

Sample exam 2

The actual final exam will have the same format as this
Answers will be posted in 3 weeks

ECO202 PRICE THEORY FALL 2019

120 Minutes

Each question is worth the same points.

Choose **any 5** questions from Each Section (5 from A plus 5 from B plus 5 from C).

Answer questions in any order. Label each question clearly.

Your questions are different from those of other students in the class.

No cellphones allowed – only personal calculators.

“Try your best; give answers as full as you can.”

Section A. Choose *any five* questions. Label each question.

- A1.** A painting is for sale at \$100. If it is authentic, you can resell it at \$300. But there is a 50% chance it is a fake. If the painting is a fake, you have to throw it away. Your utility function for money is given as $U(Y) = (500 + Y)^2$. Should you buy the painting?
- A2.** Suppose a monopolist is producing 800 units of output and is charging \$40 per unit. The price elasticity of demand for the product is -4 . What is the marginal cost of the last unit produced? What is the firm's percentage mark-up?
- A3.** The supply and demand functions for coal are $Q_S = 4P - 12$ and $Q_D = 20 - 4P$. Initially, the market is in equilibrium. If the government fixes the price at \$3.50, what is the change in consumer surplus, change in producer surplus, and deadweight loss?
- A4.** You own a gold mine. The current market price of gold is \$200 per ounce; the interest rate is 12%. The marginal extraction cost of gold is constant over time at \$25. Under Hotelling's Rule, what price do you expect in two years' time?
- A5.** A 1-year college program costs \$5,200, payable now; after the course is over, you can earn \$3,000 more each year for the next two years. Rounded to the nearest percentage point, what is the implied interest rate on this program?
- A6.** Farmer Brown grows wheat. He knows rainfall patterns are highly productive (HP) 20% of the time, moderately productive (MP) 50% of the time, and not productive (NP) 30% of the time. Wheat yields are \$50,000 with HP weather, \$30,000 with MP weather, and \$20,000 with NP weather. What is the expected yield from growing wheat? If Farmer Brown would rather lease out his farm each year for \$30,000 is he risk-averse or risk-loving?
- A7.** Show using budget constraints and indifference curves why an increase in the interest rate increases saving in the current period.
- A8.** Timmy derives utility from only two goods, carrots (C) and donuts (D). His utility function is: $U = 2CD^2$. Timmy's income is \$90 and carrots cost \$1 and donuts cost \$2. How many carrots and donuts should Timmy buy?

Section B. Choose *any five* questions. Label each question.

- B1.** What is the difference between a Cournot model and a Bertrand model? Which model is a more realist depiction of oligopoly?
- B2.** What are some of the ways in which humans are irrational?
- B3.** What measure would determine if a firm should make more than one type of product?
- B4.** You have a fixed income and only eat rice and beans. The price of rice rises, but the price of beans stays the same. What are the two effects on your consumption of rice?
- B5.** Why is the optimal auction design a second-price, sealed-bid auction?
- B6.** What is the principal-agent problem? Why does it cause market failure?
- B7.** What determines if a person has preferences that are risk loving or risk averse?
- B8.** How does bundling increase profits?

Section C. Choose *any five* questions. Label each question.

C1. What are the economies of scale for these production functions? Explain your answers:

$$Q = 0.2K^{0.6}L^{0.8}$$

$$Q = 44K^{0.1}L$$

$$Q = 11K + 2L^{0.3}$$

C2. What is a strategy? What are some examples of strategies that firms might apply?

C3. Two investments (called A and B) have the same three payoffs, but the probability associated with each payoff differs:

| Investment A | | Investment B | |
|--------------|-------------|--------------|-------------|
| Payoff | Probability | Payoff | Probability |
| \$300 | 0.10 | \$300 | 0.30 |
| \$250 | 0.80 | \$250 | 0.40 |
| \$200 | 0.10 | \$200 | 0.30 |

(a) Find the expected return and standard deviation of each investment.

(b) Jill has the utility function $U = 5I$, where I denotes the payoff. Which investment will she choose?

(c) Ken has the utility function $U = 5I^2$, where I denotes the payoff. Which investment will he choose?

C4. What's the difference between expected value and expected utility?

C5. Why might you apply a maximin strategy?

C6. In a monopoly market where the product is an exclusive durable good, why might the monopolist not be able to sell the optimal amount of the good?

C7. What is the Dorfman-Steiner equation for advertising? What are the conditions under which a firm would decrease its spending on advertising?

C8. The firm's production function is $Q = 2K^2L^3$, where Q is output, K is capital, L is labor. Denoting the wage paid to labor by w and the rental rate for capital as r , derive the conditional factor demand for capital and the cost function.

C9. Two computer firms, A and B , are planning to market their software. Each firm can develop either a fast, high-quality system (*High*), or a slower, low-quality system (*Low*). Profits to each firm for these alternative strategies are given as:

| | | Firm B | |
|--------|------|----------|----------|
| | | High | Low |
| Firm A | High | (50, 40) | (60, 45) |
| | Low | (55, 55) | (15, 20) |

(a) If both firms make their decisions at the same time and follow maximin (low-risk) strategies, what will the outcome be?

(b) Suppose that both firms try to maximize profits, but that Firm A has a head start in planning and can commit first. Now what will be the outcome?