

|  |  |  |  |
| --- | --- | --- | --- |
| Time | Benefit | Cost | Benefit-Cost |
| t=0 |  |  |  |
| t=1 |  |  |  |
| t=2 |  |  |  |
| t=3 |  |  |  |

15) Types of Goods.

a) What type of good goes in which blank?

|  |  |  |
| --- | --- | --- |
|  | Rival | Non Rival |
| Exclusion |  |  |
| Non Exclusion |  |  |

b) Illustrate how deriving the aggregate demand curve for a public good differs from deriving the demand curve for a private good, and explain how this difference relates to your answers to (a).

Aggregate demand for a private good:

Aggregate demand for a public good:

Work Page: