## QUEEN'S UNIVERSITY FINAL EXAMINATION
FACULTY OF ARTS AND SCIENCE
DEPARTMENT OF ECONOMICS

Econ 110 Sections (003, 004) - Barber
December 16th 2017

### INSTRUCTIONS TO STUDENTS:
This examination is 3 HOURS in length.
There are two sections to this examination.
Please answer all multiple choice questions on the scantron. Please answer all short answer questions in the booklet provided.

**The following aids are allowed:**
Casio FX-991 calculator

Put your student number on all pages of all answer booklets, including the front.

The exam has two parts: Part I consists of twenty-five (25) multiple choice questions. Each question is worth 1 mark. The multiple choice questions are worth 50% of the exam. Part II consists of short answer questions, marks are noted in parenthesis. There are a total of 67 points in Part II. The short answer section is cumulatively worth 50% of the exam. There is NO choice, please answer all the questions. The exam is 180 minutes, please budget your time carefully. GOOD LUCK!

### PLEASE NOTE:
**Proctors are unable to respond to queries about the interpretation of exam questions.
Do your best to answer exam questions as written.**

**PART I:** Answer the following multiple choice questions (2 Marks each). **WRITE YOUR ANSWERS IN THE SCANTRON SHEET PROVIDED.**

1. Consider a local market for 4-litre containers of windshield-wiper fluid. In January 2015, 100000 containers were sold at a price of $3 each. In March 2015, 120000 containers are sold at a price of $8 each. Does this change in equilibrium price and quantity violate the "law of demand"?

    (a) No, because the "law of demand" is not valid.

    (b) Not necessarily, because the supply curve could have shifted to the left, leading to an increase in equilibrium price and quantity.

    (c) Not necessarily, because the supply curve could have shifted to the right, leading to an increase in equilibrium price and quantity.

    (d) Not necessarily, because the demand curve could have shifted to the right, leading to an increase in equilibrium price and quantity.

    (e) Not necessarily, because the demand curve could have shifted to the left, leading to an increase in equilibrium price and quantity.

2. Suppose that the demand and supply curves in the market for apples have the following functional form: $Q_D = 250 - 4p$ and $Q_S = 10 + p$. If the prevailing price on the market is 50, then

    (a) the market is clearing.

    (b) the market exhibits an excess demand of 240 units.

    (c) the market exhibits an excess demand of 10 units.

    (d) the market exhibits an excess supply of 240 units.

    (e) the market exhibits an excess supply of 10 units.

3. Suppose that the price of good X increases from $3.00 to $4.00 while the price of good Y increases from $150 to $200. The relative price of X (in terms of Y)

    (a) is completely unrelated to the price of good Y.

    (b) remained constant.

    (c) cannot be determined from the above data.

    (d) has risen.

    (e) has fallen.

4. If household income increases by 50% and desired household expenditure on vacation travel increases by 15%, the price elasticity of demand for vacation travel is

    (a) unity.

    (b) elastic.

    (c) inelastic.

    (d) positive.

    (e) not determinable from the information given.

5. Suppose that the quantity demanded of skipping ropes rises from 1250 to 1750 units when the price falls from $1.25 to $0.75 per unit. The price elasticity of demand for this product is

    (a) 3/2.

    (b) 2/3.

    (c) 2.

    (d) 1/3.

    (e) 1.

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6. Suppose a fast-food chain determines that the price elasticity of demand for its hamburgers is 1.7, and the price of the hamburger is currently $4.00. What will be the effect on quantity demanded and total expenditure on this chain's hamburgers if the price is increased to $6.00?

    (a) Quantity demanded will fall by 11.76% and total expenditure will decrease.

    (b) Quantity demanded will fall by 34% and total expenditure will decrease.

    (c) Quantity demanded will fall by 1.7% and total expenditure will increase.

    (d) Quantity demanded will fall by 68% and total expenditure will decrease.

    (e) Quantity demanded will fall by 17% and total expenditure will increase.

7. Consider an excise tax imposed on daily parking charges in the downtown of a small city. Before the imposition of the tax, equilibrium price and quantity are $15 and 100 cars parked. (P = $15, Q =100). The city government imposes a tax of $3 per car parked per day. Market equilibrium adjusts to P = $16 and Q = 95. After imposition of the tax, what is the daily after-tax price received by the seller per car parked?

    (a) $3

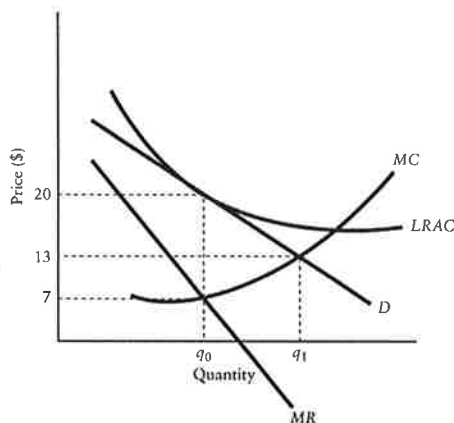    (b) $13

    (c) $16

    (d) $1

    (e) $15



Figure 1: Excess Capacity

8. Refer to Figure 1. How is the excess-capacity theorem demonstrated in this diagram?

    (a) The short-run equilibrium occurs where the firm is producing output at q0, which is less than that corresponding to the lowest point on its LRAC curve.

    (b) In long-run equilibrium, this firm has excess capacity because they are selling output at a price below their LRAC.

    (c) The long-run equilibrium occurs where the firm is producing output at q0, which is less than that corresponding to the lowest point on its LRAC curve.

    (d) The long-run equilibrium occurs where the firm is producing output at q1, which is the same as for a perfectly competitive industry.

    (e) In long-run equilibrium the firm is earning positive profits, but has unexploited economies of scale.

9. Consider an example of the prisoner's dilemma where 2 firms are making sealed bids on a highway-construction contract and each firm is allowed to bid either $100 million or $120 million. If both firms bid the same price, the job is shared equally and each firm earns half the value of its bid. Otherwise the lowest bidder wins the contract and receives the full value of its bid (and the other bidder earns zero). The cooperative outcome in this situation is

   (a) one firm bids $100 million, the other firm bids $120 million.
   (b) both firms bid $100 million.
   (c) both firms bid $50 million.
   (d) both firms bid $120 million.
   (e) both firms bid $60 million.

*The payoff matrix below shows the payoffs for Firm A and Firm B, each of whom can either "cooperate" or "cheat." The numbers in parentheses are (payoff for A, payoff for B).*

|  |  | Firm B | |
|---|---|---|---|
|  |  | Cooperate | Cheat |
| Firm A | Cooperate | (30, 30) | (10, x) |
|  | Cheat | (x, 10) | (20, 20) |

Figure 2: Game Theory

10. Refer to Figure 2. Of the choices provided below, what is the minimum value for x in order for both firms' cheating to be a Nash equilibrium?

   (a) 40
   (b) 25
   (c) 60
   (d) 80
   (e) 70

11. Refer to Figure 2. If $x = 40$, what is the Nash equilibrium in this game?

   (a) (Firm A: cooperate, Firm B: cheat)
   (b) (Firm A: cooperate, Firm B: cooperate)
   (c) (Firm A: cheat, Firm B: cooperate)
   (d) (Firm A: cheat, Firm B: cheat)
   (e) there is no Nash equilibrium for this value of x

12. A single-price monopolist is currently producing an output level where P = $320, MR = $260, ATC = $280, and MC = $200. In order to maximize profits, this monopolist should

   (a) decrease production and increase price.
   (b) produce zero output.
   (c) increase production and reduce price
   (d) not change the output level because the firm is currently at the profit-maximizing output level.
   (e) There is insufficient information to make a recommendation.

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13. Suppose the technology of an industry is such that the typical firm's minimum efficient scale is 18 units per day at an average long-run cost of $1600 per unit. If the total quantity demanded at a price of $1750 per unit is 16 units per month, the likely result would be

    (a) a natural monopoly.

    (b) price discrimination.

    (c) a concentrated oligopoly.

    (d) a cartel.

    (e) a competitive industry.

14. If a monopolist is practicing perfect price discrimination, then the following equation is true:

    (a) AR = ATC at the profit-maximizing level of output.

    (b) MR = P for all units.

    (c) P = AVC at the profit-maximizing level of output.

    (d) MC = 1/2 MR at the profit-maximizing level of output.

    (e) MR = 1/2 P for any unit.

15. Suppose ABC Corp. is a firm producing newsprint in a perfectly competitive industry. Its output is 1500 tonnes per month, the marginal cost of the last tonne produced is $710, and the average revenue per tonne is $620. In the short run, this firm should

    (a) reduce output.

    (b) increase output until average revenue is equal to marginal cost.

    (c) definitely shut down.

    (d) increase output until marginal revenue is equal to marginal cost.

    (e) The price of the product is not known, so it is not possible to determine.

16. Suppose ABC Corp. is a firm producing newsprint in a perfectly competitive industry. We have the following information about the firm's production:

    - output (Q) = 1500 tonnes per month
    - average total cost (ATC) = $627 per tonne
    - average variable cost (AVC) = $614 per tonne
    - marginal revenue (MR) = $620 per tonne
    - marginal cost (MC) = $620 per tonne

    At the current level of output, this firm is _____ profit and is earning economic profit of _____ per month.

    (a) maximizing; -$10 500

    (b) maximizing; $10 500

    (c) not maximizing; -$9000

    (d) not maximizing; -$10 500

    (e) maximizing; $9000

17. Suppose your trucking firm in a perfectly competitive industry is making zero economic profits in the short run. The federal government imposes a new safety regulation that affects all firms, thus shifting the marginal cost curve upward. As a result your firm's profit maximizing short-run output will

    (a) remain the same because you will pass on the extra costs to the consumers.

    (b) increase as firms will leave the industry at the higher costs, thus driving up the market price.

    (c) decrease because the new MC curve will intersect the horizontal demand curve at a lower rate of output.

    (d) remain the same since the new regulation does not affect ATC.

    (e) increase as price rises in the long run.

18. Bjorn is a student with a monthly budget of $500, which he allocates between transportation services and "all other goods." Suppose the price of transportation is $5 per unit, and the price of "all other goods" is $20 per unit. The marginal utility he currently receives from his consumption of transportation services is 60. What is his marginal utility from the consumption of "all other goods" if he is maximizing his utility?

    (a) 200

    (b) 240

    (c) 25

    (d) 20

    (e) 5

19. Bjorn is a student with a monthly budget of $500, which he allocates between transportation services and "all other goods." Suppose the price of transportation is $5 per unit, and the price of "all other goods" is $20 per unit. The marginal utility he currently receives from his consumption of transportation services is 60. How many units of "all other goods" is he consuming if he is maximizing his utility?

    (a) 60

    (b) 25

    (c) 240

    (d) 200

    (e) There is not enough information to determine.

20. Assume you are consuming two goods, X and Y. X and Y are both normal goods but they are not close complements. The price of good X increases but the price of Y remains unchanged. However, you are given enough additional income to ensure that your utility remains unchanged. What happens to your consumption of good X?

    (a) it stays the same

    (b) it increases or decreases

    (c) it decreases

    (d) it increases

    (e) it increases over the long run

21. Consider the following information about the production of two goods, X and Y, in two countries, A and B:

- In Country A it takes $X_a$ units of resources to produce one unit of X and $Y_a$ units of resources to produce one unit of Y.
- In Country B it takes $X_b$ units of resources to produce one unit of X and $Y_b$ units of resources to produce one unit of Y.
- Assume the amount of resources used to produce the goods in the two countries can be compared unambiguously.

If the ratio $\frac{X_a}{Y_a}$ is less than the ratio $\frac{X_b}{Y_b}$, then we can say with certainty that

(a) The opportunity cost of producing good X in Country A is less than in Country B.

(b) Country A has a comparative advantage in the production of good X.

(c) Country A has an absolute advantage in the production of good X.

(d) The opportunity cost of producing good X in Country A is higher than in Country B.

(e) Both A and B are correct.

22. Suppose Spain is currently producing 90 units of wine and 10 units of cheese, but to produce 10 more units of cheese it must sacrifice 30 units of wine. Further, suppose that Portugal produces 45 units of wine and 45 units of cheese, but to produce 10 more units of cheese it must sacrifice only 10 units of wine. What is the pattern of absolute advantage between Spain and Portugal?

(a) Spain has an absolute advantage in both wine and cheese production.

(b) Portugal has an absolute advantage in both wine and cheese production.

(c) Portugal has an absolute advantage in wine production and Spain has an absolute advantage in cheese production.

(d) neither country has an absolute advantage in the production of either wine or cheese.

(e) more information is needed to conclude anything about absolute advantage in either country.

23. When opportunity costs are identical between two countries for all goods,

(a) international trade will be advantageous only to the country that has an absolute advantage in the production of some commodity.

(b) there can be no gains from trade unless there are economies of scale in some of the products.

(c) there will be gains from trade for both countries if one country has an absolute advantage in the production of some commodity.

(d) there will be absolute advantages from trade but no comparative advantages from trade.

(e) absolute advantages will determine the gains from trade.

24. Since joining NAFTA in the early 1990s, Canada has experienced increases in productivity and output in many export-oriented industries because of economies of scale and learning by doing. In these industries, these gains from trade will lead to

(a) downward shifts of the LRAC and short-run AC curves.

(b) downward shifts in the long-run average cost (LRAC) curve.

(c) downward movement (to the right) along the LRAC curve only.

(d) downward shifts of the LRAC and movement to the left along the LRAC curve.

(e) downward shifts of the LRAC curves and downward movement (to the right) along the LRAC curve.

The diagram below shows two production possibilities boundaries for Country X.
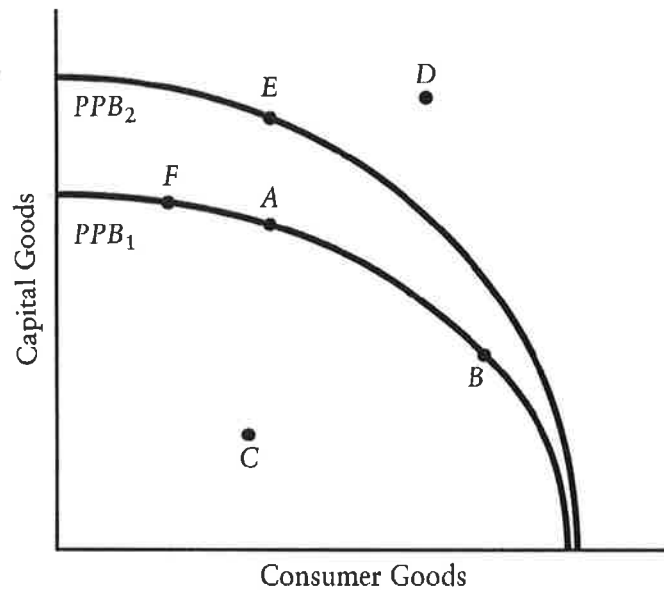


Figure 3: Production Possibilities

25. Refer to Figure 3. Suppose that Country X is currently producing at point E. Country X could achieve production at point D if

   (a) the prices of capital goods and consumption goods fell.

   (b) sufficient improvements in technology occurred in either the capital goods industry or the consumer goods industries.

   (c) firms reduced output of capital goods.

   (d) the given resources were fully employed.

   (e) the given resources were more efficiently employed.

**PART II:** Short Answer Questions.

II.1) Consider a small town in Ohio that has only one bookstore, named "Chapter One". The local college has made an agreement with this bookstore, that they are the sole suppliers of books to their students, and will prohibit more book stores from opening. For now, assume that students cannot buy books from any other sources. For part (A) assume we face the usual downward sloping demand curve, and "u-shaped" cost curves.

    A. Illustrate the market for textbooks in this small town in Ohio. For full marks, be sure to label all relevant axes, curves and other areas on the graph including consumer and producer surplus, profit/losses and any deadweight loss. (**5 marks**)

    B. Students are up in arms over the high price of books and stage numerous demonstrations. Students demand that this small town open up the textbook market to other firms (both physical and online stores). If this were to happen, what kind of market structure do you think would appear? Justify your answer using economic terminology. State the assumptions of the market structure you pick, and draw that market in long-run equilibrium. Discuss the differences in pricing, output and efficiency between the market structure in (A) and (B). (**10 marks**)

    C. What would happen in this new market if the college decided to increase enrolment? Discuss the short-run and long-run effects of this change in enrolment on the market structure you chose in (B). (**5 marks**)

    D. The book store and college counter the proposal by the students in (B) by offering to charge students different prices based on their family income. The new book store pricing would offer 3 different prices ($P_1$ to students whose family earn over $150,000, $P_2$ for students whose families earn $75,000-$150,000, and $P_3$ for students whose families earn less than $75000. For this part, you may assume "Chapter One" faces the usual downward sloping demand curve, has 0 fixed costs, constant marginal costs and maximizes economic profit. What is this pricing strategy called? Draw a diagram being sure to label all relevant axes, curves and other areas on the graph including consumer and producer surplus, profit/losses and any deadweight loss. Discuss the effects of this pricing strategy on output and efficiency compared to a single-price monopolist. What is required for this sort of pricing strategy to be possible? (**5 marks**)

II.2) Adam and Steve decide independently whether to go to a Gaels football game or go to the QP. Each person likes to do something with the other, but Adam prefers going to the game and Steve prefers the QP. Assume that no previous communication was made (and cell phones cannot be used to communicate).

A.  Consider the following payoffs:

|      |          | Steve    |     |
|------|----------|----------|-----|
|      |          | Football | QP  |
| Adam | Football | 3,1      | 2,2 |
|      | QP       | 0,0      | 1,3 |

Are there any Nash Equilibriums in this game? If yes, find them and explain why they are Nash Equilibriums. If there are no Nash equilibriums, explain why. (**6 marks**)

B.  Suppose the payoffs are instead:

|      |          | Steve    |     |
|------|----------|----------|-----|
|      |          | Football | QP  |
| Adam | Football | 3,2      | 1,1 |
|      | QP       | 0,0      | 2,3 |

Are there any Nash Equilibriums in this game? If yes, find them and explain why they are Nash Equilibriums. If there are no Nash equilibriums, explain why. (**6 marks**)

C.  What leads to the differences in Nash Equilibriums between these two similar games? (Hint: The first payoffs are often referred to as the low love version of the game, while the second set of payoffs are referred to as the high love version of the game). (**6 marks**)

II.3) An important policy question is the influence of interest rates on savings. In this question we will use consumer choice/theory to explore how changes in interest rates influences savings. An individuals' life will be split into two periods: In the first period the individual is young and working. In the second period they are retired. An individual must decide current consumption and savings. When the individual is old, they will consume any income (+ interest) they have saved.

A. Suppose the interest rate is 10%. That is, for every dollar you save when young, you can consume $1.10 worth of goods when you are old. Draw a budget constraint showing the trade-off between consumption when old (y-axis) and consumption when young (x-axis) assuming that you earn $1 million dollars when you are young. Assuming that you consume $500,000 of your income when you are young, draw an indifference curve showing the optimal point. Label the optimum as point A as well as the consumption levels in both periods. (**6 marks**)

For Part (B) and (C) assume that the interest rates increases to 30%.

B. Draw a budget constraint showing the new trade-off between consumption when old (y-axis) and consumption when young (x-axis) assuming that you earn $1 million dollars when you are young. Suppose you now consume $300,000 when you are young, draw an indifference curve showing the optimal point. Label the optimum as point $B_1$ as well as the consumption levels in both periods. (**6 marks**)

C. Draw a new diagram, with budget constraints showing the new trade-off between consumption when old (y-axis) and consumption when young (x-axis) assuming that you earn $1 million dollars when you are young. Suppose you now consume $550,000 when you are young, draw an indifference curve showing the optimal point. Label the optimum as point $B_2$ as well as the consumption levels in both periods. (**6 marks**)

D. Discuss the effects of the increase in interest rates on savings in (B) and (C), using the concepts of income and substitution effects. Be sure to draw (and refer to) the income and substitution effects on your diagrams in Part (B) and (C), discuss their meaning in this context, as well as their relative size in your answer. (**8 marks**)