Name:_____Econ 812, Spring 2004. Practice Final

e-mail address:_____

Phone number:_____

General Instructions:

READ EACH QUESTION CAREFULLY. PARTIAL CREDIT WILL
NOT BE GIVEN TO STUDENTS WHO FAIL TO GIVE THE
CORRECT ANSWER BECAUSE THEY MISREAD THE QUESTION.

PUT YOUR NAME ON ALL OF THE SHEETS OF THE EXAM
BOOKLET, INCLUDING THE SCRATCH PAPER AND THE GRAPH
PAPER. DO ALL WORK IN THE EXAM BOOKLET.

CALCULATORS, SLIDE RULES, PENS, PENCILS, ERASERS, AND
RULERS ARE THE ONLY TOOLS YOU MAY USE ON THIS EXAM.

PLEASE READ AND SIGN THE FOLLOWING:

I understand that academic integrity is highly valued at GMU. Further, I
understand that academic dishonesty, such as cheating and plagiarism, are
violations of University policy and will be pursued by the appropriate
campus administrator. Finally, my signature below signifies that the work
included is my own, and that I completed this assignment honestly.

Signature:_____

**Sanctions for academic dishonesty include suspension or dismissal from
the university. There are alternatives to academic dishonesty. Please see
you professor, advisor, or the Dean of Students to discuss other choices.**

Point distribution:
Short Answers: 60%
Long Problem2: 40%

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I. Short Answer

1. A **common resource** is:
    a) A good which is non-rival – it can be used by many people without exhaustion.
    b) A good which is not excludeable – people cannot be prevented from using it.
    c) A good which cannot be sold because there is insufficient demand.
    d) A good which is produced by the government.
    e) A good which whose production creates negative externalities.

2. The long run price elasticity of supply for urban housing has been estimated to be 5.3. This is best interpreted to mean:
    a) A $1.00 increase in the market rent will increase the supply of housing by 5.3%.
    b) A $5.30 increase in the market rent will increase the supply of housing by 1%.
    c) In the long run the supply of housing does not increase when prices increase because there is no vacant land in cities.
    d) In the long run the price of urban housing is a constant.
    e) A 1% increase in the market rent will increase the supply of housing by 5.3%.

3. In the short run a firm may not be able to alter the quantity of capital used in production (long term leases on buildings, sunk expenses in purchased machinery, etc.) Therefore in a perfectly competitive economy it is possible that in **short run equilibrium**:
    a) Short Run Marginal Cost may NOT equal the Price.
    b) Short Run Total Cost will NOT ever be greater than Short Run Total Revenue.
    c) The ratio of the Marginal Product of Labor to the Marginal Product of Capital may NOT be equal to the ratio of the wage to the cost of capital.
    d) The firm will NEVER shut down, i.e. choose to produce no output.
    e) The economic profits will ALWAYS be equal to zero.

4. Both wages and the cost of living are higher in urban areas then they are in rural areas, yet both people and firms stay in the urban areas. As economists, we explain this as the result of:
    a) Positive externalities in production make labor more productive in cities.
    b) Negative externalities such as congestion increase the cost of living.
    c) Access to more public goods in cities encourages people to move to cities despite higher prices.
    d) All of the above may help explain the existence of cities.
    e) None of the above helps us understand cities.

5. A major league baseball stadium is considering how much to charge for the monopoly to sell hotdogs in the stadium. Hot dogs are produced at constant cost of $0.50 each. The demand for hotdogs is given by the formula:

Q = 9 - P   where Q is measured in units of ten thousand hotdogs.

What is the maximum price that the managers of the baseball stadium can charge for the right to be the only hot dog seller at the stadium?

6. What is the loss in consumer surplus compared to selling hot dogs at the competitive price of $0.50 each? How much of the loss is dead weight loss?

DON'T FORGET THAT THE ABOVE EQUATIONS MEASURE Q IN TENS OF THOUSANDS OF HOT DOGS.

Consider the following prisoner's dilemma game:
Mo and Jo have just robbed a bank and they now have 2 million dollars stowed in a secret hideaway. Unfortunately, they have both been arrested, and the police are currently interrogating them, in separate cells. If they both keep mum, they will be released and can split the 2 million bucks (payoff of 1 each). If Mo squeals, but Jo doesn't, Jo goes to jail (which costs him – 1) and Mo gets all the money (payoff of 2), likewise if Jo squeals and Mo doesn't these payoffs are reversed. If they both squeal, they both go to jail (– 1 for both).

Row (Mo)		Column (Jo)	
		Keep Mum	Squeal
	Keep Mum	1, 1	– 1 , 2
	Squeal	2, – 1	– 1, – 1

7. Assume Mo and Jo do this once a year, so this is a repeat game. How patient do Mo and Jo have to be in order for the strategy (keep mum, keep mum) forever to dominate over squeal today. (I.e. find the discount rate δ that just supports cooperation.) Assume if either squeals, then the game is off after this turn and they both receive 0 for all succeeding periods.

8. What happens to the minimum amount of patience (minimum δ) needed to support cooperation if Mo and Jo were unexpectedly lucky and this time only were able to steal four million dollars. (Assume they still expect in the future to steal two million per year.) – you don't need to solve for the exact δ, just tell me if the minimum δ will rise or fall.

9. The local mason's union is successful in negotiating a collective agreement with builders in a city establishing a monopoly in the labor market for masons (people who build with stone, bricks and cement). In order to get city approval a builder must use a union mason. Which of the following is <u>NOT</u> likely to be a result of this contract.

  a) the wages of masons will rise
  b) the employment of masons will rise
  c) the demand for alternative inputs, such as wooden construction, will rise
  d) the price of housing will rise.

10. In a recent article on personal finance in the Washington Post, the author argued that the purchasers of new cars had recently become irrational and imprudent – they were taking out car loans so large and of so long a duration that when it came time to sell the car the outstanding loan was larger than the value of the car. She argued that a smart investor would never take out a loan to purchase a depreciating asset where the outstanding value of the loan would eventually be greater than the value of the asset. As an economist, discuss the wisdom of this advice. (Michelle Singletary, "Car loans can flip finances upside down." *The Washington Post*, April 25, 2004, p. F01.)

11. The Department of Homeland security wants to vaccinate the health care workers in order to prevent them from spreading the disease from patients to the un-infected, event of a bio-terrorist attack using Small Pox. The Washington Post reported recently that the plan to vaccinate health car workers against Small Pox, however, is running into problems because most health care workers have refused to be vaccinated. Health care workers are reluctant to take the vaccines because it can produce a number of side-effects which, although rare, can be serious or even life threatening.

This is an example of:

  a) the underproduction of a positive externality
  b) the overproduction of a negative externality
  c) the overuse of a common resource
  d) the shortages that result when the government gives something, like the small pox vaccine, away for free.

12. For the following systems of equations, determine how many unique solution sets exist, and if the number of solution sets is finite, solve for the values that satisfy both equations. If no solution set exists or the number of solutions is infinite, explain.

a) $8P_B - 3P_M = 7$
       $-P_B + 7P_M = 19$

b) $x^2 = 9$
       $x + y = 17$

c) $x + y + z$ $= 3$
       $x + y$ $= 2$
       $2x + 2y + z$ $= 5$

d) $x + y + z$ $= 3$
       $x + y$ $= 2$
       $2x + 2y + z$ $= 17$

13. Given the profit function $\pi = 160x - 3x^2 + 120y - 2y^2 - 2xy - 18$ for a firm producing goods x and y, maximize profits, test the second order conditions, and evaluate the function at the critical values x* and y*.

14. Find the total differential for the function

$$f(x,y,z) = \ln(xyz) + e^{xy} - z^3$$

15. You own a bottle of wine that is improving according to the following formula:

$$V(t) = V(0)^{t^{0.5}}$$

If the current interest rate is r, what is the general formula for the optimal date for selling you wine, t* = f(r).

A) t = 1/(2r)   B) t = 1/(4r²)   c) t = ln(r)   d) t = ln V(0) + $r^{0.5}$ e) t = ln V(0) + t^r

Part II:
Question 1   "Concrete Competition"
Suppose there are a fixed number of 1,000 identical firms in the perfectly competitive concrete pipe industry. Each firm produces the same fraction of total market output, and each firm's production function for pipe is given by

$$q = (KL)^{½}$$

Suppose also that market demand for concrete pipe is given by

$$Q = 400,000 - 100,000P$$

Where Q is total concrete pipe.

A) If $w = v = \$1$, in what ratio will the typical firm use K and L?
What will be the Long Run average and marginal cost of pipe?
In long-run equilibrium what will be the market equilibrium price and quantity for concrete pipe?
How much will each firm produce?
How much labor and capital will be hired by each firm and by the market as a whole?

B) Suppose the market wage rose to \$2.00, while v remained constant at \$1.00. What is the new capital-labor ratio?
What is the new long run average and marginal costs?
What is the new long market equilibrium quantity and price for pipe?
How much will each firm now produce?
And finally how much labor will now be hired by each firm and by the market as a whole? How much capital?

C) Assume now that concrete pipe is costly to move, so that although there are many producers in the national market, the industry is effectively an oligopoly in most local markets. Assume there are only two producers of concrete pipe in Pipopolis, PA. Each In this case, return to the conditions in part a ($w = 1$, $v = 1$), assume that there are two producers of concrete pipe in Pipopolis, PA. Assume Demand in Pipopolis is given by $Q = 800 – 200P$. Further assume that the two firms can compete on QUANTITY (by committing to a particular SIZE of concrete pipe plant). If the two firms are otherwise identical, find the Cournot reaction function for each firm and the equilibrium quantity for each firm and the equilibrium market price.

Question 2   "A Mickey Mouse Problem"

A. According to the U.S. Constitution, the Congress is specifically charged with the responsibility for establishing patents and copyrights in order to encourage innovation and creative endeavors. The traditional length of a copyright in the U.S. (a property right in a piece of creative output, such as a novel or painting or song) had been 56 years. Recently, at the urging of the owners of several valuable but aging examples of "IP" (intellectual property) the copyright was extended, and it may be extended again. In this problem we will consider the increase in the value of the incentive offered to an artist of a copyright good for 56 years compared to a copyright good for infinite number of years.

Assume an artist has created a short film, starring a big eared mouse, that will generate an annual revenue of $10,000 per year forever. Assume the expected future interest rate is a constant 5% per year. Compute the value of the 56 year copyright, the value of the (proposed) infinite copyright, and the percent increase in the value of the copyright that occurs when the lifespan is increased from 56 years to infinity years.

B. Based on your answer to A, briefly discuss whether you think extending the copyright would represent a large encouragement to creative production?

C. This same artist is considering selling DVD's of his movie in two markets. The demand in the two markets is:

$Q_E = 21 - 0.1P_E$
$Q_U = 50 - 0.4P_U$

The Total Cost of production is $TC = 20,000 + 3Q$

What price will the producer charge in order to maximize profits, how much will he sell, and what will be his profits:

i) If he can discriminate between the two markets (set a different price in each market)

ii) If he cannot discriminate (must set the same price, perhaps because it doesn't cost much to ship a DVD from one market to the other.

D) Based on your answer, briefly discuss the observation that DVD's sold in Europe and DVD's sold in the U.S. are different formats, so a U.S. DVD will not play in a European DVD player and vice versa.

(End of Exam)

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