UBC
Managerial Economics: Commerce/ FRE 295

Final Exam: December 11, 2013

NAME: _____, _____ (please print)
(Family Name) **(Given Names)**

SIGNATURE: _____

STUDENT NUMBER _____

SECTION: _____

PROFESSOR'S NAME: _____

EXAM ROOM _____

Section 101	MW 10:00-11:30 J. Brander
Section 102	MW 11:30 – 1:00 J. Brander
Section 103	MW 1:00-2:30 M. Tappata
Section 104	MW 2:30-4:00 M. Tappata
Section 105	MW 4:00-5:30 S. Meyer
Section 106	TTh 11:00-12:30 J. Vercammen
Section 107	TTh 2:00-3:30 R. Shrestha

Maximum Score: 100
Time Available: 2 hours (120 minutes).

Instructions:

There are two parts to this exam. The first part consists of 20 multiple-choice questions and the second contains 5 longer questions. Please answer all multiple choice questions and **choose 4 out of 5 longer questions**. If you do all 5 questions the last question will not be marked. The longer questions are worth 60% of the exam so you should make sure you leave enough time to do these questions.

This is a closed-book exam. You may not use books or notes. You may use a basic (non-programmable) calculator but may not use other electronic devices such as smartphones, tablets, computers, etc. Keep any such devices turned off (powered down) and/or packed away during the exam.

You may use pen or pencil. Answers must go in the indicated places. For the multiple choice questions you must transfer your answers to the answer sheet, which is the next page in this exam.

For each longer question your answer must fit in the indicated space. However, if you wish to re-do a question, you may cross out your answer and provide the answer somewhere else on the exam, such as on the back of a page, but the total space used should be no more than allowed in the original question.

Please do not leave the exam room during the final 15 minutes of the exam, as that is disruptive to other students. If you have a question or want scrap paper just raise your hand.

PART I. MULTIPLE CHOICE ANSWERS (Use letters A, B, C, or D.) Put your answers here. Multiple choice answers placed elsewhere will not be marked.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Total Multiple Choice Marks: _____ / 40

PART II: Marks for Longer Questions: (Choose 4 questions out of 5.)

Question 1. _____
Question 2. _____
Question 3. _____
Question 4. _____
Question 5. _____

Students, please do NOT complete this section. This section will be completed by the markers.

Total Longer Question Marks: _____ / 60

Overall Mark: _____/ 100

PART I

MULTIPLE CHOICE QUESTIONS

Each question has one correct response. There are 20 questions. Each question is worth 2 pts. If you choose the correct answer you get 2 pts. Otherwise you get no points for that question. **Transfer your answers to the answer page (p. 2).**

1.If the inverse demand curve for yoga lessons in Vancouver is given by P = 100 – 0.5Q and the inverse supply curve is P = 10 + Q then:

A. The equilibrium price is 60.
B. The equilibrium quantity is 60.
C. The equilibrium quantity cannot be determined from the above information.
D. None of the above.

2. There was a 5 percent decrease in the demand for gasoline (using the average quantity as the base for the percentage calculation) when a carbon tax raised the price of gasoline from $1.00/liter to $1.20 liter. The estimated arc elasticity of demand for gasoline is:

A. -0.275
B. -2.5
C. -3.636
D. None of the above.

3. You have obtained some information on price and quantity for music downloads that can be used to estimate a demand curve. You have a large sample of data points. Among other things, you need to assess whether quantity demanded is a linear function of price or a quadratic function. You estimate the function $Q = a + bp + cp^2$. Your estimate of c is 2.3 and the associated standard error is 0.5. The estimated R^2 statistic is 0.73. You can infer that a quadratic specification is better than a linear specification because:

A. The implied t-statistic for c is larger than 2 in absolute value.
B. The R^2 statistic is suitably large.
C. The estimated value of c is positive.
D. None of the above.

4. The "last dollar rule" implies that:

A. To maximize utility the marginal utility of the last dollar spent on each good should be the same for all goods consumed.
B. To minimize cost the marginal product of the last dollar spent on each input should be the same for all inputs used to produce a given output.
C. Both of the above.
D. None of the above.

5. A firm has a cost function as given by $C(Q) = 27 + 3Q^2$ where Q is the quantity of production. Which of the following statements is true?

A. The firm's marginal cost (MC) of production and average total cost (AC) of production are equal at Q = 9.
B. The firm's MC is higher than average variable cost (AVC) for all positive levels of production.
C. The firm's AVC decreases with quantity of production for all production levels from 0 to 3, then increases.
D. All of the above.

6. Suppose a (profit maximizing) monopolist has inverse demand function P = 40 - Q and cost function C(Q) = F + 10Q, where F is the fixed cost of production and Q is the quantity of output.

A. If F < $225, then the firm will produce Q =15, irrespective of whether this fixed cost is avoidable or not.
B. If F > $225 and is avoidable if the firm shuts down, then the firm will shut down and produce nothing.
C. If F > $225 and is unavoidable, then this firm will continue producing even though it makes a loss.
D. All of the above.

7. If a firm is in a long run perfectly competitive equilibrium then

A. Average variable cost must be constant.
B. Average fixed cost must intersect average cost where average cost is at its minimum.
C. Entry barriers are large enough to prevent new firms from entering the market.
D. None of the above.

8. When a government intervenes in an otherwise undistorted perfectly competitive industry without market failure using a tax, a price control, or a production quota we expect to see a deadweight loss (DWL). Also, consumer surplus (CS) and producer surplus (PS) will typically change. If consumers gain from the intervention then we expect:

A. The loss to producers must be larger than the gain to consumers.
B. The DWL must equal the difference between CS and PS measured after the intervention.
C. Negative DWL implies a gain for both consumers and producers.
D. CS + PS is always the same both before and after the intervention.

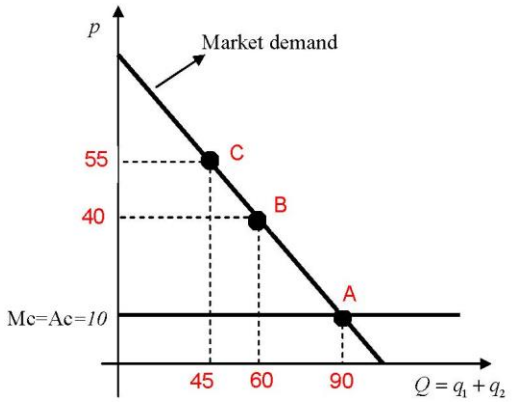
9. Consider a monopoly with a positive fixed cost but zero marginal cost of production. Which of the following statements is true?

A. This firm maximizes profits by producing a quantity on the elastic portion of the demand curve (i.e. where the absolute value of the elasticity exceeds 1).
B. When it maximizes profit, this firm also maximizes revenue.
C. Since the marginal cost of production is zero, deadweight loss is also zero at the profit maximizing level of output.
D. None of the above.

10. Which of the following statements about price discrimination is correct?

A. With group-based price discrimination, profit maximization implies that marginal revenue will be the same for both groups.
B. Issuing coupons is one method to price discriminate by separating consumers into two groups.
C. If a monopoly shifts from using a single price (uniform pricing) to using block pricing (a form of price discrimination) then it may increase producer surplus and decrease deadweight loss.
D. All of the above.

11. Assume there are two firms in a duopoly (an oligopoly with two firms) selling homogeneous goods. For each firm we have MC =AC=$10. The market demand is given by $Q_d = 100 - P$. The figure below shows three possible outcomes (A, B and C)



A. Point A corresponds to the Cournot outcome.
B. Point B corresponds to the Bertrand outcome.
C. Point C corresponds to the profit maximizing Cartel outcome.
D. All of the above.

12. Firm A's best response function when firms A and B compete in a Bertrand-Nash oligopoly can best be described as a schedule that shows:

A. The *price* that maximizes profits for A for each *price* that might be set by B.
B. The *price* that maximizes revenue for A for each *price* that might be chosen by B..
C. The *quantity* that maximizes profits for A for each *quantity* that might be chosen by B..
D. The *profits* earned by A in a best response Nash equilibrium.

13. Under monopolistic competition:

A. Each firm's marginal revenue curve is tangent to its average cost curve in the long run.
B. The last firm that enters the market is expected to make positive long-run profit.
C. Each firm faces a downward-sloping demand curve.
D. All of the above.

14. In the following payoff matrix Coke and Pepsi have three choices available to them regarding their advertising budget for the next period. Choices are made simultaneously and the game is played only once. In each cell the number on the left is the profit of Coke and the number on the right is the profit to Pepsi. Which of the following statements is true?

		Pepsi		
		No Advertising	Moderate Advertising	Massive Advertising
Coke	No Advertising	100, 50	90, 55	80, 60
	Moderate Advertising	105, 40	90, 45	85, 48
	Massive Advertising	110, 30	95, 35	80, 30

A. A unique Nash equilibrium exists in pure strategies.
B. At least one player has a dominant strategy.
C. Because this game has no pure strategy Nash equilibrium, we can find an equilibrium by looking at mixed strategies.
D. The maximin solution yields a larger combined profit than any pure strategy Nash equilibrium.

15. Which of the following statements about the prisoner's dilemma game is true?

A. The prisoner's dilemma game has unique Nash equilibrium in pure strategies which is also a dominant strategy solution.
B. If we play the prisoner's dilemma game more than once the outcome will necessarily be different than if we play only once.
C. The result from a one-time (static) prisoner's dilemma game is an example of the irrational behavior of individuals.
D. All of the above.

16. The matrix below summarizes the payoffs (in utility) in a soccer penalty kick shootout. The striker and the goal keeper must simultaneously choose the direction of the kick and dive respectively: Left, Right or Center. The goal keeper stops the ball if he or she chooses the same position as the striker. Otherwise, the striker scores the goal. The payoff to the striker in each cell is the number on the left.

		Goal keeper		
		Left	Center	Right
Striker	Left	0,1	1,0	1,0
	Center	1,0	0,1	1,0
	Right	1,0	1,0	0,1

A. Goal keeper choosing Center and Striker choosing Left is a Nash Equilibrium.
B. Goal keeper choosing Center and Striker choosing Center is a Nash Equilibrium.
C. The only Nash Equilibrium involves mixed strategies.
D. None of the above.

17. Adidas and Nike are rivals in selling athletic clothing. Each firm has decided that it will sign on as a sponsor for either the Summer Olympics or the Winter Olympics, but not both. Each firm is affected by its own choice and the choice of its rival. The payoffs are as follows. The left number in each cell is the payoff to Adidas.

		Nike: Sponsor Summer	Nike: Sponsor Winter
Adidas	Sponsor Summer	50, 50	200, 100
	Sponsor Winter	100, 200	25, 25

A. We can confidently predict that if Adidas threatens in pre-play communication (cheap talk) to pick the Summer Olympics then Nike will pick the Winter Olympics.
B. The Pareto criterion implies that both firms will choose to sponsor the Summer Olympics.
C. If Adidas can move first and make a publicly known contractual commitment over its sponsorship choice then we can be confident that Nike will sponsor the Winter Olympics.
D. None of the above.

18. Other things equal, risk averse individuals want to eliminate or reduce the risks they face. Which one of the following statements regarding "reducing risk" is true?

A. Diversifying investments can fully remove risk if the returns on those investments are perfectly negatively correlated.
B. During 2008-2009, many people lost substantial value in their investment portfolios because the returns on most of those investments (including stocks, bonds, and real estate) were negatively correlated.
C. Risk averse people will not buy insurance priced at more than the (actuarially) fair price.
D. None of the above.

19. In our study of behavioral game theory we provided examples showing that players in a game may fail to reach the “fully rational” equilibrium because of “bounded rationality” or because of psychological biases in decision-making. Bounded rationality arises when a game is too complicated for players to calculate optimal strategies.

A. The ultimatum game illustrates bounded rationality.
B. In the ultimatum game full rationality implies equal payoffs for both players.
C. The “beauty contest game” in which players try to guess 2/3 of the average guess illustrates the importance of different levels of reasoning in decision-making.
D. All of the above.

20. Framing effects arise when people make different choices depending on how a choice is described or “framed” even when the underlying payoffs do not change. Framing effects can be explained by prospect theory. Prospect theory is based on the assumption that:

A. Decision-makers suffer from bounded rationality.
B. Decision-makers are strongly influenced by the reciprocity norm.
C. People are risk-preferring in the domain of losses and risk averse in the domain of gains.
D. All of the above.

Part II

LONGER QUESTIONS

Choose 4 questions out of 5. If you do all 5 questions the last question will not be marked. Show your working and provide explanations where appropriate. Many questions ask you to "explain briefly", which means that one or two good sentences should be enough. Confine your answers to the space provided in the question. You may cross out an answer and do the entire answer somewhere else if necessary but the total space used cannot exceed the original space provided.

1. **Pricing**

ACME Ultralight has a monopoly in the ultralight recreational airplane market. ACME rents ultralight planes to customers on an hourly basis. The hourly market demand can be represented by the inverse demand function $P = 50 - Q/2$. ACME's cost function is $C=20+10Q$.

a. (5 pts) Determine the quantity sold under uniform (i.e. single price) monopoly pricing and under perfect price discrimination. Illustrate perfect price discrimination in a diagram. In which case do consumers pay higher prices? Explain briefly.

b. (6 pts) Suppose individual inverse demand for hours is $P = 50 – 5q$. All consumers have the same demand. If ACME uses profit-maximizing two-part pricing what access fee and hourly fee would it charge? Suppose ACME discovers an additional consumer group in which individuals have identical demand and each individual has a lower level of demand than in the first group. If ACME sells to both groups would the access fee and hourly fee change and, if so, in what direction?

c. (4 pts) In the case of just one group of identical consumers, which of the three pricing methods above (single price monopoly, perfect price discrimination, or two-part pricing) would yield the best outcome and which would yield the worst outcome for consumers and for total surplus? (Do not do any additional calculations. A verbal answer is adequate.)

2. **Dynamic Games**

a. (5 pts) Microsoft and Sony are considering the prices for their game consoles to be released this month (XBOX One and PS4). The marketing advisors narrowed down the set of possible prices to two, a high and a low price: $499 and $399. The payoffs (in $millions) to each company are displayed in the matrix below.

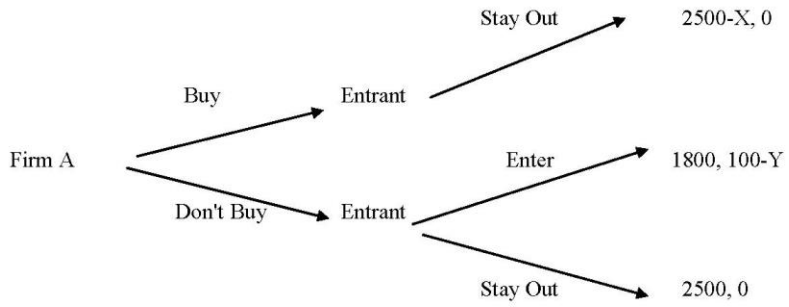
Microsoft's XBOX One

Sony's PS4	Low Price	High Price
Low Price	50 , 30	80 , 20
High Price	30 , 60	60, 50

What is the Nash Equilibrium of the one-shot (static) game if the firms set prices simultaneously? Now assume the firms face the same situation over and over indefinitely (every year) when they release new consoles. A tit for tat strategy in this context means choosing the high price in the first period and then choosing whichever price the other firm chose in the previous period. Is it a Nash equilibrium if both players play tit for tat? Explain, using actual numbers if possible.

b) (5 pts) Assume now that the game is played only once. Also assume Sony could be ready to sell the new PS4 earlier than expected if they spend $5m more on R&D. That is, if Sony spends $5m more it will have the option to launch and set the price for the PS4 before Microsoft. Will Sony choose to spend the $5m and move first? Explain briefly.

c) (5 pts) Firm A is the only incumbent producer of skate boards in Vancouver. A potential entrant is considering entering the market. If entry occurs Firm A will earn $1800 and the entrant will earn $100 minus an entry cost equal to Y. Firm A can buy exclusive rights to be the only firm in the market by paying a license fee equal to X. The extensive form (game tree) diagram below shows the possible outcomes and the payoffs for each firm.



For what values of X and Y will Firm A pay the license fee? For what combinations of X and Y will entry occur? Explain briefly.

3. Uncertainty

Ethan is a former Commerce graduate who is considering two job offers at major firms. Job 1 pays a fixed salary of $550 per day and Job 2 pays $400 per day with 60% probability and $ 900 per day with 40% probability.

a. (5 pts) Calculate the expected value and variance of each job. What can you say about Ethan's job choice if he is risk neutral? What if he is risk averse? Explain your reasoning briefly

b. (5 pts) Now suppose Ethan's utility as a function of his income is given by $U(W) = W^{0.5}$ where W is his daily income. Given his utility function, which job will Ethan accept? What is the minimum fixed salary that would provide Ethan with the same expected utility as Job 2?

c. (5 pts) If Ethan has an option to buy insurance to protect against the variable income associated with Job 2, how much is he willing to pay for that insurance? (In other words, what is the risk premium Ethan is willing to pay to avoid the risk associated with Job 2?). Show the risk premium in an appropriate diagram. Label the axes and show the relevant numbers that allow you to calculate the risk premium.

4. **Asymmetric Information**

a. (4 pts) The cost of a hospital visit is $10,000. In a given year a healthy person has a 4% chance of needing a hospital visit and an unhealthy person has a 10% chance. Half the population is healthy and half is unhealthy. By law everyone is required to purchase hospital insurance. There is a monopoly provider of insurance who is required by law to charge the (actuarially) fair price for insurance. This insurance company knows the information just given but does **not** know which people are healthy and which people are unhealthy. What price will be charged for insurance? Is there adverse selection in this market? Explain briefly.

b. (5 pts) The government repeals the law requiring everyone to buy insurance but still requires the insurance company to charge the (actuarially) fair price for the people who buy insurance. Healthy people are risk averse and are willing to pay up to $500 for insurance. Unhealthy people are also risk averse. The company still does not know who is healthy or unhealthy. In equilibrium what will be the price of insurance and who will buy it? Does the market exhibit adverse selection? Explain briefly.

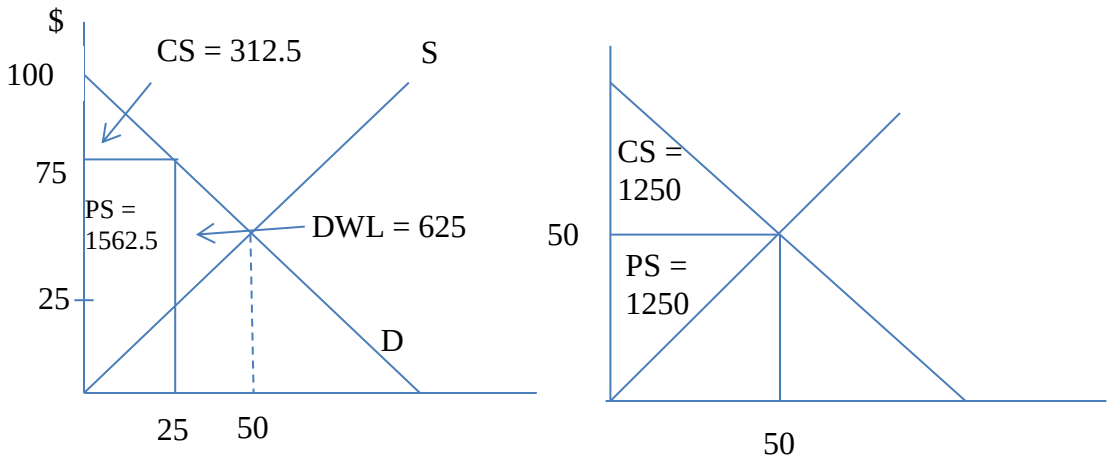
c. (6 pts) Amy is a tax accountant for an import-export firm. She keeps track of foreign transactions and applies for tax rebates where appropriate. The tax savings she generates depend in part on how hard she works and in part on what kind of transactions are made by the firm. We will consider just two possibilities: case 1 and case 2, each of which has 50% probability. The tax savings are given by the following table. The numbers show the tax savings before any payments to Amy are made.

	Case 1	Case 2
Normal Effort	20	60
High Effort	60	100

Amy is risk neutral. Her cost of normal effort is 0 and her cost of high effort is 12. Amy is paid through a profit-sharing contract that allows her to keep a share of the tax savings. What effort level will she provide if she keeps 20% of the tax savings. What if she gets to keep 40% of the savings? What is the minimum share that will induce Amy to provide high effort?

5. **Market Failure and Externalities.**

a. (5 pts) The graph on the left shows a market with a production quota set at Q = 25 and a market clearing price of P = 75. In this case consumer surplus (CS) is equal to 312.5, producer surplus (PS) is equal to 1562.5 and dead-weight loss (DWL) is equal to 625. A regulator is contemplating eliminating the production quota to make the market perfectly competitive, as depicted in the graph on the right. In this case CS and PS will both equal 1250 and there will be no DWL. Briefly explain the following true statement: "Eliminating the production quota is not a Pareto improvement." What additional action can be taken by the regulator to ensure that the shift to the competitive outcome is a Pareto improvement? (Please use specific numbers in your answer).



Market with Production Quota set equal to 25

Competitive Market

b. (5 pts) Fossil Electricity produces electricity in Windy Flats by burning coal at a (private) marginal cost of $80 per megawatt hour (MWH) and is required to sell electricity at a price equal to its marginal cost. However, burning coal to produce electricity causes pollution that imposes a negative externality on the environment estimated at $40 per MWH produced. Demand is given by P = 140 – Q. What is the equilibrium price and quantity? What is the deadweight loss due to the externality? Illustrate the deadweight loss in a diagram.

c. (5 pts) WindyWatt Enterprises enters the market, using wind turbines to produce electricity at a marginal cost given by $MC = 20 + Q_w$ where Q_w is the number of MWHs it produces. Fossil is still required to charge a price equal to its marginal cost. If Fossil and WindyWatt charge the same price, assume buyers will purchase from WindyWatt if they can. How much will WindWatt produce? How much will total surplus associated with this market change as a result of the entry by WindyWatt?