

Before you start read the following carefully:

- The exam has a maximum duration of two hours and fifteen minutes.
- The exam has of two parts: Part A consists of 12 multiple-choice questions, Part B, of three open questions.
- Write your answers to Part A in the table below in this page. At the end of the exam separate this sheet from the rest of the exam and hand it in together with your answers to Part B. Make sure you have written your identification in this page below.
- This is a closed-book exam: you cannot look up any book or any other learning material.
- You may use non-graphic calculators but you cannot use graphic calculators.
- Keep any mobile phone, tablets and pcs switched off. No smartwatches are allowed.

| | | |
|---|---------------|----------------|
| Full name: (as it appears on your student record) | | |
| Student number: | Class: | Degree: |

Part A (6 marks)

Indicate with an 'O' in the table below the correct answer to the questions 1 to 12. You get 0.5 marks for each correct answer and will have a 0.15 deduction for each wrong answer.

At the end of your exam separate this sheet from the rest of the exam paper and hand it in together with your answers to Parts B.

| | | | | | | | | | | | | |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| a) | a) | a) | a) | a) | a) | a) | a) | a) | a) | a) | a) | a) |
| b) | b) | b) | b) | b) | b) | b) | b) | b) | b) | b) | b) | b) |
| c) | c) | c) | c) | c) | c) | c) | c) | c) | c) | c) | c) | c) |
| d) | d) | d) | d) | d) | d) | d) | d) | d) | d) | d) | d) | d) |



- The points on the production possibility frontier:**
 - Make up the set of production possibilities.
 - Make up the output combinations arising from efficient use of inputs.
 - Are equally desirable.
 - Show the total cost of output.
- Assume a perfectly competitive market with downward-sloping demand curve and a horizontal supply curve. The supply curve shifts downwards. Then, the equilibrium price _____, equilibrium quantity _____, and consumer surplus _____ respectively:**
 - Falls, remains unchanged, rises.
 - Falls, increases, remains unchanged.
 - Falls, rises, rises.
 - Remains unchanged, rises, rises.
- Student accommodation in large cities costs around €450 per month, which many students cannot afford. A price ceiling of €250 would lead to:**
 - Demand being fully met at the new €250 price.
 - A more efficient allocation of available accommodation.
 - Incentives for a black market.
 - An increase in rented accommodation (quantity traded).

- In the table below, the midpoint price-elasticity of demand (in absolute value) between prices €12 and €14 when income is €1,000 is**

| Price | Quantity demanded when income is €1,000 | Quantity demanded when income is €1,400 |
|-------|---|---|
| €14 | 6 | 10 |
| €12 | 7 | 11 |
| €10 | 8 | 12 |

- 0.6.
 - 1.0.
 - 1.6.
 - 2.0.
- Governments can more easily quickly increase tax revenue by taxing goods with:**
 - Price-inelastic demand.
 - Positive income-elasticity of demand.
 - Elastic supply.
 - Substitute goods with high cross-price elasticity.
 - The government requires producers of good H to pay a €5 tax per unit sold. Demand is elastic and supply is perfectly inelastic. Then the price observed in the market will:**
 - Increase by more than €5.
 - Increase exactly by €5.
 - Increase by less than €5.
 - Remain unchanged.

- Suppose a tax per unit sold causes a deadweight loss. It always happens that the deadweight loss arises because:**
 - The consumer price rises.
 - The producer price falls.
 - Quantity traded falls.
 - The tax causes a shortage.
- Fred spends all his income on oranges and pears. His marginal utility from 1 kg of pears is 200, and his marginal utility from 1 kg of oranges is also 200. The price per kg of pears is €2 and the price per kg of oranges is €2.50. To maximise his utility Fred should:**
 - Purchase fewer oranges and more pears.
 - Purchase fewer pears and more oranges.
 - Purchase fewer pears and fewer oranges.
 - Change nothing, as he is maximising his utility already.
- If average variable cost increases as output increases, then:**
 - Total fixed cost must be increasing too.
 - Average total cost must be increasing too.
 - Marginal cost must be greater than average variable cost.
 - Marginal cost must be greater than fixed cost.
- In the perfectly competitive model, if one of the firms increases output the equilibrium price:**
 - Remains the same.
 - First increases, then falls.
 - Increases.
 - Falls.
- If a monopolist is producing a quantity such that marginal cost is less than marginal revenue, then the profit:**
 - Is at its maximum.
 - is at its maximum only if marginal cost equals the price.
 - Will increase if output increases.
 - Will increase if output decreases.

- Two duopolists will make profits as shown in the payoff table below. For which values of a and b will there be an equilibrium in dominant strategies?**

| | | | |
|--------|---|---------|---------|
| | | Firm 2 | |
| | | X | Y |
| Firm 1 | X | 120, 30 | b, 25 |
| | Y | 110, a | 200, 40 |

- $a = 30; b > 200$.
- $a > 40; b > 200$.
- $a = 40; b = 120$.
- $a < 30; b < 200$.

**Part B (14 marks)**

1. The supply and demand curves for good A are $Q^S = 2p - 10$ and $Q^D = 65 - p$, where the notation is the usual one.
 - a) Find the equilibrium price and quantity. Show your calculations and illustrate in a graph. [1 mark]
 - b) Find the producer surplus and the consumer surplus. Show your calculations and illustrate in a graph (the one you drew for part a) if you like). [1 mark]
 - c) Explain what producer surplus and consumer surplus mean. Why are they relevant in Economics? [2 marks]

2. Greg spends all his income on goods X and Y . His income is €1,000 per month, and the prices of the goods are $p_X = 10$ and $p_Y = 20$.
 - a) Show Greg's budget line in a graph and label it appropriately. [1 mark]
 - b) Greg's marginal utilities from the two goods are as shown in the table below. Find Greg's optimal consumption bundle. Explain your reasoning. [2 marks]

| X | $MU(X)$ | Y | $MU(Y)$ |
|-----|---------|-----|---------|
| 10 | 100 | 20 | 320 |
| 20 | 80 | 25 | 280 |
| 30 | 60 | 30 | 240 |
| 40 | 40 | 35 | 200 |
| 50 | 20 | 40 | 160 |
| 60 | 10 | 45 | 120 |

- c) Can a normal good be a Giffen good too? Explain, discussing the substitution and income effects. [2 marks]

3. A monopolist has total costs described by $TC(Q) = 10Q$ and faces the inverse demand curve $p^d(Q) = 60 - Q$.
 - a) The monopolist charges a single price. Find the profit-maximising price and quantity. [1 mark]
 - b) What is the monopolist's profit in that situation? Show it in a graph. [1 mark]
 - c) By how much would the monopoly deadweight loss change if the monopolist were able to perfectly price discriminate? Show it in the graph you drew for the previous part. [1.5 marks]
 - d) Now (with no price discrimination) the government sets a price ceiling of 20. Find the new quantity the monopolist will sell, and the change in consumer surplus. [1.5 marks]



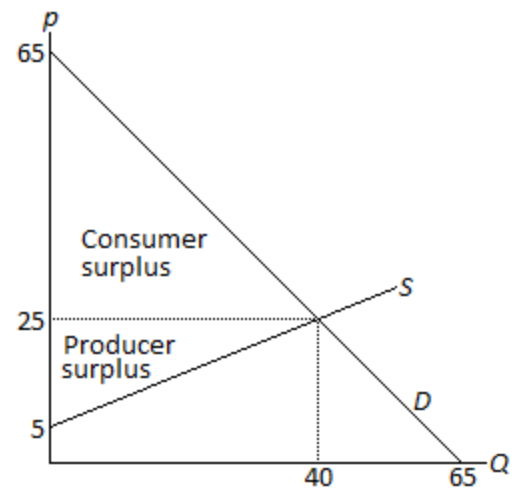
Answers to Part A

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| b | c | c | b | a | d | c | a | c | a | c | b |

Answers to Part B

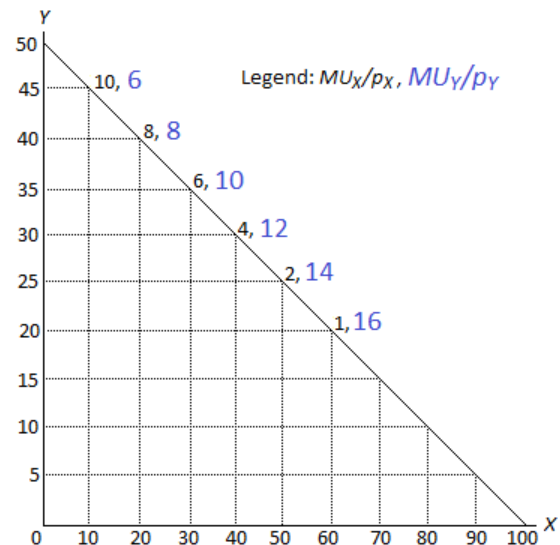
Question 1

- a) $Q^S = Q^D \Leftrightarrow 2p - 10 = 65 - p \Leftrightarrow p = 25; Q = 40$, as illustrated in the graph.
- b) Consumer surplus = $(65 - 25) \times 40 / 2 = 800$; producer Surplus = $(25 - 5) \times 40 / 2 = 400$, as shown in the graph.
- c) The consumer surplus measures the net gain consumers obtain from the market: it is the maximum consumers would be willing to pay for the good minus what they actually pay. Similarly for the producer surplus: it is the difference between what producers are paid for the good and the minimum they would demand to be paid (their variable costs). So, we can evaluate the welfare impact of market changes, such as those caused by taxes, by measuring the changes in consumer and producer surpluses.



Question 2

- a) The equation of the budget line is $10X + 20Y = 1000 \Leftrightarrow Y = 50 - 0.5X$, with vertical intercept $1000/20 = 50$ and horizontal intercept $1000/10 = 100$, as shown in the graph.
- b) The graph shows, next to each consumption bundle on the budget line for which information is provided, the marginal utility per euro spent on good X (MU_X/p_X in black, small font size) and marginal utility per euro spent on good Y (MU_Y/p_Y in blue, large font size). Greg maximises his utility by choosing a consumption bundle on the budget line such that marginal utility per euro spent is the same for both goods, which is the bundle $X = 20, Y = 40$.



- c) A Giffen good is a good whose demand increases when the price increases. When a price increases, the substitution effect contributes to a reduction in the quantity demanded. Real income falls. If the good is a normal good, quantity demanded will fall further (income effect), reinforcing the substitution effect, so the good cannot be a Giffen good. For it to be a Giffen good, the good must be an inferior good, so that quantity demanded increases when the real income falls, and this effect has to be larger (in absolute value) than the substitution effect.

Question 3

a) Total revenue is $TR = p^d(Q)Q = (60 - Q)Q = 60Q - Q^2$. Marginal revenue is $MR = TC' = 60 - 2Q$. Marginal cost is $MC = TC' = 10$. The monopolist maximises profit by equating marginal cost to marginal revenue: $MC = MR \Leftrightarrow 10 = 60 - 2Q \Leftrightarrow Q = 25$; the profit-maximising price is $p^d(25) = 60 - 25 = 35$, as illustrated in the graph.

b) Profit is $\pi = TR - TC = 35 \times 25 - 10 \times 25 = (35 - 10) \times 25 = 25 \times 25 = 625$, as shown in the graph.

c) With a single price ($p=35$), the deadweight loss (*DWL*) is as shown in the figure: $DWL = (35 - 10)(50 - 25)/2 = 312.5$. This disappears with perfect price discrimination, as the monopolist sells each unit at the consumer's willingness to pay (which is given by the inverse demand curve); so it will sell 50 units, the quantity for which marginal cost equals willingness to pay ($10 = 60 - Q \Leftrightarrow Q = 50$). Therefore there would be no deadweight loss anymore.

d) The quantity demanded at price 20 is 40 ($20 = 60 - Q \Leftrightarrow Q = 40$). With a price ceiling of 20, up to quantity 40, marginal revenue is simply 20; this is higher than the marginal cost, which is always 10. Therefore the monopolist will sell these 40 units (because it cannot charge more than 20, it has no incentive to restrict the quantity sold); it will not sell more than 40 because to do so it would have to lower the price, and marginal revenue would be lower than the marginal cost (negative, in fact). With the single price of 35 (part a) the consumer surplus would be the unshaded top triangle in the graph: $(60 - 35) \times 25/2 = 312.5$. Now it is larger, as consumers pay a lower price and buy more: $(60 - 20) \times 40/2 = 800$. So the consumer surplus increases by $800 - 312.5 = 487.5$.

