Economics I; 2016/2017 (1st semester)

Normal Period Exam

3 – January - 2017

[SOLUTIONS]

Part A (7 MARKS)

Correct ANSWERS per version of the exam

EN version	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14
A	d	c	b	d	a	c	a	a	a	c	c	d	b	a
B	c	d	a	d	b	c	b	b	d	b	b	a	a	d
C	a	c	b	a	c	a	b	d	c	c	d	a	b	c
D	a	c	a	b	d	d	c	d	a	c	a	d	d	c

Part B – Exercises (13 marks)

1. Katherine sells biscuits for 4 euros a dozen. She sells 50 dozen, and decides that she can charge more. She raises the price to 6 euros a dozen and sells 40 dozen.

a) What is the elasticity of demand? In your calculus, use the formula with the initial values of the variables. (1v)

b) Assuming that the elasticity of demand is constant, how many biscuits would she sell if the price were 10 euros a dozen? (1v)

c) Katherine also sells cupcakes. She noticed that when she raised the price of biscuits from 4 to 6, the demand for cupcakes increased 10%. Calculate the cross-elasticity between biscuits and cupcakes and classify the relation that exists between the two goods. (1v)

SOLUTION:

a)

> Note: Although in the questionnaire it is explicitly requested that the elasticity is calculated using the formula with the initial values of the variables, the answers with the calculus made using the mid-point method will be considered correct. The solution presented here uses the method that was requested in the questionnaire.

Price-elasticity of demand, $E = |(\Delta Q/Q \text{ initial}) / (\Delta p/p \text{ initial})|$, where:

$(\Delta Q/Q \text{ initial})$ = % change in quantity = $(40 - 50)/(50) = -0{,}20 = -20\%$
$(\Delta p/p \text{ initial})$ = % change in price = $(6{,}00 – 4{,}00)/(4{,}00) = 0{,}50 = 50\%$
Price-elasticity of demand, $E = |(-20\%)/(50\%)| = |-0{,}4| = 0{,}4$

The price-elasticity of demand is 0,4.

b) It is said that the price-elasticity of demand is constant.

Elasticity = 0.4 = |(% Change in Quantity)/(% Change in Price)|

% Change in Price = (10.00 - 4.00)/(4.00) = 1.5 = 150%

|-0.4| = |(% Change in Quantity)/(150%)|

%Change in Quantity = -60% = -0.6
-0.6 = (X - 50)/50
X = 20

The new demand at 10 euros a dozen will be 20 dozen biscuits.

c)

cross-elasticity = (% Change in $Quantity_{CC}$)/(% Change in $Price_B$)

= 10%/50% = 0,2.

The two goods are substitutes because the cross-elasticity is positive..

2. The following table shows the total utilities (TU) of Marcelo for the activities *kitesurf* and *SUP* (*Stand-Up-Paddle*).

Hours per day	**TU - *kitesurf***	**TU - *SUP***
1	120	40
2	220	76
3	300	106
4	360	128
5	396	140
6	412	150
7	422	158

Marcelo has €35 to spend in *kitesurf* and in *SUP* and may spend the time he wants practicing these activities. Renting the equipment for *kitesurf* costs €10 per hour and renting a *SUP* surfboard costs €5 per hour.

a) Determine Marcelo's marginal utility of consuming *kitesurf* and of consuming *SUP* for each level of hours spent in the respective activity present in the table. Does Marcelo's marginal utility of

kitesurf follow the principle of decreasing marginal utility? And what about the marginal utility of *SUP*? Justify. (1,5v)

b) How many hours per day should Marcelo spend on each activity, so that he maximizes his total utility? (2v)

c) If the cost of renting a *SUP* surfboard raises to €7 per hour, and the cost of renting the equipment for *kitesurf* does not change, what income would Marcelo need to be able to spend the same number of hours in each activity (as in b))? (1,5v)

SOLUTION:

a)

Hours per day	TU *kitesurf*	**MU *kitesurf***	TU *SUP*	**MU *SUP***
1	*120*	***120***	40	**40**
2	*220*	***100***	76	**36**
3	*300*	***80***	106	**30**
4	*360*	***60***	128	**22**
5	*396*	***36***	140	**12**
6	*412*	***16***	150	**10**
7	*422*	***10***	158	**8**

The Marginal Utilities in the consumption of *kitesurf* and of *SUP*, obey the principle of diminishing returns because the respective MU decreases when consumption increases, ie , with additional units of consumption, total utility increases by smaller and smaller values.

b)

The optimal consumption bundle is 3 hours of *kitesurf* and 1 hour of *SUP*. The consumer's optimal choice corresponds to a bundle that belongs to the budget line and respects the condition: $MU_{ks}/P_{ks} = MU_{sup}/P_{sup}$

Hours per day	TU *kitesurf*	*MU kitesurf*	TU *SUP*	MU *SUP*	***MU kitesurf /P; P = €10***	**MU *SUP/P; P = €5***
1	*120*	*120*	40	40	*12*	**8**
2	*220*	*100*	76	36	*10*	7,2
3	*300*	*80*	106	30	***8***	6
4	*360*	*60*	128	22	*6*	4,4
5	*396*	*36*	140	12	*3,6*	2,4
6	*412*	*16*	150	10	*1,6*	2
7	*422*	*10*	158	8	*1*	1,6

The optimality conditions $UMg_{ks}/P_{ks} = UMg_{sup}/P_{sup}$, is verified for the following bundles:

1) *3 hours kitesurf and 1 hour SUP → €35 = 3*€10 + 1*€5 (belongs to BL);*

2) 4 hours kitesurf and 3 hours SUP → €35 < 4€10 + 3*€5 = €55 (does not belong to BL);*

3) 6 hours kitesurf and 7 hour SUP → €35 < 6€10 + 7*€5 = €95 (does not belong to BL).*

Since only the first bundle (**3 hours** *kitesurf* and **1 hour** *SUP*) belongs to the Budget Line, that is the bundle that maximizes the consumer's total utility.

c)

With the new cost of renting a SUP board, the iniatially optimal bundle costs

$$€37 = 3*€10 + 1*€7$$

Therefore, the consumer needs an income of 37 € to be able to consume it.

3. A monopolist has the total cost function:

$$TC = 200.Q + 15.Q^2$$

and faces a demand function given by:

$$P = 1200 - 10.Q\ .$$

a) What output maximizes its profit? What is the profit-maximizing price? (2v)

b) What is the maximum profit? (1,5v)

c) Suppose that before realizing what the profit-maximizing price was, the monopolist charged a price of 500. Explain what were the price effect on the revenue and the quantity effect on the revenue when moving from that situation to the profit-maximizing situation that you found in the previous alineas. Illustrate graphically. (1,5v)

SOLUTION:

a) $TR = (1200 - 10Q).Q = 1200Q - 10Q^2$
$MR = 1200 - 20Q$
$MC = 200 + 30Q$
$MR = MC \Leftrightarrow 1200 - 20Q = 200 + 30Q \Leftrightarrow Q = 20$

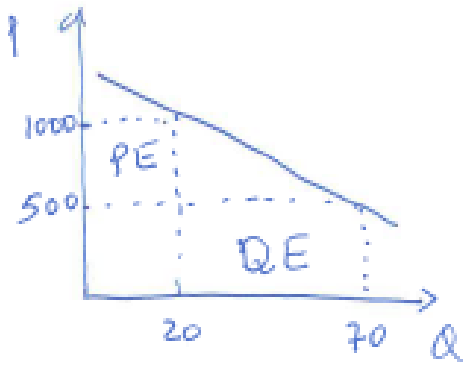
$P = 1200 - 10x20 = 1000$

Since $AVC = 200 + 15Q$, when $Q = 20$, $AVC = 500$.
Since $P > AVC$, the monopolist should, in fact, offer $Q = 20$.
The quantity that maximizes profit is 20 and the profit-maximizing price is 1000.

b) $Profit = TR - TC = 1200Q - 10Q^2 - 200.Q - 15.Q^2$

For $Q = 20$, Profit = 10 000.

c) $P = 500 \rightarrow Q = 70$ with a revenue of $500x70 = 35\ 000$
$P = 1000 \rightarrow Q = 20$ with a revenue of $1000 \times 20 = 20\ 000$.
TR changed -15 000
The price effect (PE) was $500x20 = 10\ 000$
The quantity effect (QE) was $-50x500 = -25\ 000$


P
1000
500
PE
QE
20
70
Q