Econ 493f   **Law and Economics**   Spring 2017

1   Identify and/or Define:

a. Codex of Hammurabi
b. Marginal Cost
c. Net Benefit
d. Expected Penalty
e. Present Discounted Value
f. Pareto Superior Move
g. Normative Statement
h. Prisoner's Dilemma
i. Hobbesian Dilemma
j. Commons Problem
k. Shirking Problem

l. Dominant Strategy
m. Nash Equilibrium
n. Optimal Crime Rate
o. Gary Becker
p. Torts
q. Strict Liability
r. Negligence
s. Reasonable Care
t Contributory Negligence
u. Learned Hand Decision
v. Civil Law

2   Use a Hobbesian dilemma diagram to demonstrate that creating property rights over produced outputs can greatly increase a society's prosperity.

a. (Label all important details, including the Nash equilibrium.)

b. In what way does your game matrix imply that there is a problem.

c. What expected fine is sufficient to enforce property rights in your game matrix?

3   Use a 3x3 game matrix to characterize the "tragedy of the commons" for a two person commons.

a. What in your game matrix, if anything, distinguishes this tragedy from the standard prisoner's dilemma problem?

b. The game matrix can be used to show how various solutions to the commons problem may operate.

- Show how user fees can solve the dilemma. (That is to say, modify the payoffs by subtracting the appropriate user fees to produce a Pareto optimal outcome.)

- Analyze how quotas (use entitlements) can solve the problem.

c. Illustrate and discuss how privatization can solve a commons problem.

d. Develop an example in which the payoffs (outputs) are based on a production schedule and so there are more than three possible strategies.

- Create a table characterizing a production function, with inputs, outputs, and average products.

- Use that table to characterize the payoffs and outcomes with a game matrix.

- Find the Nash Equilibrium.

- Is there a problem at the Nash equilibrium? Explain.

- Construct examples where (i) there is a problem and (ii) there is not a problem..

- (Hint, use production schedules that have constant returns and strong diminishing returns.)

e. Explain why solutions to the commons problem tend to become more difficult as the number of commons users increases.

f. Does every commons have a commons problem? Why or why not?

4   Use a diagram to illustrate how property rights that can be shifted from individual to individual tend to increase the size of markets and the extent of specialization.

- Label all relevant details.

- Explain why specialization tends to increase when produced goods can be both owned and sold.

- Explain why tradable ownership rights tend to be more important for produced goods than goods, like land, that are not produced.

- Are there economic advantages to tradable ownership rights over land? Explain.

5   Use a game matrix to show how contract enforcement can solve problems associated trades that are not simultaneous.

- Assume that Al pays Bob $100 dollars for Bob to provide a service worth $120 to Al at some point in the future (next week).

- Create a game matrix that illustrates the intertemporal trading dilemma that occurs in such cases.

- Use your game matrix to explain why such trades are not likely to occur unless contracts are enforced (or there are strong internalized norms against reneging on promises).

- Do enforceable contracts solve all such problems? Why or why not?

6   Show how contracts can solve a team production problem.

a. Develop an team production matrix, and note the existence of unrealized potential gains to trade at the independent adjustment equilibrium (e.g. unrealized team or social net benefits at the Nash equilibrium).

b. Discuss why there tends to be a timing problem similar to that in problem 5.

c. Use game matrices to show that some contracts work better than others as solutions to the team production problem.

d. Why are many contract put in writing?

7   Analyze the following game matrix.

Game Matrix Puzzle			
A \ B	High	Medium	Low
High	4, 4	3, 5	1, 6
Medium	5, 3	5, 5	2, 7
Low	6, 1	7, 2	4, 4

a. Find the Nash Equilibrium (or Equilibria) of this game. Explain

b. Do either of the players have a dominant pure strategy?

c. Is the equilibrium (or equilibria) Pareto optimal? Explain.

d. Subtract 3 from A's payoffs in the bottom row. How does this change the equilibrium?

e. What type of problem from law and economics could this game be used to analyze? Explain.

8   Use marginal benefit and marginal cost curves to depict a setting where:

a. an externality generating activity (for example, pollution) is over produced in unregulated markets

b. an externality generating activity (for example, picking up trash) is under produced in unregulated markets

c. an externality generating activity is produced at the Pareto efficient level in unregulated markets

d. Illustrate how conditional fines (or subsidies) can be used to solve the problems illustrated.
   [Be sure to carefully label all relevant details in each of your diagrams.]

9   Depict a law breakers choice of personal "crime rate."

a. Note all relevant details.

b. What is the law-breaker's net benefit from this crime?

c. Show the effect on an increase in expected penalties on the crime rate selected by this person.

d. How would one create a supply (or demand) curve for criminal activities? [Hint: the expected fine can be thought of as the price of illegal activities.]

10 Create a diagram or series of diagrams that demonstrate that the optimal crime rate is NOT zero.

a. Explain the logic of these diagrams.

b. What factors tend to increase the optimal level of crime?

c. What factors tend to decrease the optimal level of crime?

d. How would an increase in average age increase the crime rate?

e. Crime rates have been falling in the US for the past 20 years, are their any factors that suggest that such reductions have been "optimal."

11 Illustrate a moral hazard problem (under-investment in care problem) and show how tort law can induce people to take greater care than they would have without tort law?

a. Label all important details.

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b. What assumption about causality have you made?

c. What type of liability law have you assumed?

d. What incentive does the modeled individual have to take steps to reduce the probability of an accident without tort law?

e. What is the normative problem associated with a person's decisions to "take care" in the absence of tort law?

f. How does tort law change a person's incentives to exercise due care?

12 Use a game matrix to illustrate how strict liability, negligence, and contributory negligence rules affect levels of care in a setting where both the accident causer (tort feasor) and victim can affect the extent of the damages by exercising "care."

a. Find the Nash equilibria that occur with and without tort law.

b. Explain the problems associated with strict liability rules, if any, in this setting.

c. Are there any differences between negligence and contributory negligence rules in your choice setting (game matrix)?

d. Create a choice setting (game matrix) in which strict liability is inferior to a Tort system that includes consideration of negligence.

e. In what sense can negligence and contributory negligence rules be said to be superior to strict liability rules in this context?

13 How would a reduction in court efficiency affect the optimal extent of law enforcement and crime (as in problem 10) and the effectiveness of tort law (as in problem 11)?

a. How would P<1 affect the optimal assignment of fines or damages?

b. How would a shift from negligence rules to strict liability rules affect behavior in settings of one-way causality? in settings of joint causality?.

c. Suppose that the court errors are not a lower probability of punishment but tend to impose fines and damages award that are much larger than the actual damages generated. How would this affect the optimal investment in crime prevention and rules for assigning liability?

14 Depict the optimal level of care for three types of accidents: no causality, one way causality, joint causality. Label all important details.

a. Is there an assignment of damages from accidents that induces the ideal level of care in all cases?

b. What liability rules work best for each setting? Discuss.

c. Is there any reason to treat accidents differently from crimes that impose similar damages? Explain.

15 Regulatory solutions.

a. Show how a conditional fine can be used to solve an externality problem.

b. Label all important details and briefly discuss your analysis..

c. [If you have used an external marginal cost diagram, repeat using a negative external marginal benefits.]

d. What difficulties might one encounter in setting fines to support you regulation.

e. Repeat a and b using demand and supply curves with different slopes.

• How do the slopes of the supply and demand curves affect the size of the fines required to internalize an externality?

16 Discuss the relative merits of privatization, limited access, and communal management for commons problems.

a. Create a game matrix to illustrate a commons problem.

b. Show a user fee or fine that is sufficient to solve the problem.

c. What advantages does privatization have?.

d. Are there any problems that are larger for privatization than collective management?

e. Does every commons have a problem? Why or why not?

17 Given the MB curves below derive each person's demand for apples.

$/Q

MBa

Q

$/Q

MBb
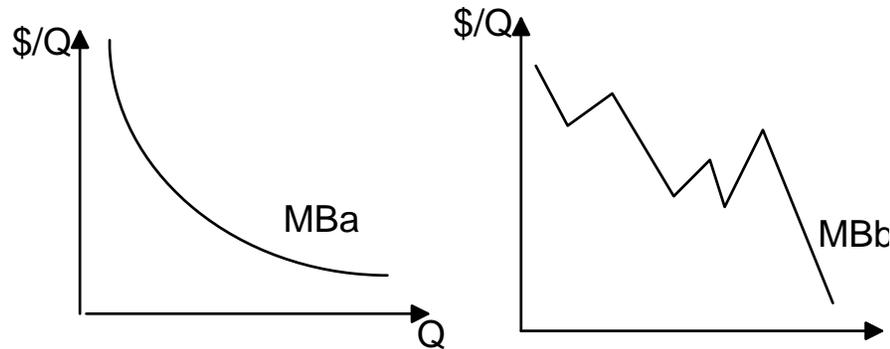
EXTENSIONS, THOUGHT PROBLEMS, and PUZZLES

18 Discuss how Coasian contracts can be used to solve externality problem(s) in settings in which transactions costs are low.

- Consider both the case in which the polluter and the persons affected by the externality initially control the output or effluent of interest.
- If the Coase theorem is correct, do we also need tort law? If so why?

19 Discuss briefly two or three methods for escaping from the Hobbesian Jungle.

a. Begin with a Hobbesian Dilemma..
- Explain the basic problem.
- Explain why property rights in manufactured products (pots etc) can solve the problem.

b. Is there another Hobbesian dilemma for the enforcer?
- How would the enforcement system be organized.
- What are problems associated with "dictatorial" enforcement?

c. The problem with constitutions is that they have to be "self enforcing" in the sense that no signatory has an incentive to default on his or her obligations. (i) Use your game in part "a" to demonstrate that each party has an incentive to cheat on the original agreement. (ii) Is there a way to deal with this problem? If so describe, if not criticize. (iii) How can the *repeated* nature of the game help solve this problem?

20 Suppose that the market for Apples has the following supply and demand curves:

$$Qd = 100 - 2P \qquad Qs = 100P$$

a. Find the equilibrium price (that which sets supply equal to demand).

b. Find the effect on output and prices for a 20 cent per apple excise tax.

c. Suppose that the $MCx = 30P$.

d. Find the Pareto optimal level of apple consumption.

e. Find the smallest fine that can produce the net benefit maximizing outcome.

f. Draw a graph of your solution and label all important details

21 The cost of a regulatory scheme includes the initial costs of establishing the regulation, private adjustments to the regulation (deadweight loss), and the day-to-day costs of enforcement. Calculate the long term (infinite) present value of the following programs.

a. Suppose that the initial "setup" costs be 500, the enforcement costs be 100 per year, the private capital costs be 150 per year and the flow of benefits be 300 per year. Assume that the discount rate is 5%/year. What is the present discounted value of the net benefit stream?

b. Suppose that the initial cost is 100, the enforcement costs are 150 per year, the private capital costs are 175 per year, and that the benefit is a single "lump sum" that is realized in twenty five years. If the interest rate is 5%/year, what is the lowest benefit that makes the project worth while?

- For example, the code of Hammurabi includes provisions that impose penalties on persons who do not **properly** maintain their dikes and their neighbor's field is flooded as a consequence.

Practice Game Matrices: (a) find the Nash Equilibrium, (b) Is the Nash Equilibrium Pareto Optimal? (c) Are SNBs maximized?

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Table 1		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	2, 2	0, 3
Strategy 2	3, 0	1, 1

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Table 2		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	(A, B) 1, 1	(A, B) 0, 3
Strategy 2	3, 2	1, 1

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Table 3		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	2, 2	0, 3
Strategy 2	3, 0	4, 4

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Table 4		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	2, 2	0, 3
Strategy 2	3, 0	-2, 2

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Table 5		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	(A, B) 1, 1	(A, B) 2, 0
Strategy 2	2, 0	1, 1

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Table 6		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	1, -1	0, 3
Strategy 2	2, 1	4, 0

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Table 7		
Al / Bob	Strategy 1	Strategy 2
Strategy 1	12, 7	6, 8
Strategy 2	5, 5	7, 6

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Table 8			
Al / Bob	Strategy 1	Strategy 2	Strategy 3
Strategy 1	5, 5	4, 1	2, 6
Stategy 2	3, 1	3, 3	3, 1
Strategy 3	4, 0	2, 2	4, 3

Answers T1: (1,1) no, no; T2: (3,2) yes, yes; T3: (4,4), yes, yes; T4: (0,3) yes, no; T5: no Nash eq, T6: (2,1) yes, no; T7: (7,6), no, no; T8: (3,3) and (4,3), no, no.