

National University of Singapore
EC3101 Microeconomic Analysis II
Semester 2 AY2014/2015
Time allowed: 2 hours

INSTRUCTIONS TO CANDIDATES

1. This assessment paper contains FIVE (5) questions and comprises FIVE (5) printed pages.
2. Answer ALL questions in examination answer booklets.
3. Start each question on a new page.
4. Be sure to put student number on the cover page of each booklet.
5. You may use non-programmable calculators.
6. This is a Closed Book assessment.
7. The total marks for this paper are 75.

Question 1

Suppose that we are in an economy with two individuals $i=1,2$ with identical utility functions $u^i(x_1, x_2) = (x_1 x_2)^{1/2}$. Suppose that agent 1 is endowed with $x_1=1$, $x_2=0$ and agent 2 is endowed with $x_1=0$, $x_2=2$.

a) At what price ratio $\frac{p_1}{p_2}$ will prices clear in this market? Determine the allocation in this situation. (5 marks)

b) Prove that in this economy, the price ratio found in part a) will clear the market regardless of the initial allocation as long as the total endowment stays the same. What will the contract curve look like? (10 marks)

Question 2

Frank works as a consultant. His income when young is \$4000 (period 1) and \$16000 when old (period 2). The interest rate is $r=100\%$.

a) In a graph, depict Frank's budget set. Mark all the bundles on the budget line that involve saving and the ones that involve borrowing. Find analytically PV and FV of income and show it in the graph. (3 marks)

b) Frank's intertemporal preferences are given by

$$U(C_1, C_2) = \ln C_1 + \frac{1}{1+\delta} \ln C_2 ,$$

where the discount parameter $\delta = 100\%$. Find the optimal consumption plan (C_1, C_2) and how much Frank borrows or saves. (5 marks)

c) Is Frank smoothing his consumption? (2 marks)

Question 3

Stan and Wendy are the only people who live near a public pond, which is frozen in the winter. Wendy enjoys skating on the pond, while Stan wants to cut holes in it for ice fishing; he sells all the fish he catches. The first hole Stan cuts will produce the most fish, the second hole will produce fewer fish and so on; once Stan has cut 100 holes, cutting any further holes will produce no more fish. Suppose that Wendy's pleasure in skating is reduced by \$X for every hole Stan cuts.

- a) Draw a diagram that depicts this situation. Show the number of holes that Stan cuts if he and Wendy can't talk to each other or negotiate what Stan does. (5 marks)

- b) On your diagram, show the tax that will induce Stan to cut the efficient number of holes, and show the amount of revenues collected by the tax. (5 marks)

Question 4

Consider an industry with 3 firms, each having marginal costs equal to 0. The inverse demand curve facing this industry is: $P(q_1, q_2, q_3) = 60 - (q_1 + q_2 + q_3)$.

- a) If each firm behaves as a Cournot competitor, what is firm 1's best response function? (5 marks)
- b) Calculate the Cournot equilibrium. (5 marks)
- c) Firms 2 and 3 decide to merge and form a single firm (MC still 0). Calculate the new industry equilibrium. Is firm 1 better or worse off as a result? Are the combined profits from firm 2 and 3 greater or less than before? Would it be a profitable idea for all three firms to organize into a cartel? (5 marks)
- d) Suppose firm 1 can commit to a certain level of output in advance. If the choice of firm 1 is q_1 , what would be the optimal choices of non-merged firms 2 and 3? (5 marks)

Question 5

Will and Davy are playing the following game of “Liar’s poker” with the following form:

- A deck of cards consisting of 4 kings and 4 aces is shuffled and put in front of Will. Will looks at the top card and makes a potentially untruthful announcement of “King” or “Ace”. If he announces “King”, the game ends with no exchange of money. If he announces “Ace”, Davy gets to take an action:

- Davy has the option of “Folding” or “Calling”. If he Folds, Davy pays Will \$0.50. If he Calls and Will is holding the Ace, Davy pays Will \$1. If he Calls and Will is holding the King, Will pays Davy \$1.

a) Draw the extensive form and normal form of this game. (10 marks)

b) Find all the pure strategy NE. (2 marks)

c) Given that Will has a King, how often should he bluff? (5 marks) (*Hint: Consider mixed strategy equilibrium*)

d) Given that Will announces an Ace, how often should Davy call him? (3 marks)