Final Exam – Microeconomics I, 2022/23

Apellidos / Last Names:

Nombre / First Name:

NIU / Student ID:

Grupo / Group:

- This exam contains 25 multiple-choice questions. They are divided into 10 theory questions and 15 analytical questions.

- Each multiple-choice question has one, and only one, correct answer. A correct answer counts for +4 points; an incorrect or no answer for 0 point. Maximum total number of points is 100.

- Each analytical question is followed by a "Reasoning" box, where you must provide derivations of your answer. Your derivations can be based on mathematical reasoning, verbal reasoning, and arguments from the lectures.

- You have to get 50 points to pass the course. Between 45-50 (and above 85) the derivations in the "Reasoning" box will be checked.

- The first thing you have to do when the exam starts is to fill out your name and student number in the appropriate place.

- You may use a calculator and a dictionary in the exam.

- All the sheets of the exam must be kept stapled together.

- Mark all your answers on the optical sheet.

- The only additional piece of paper allowed is the optical sheet.
  IMPORTANT: On the optical sheet you must correctly enter: 1) DNI, 2) PERMUT: your exam's permutation number, 3) GRUP: your group number, 4) Your user ID (Uxxxxxx): Fill only the 5 or 6 digits on the boxes furthest to the right.

- The use of any other material, or any other attempt at cheating, will result in a 0 for the course and we will pursue disciplinary action at the university level.

- Do not start the exam until you are instructed to do so by the invigilator.

Good luck!

Theory Questions:

1. Suppose there is a good 1 for which we have the demand function:

$$x_1(p_1, p_2, m) = \frac{4}{2p_1 p_2 + m^{-1}}$$

In the demand function, $p_1 > 0$ denotes the own-price of good 1, $p_2 > 0$ is the price of good 2, and $m > 0$ is the relevant consumer's income. Which of the following statements about good 1 is correct?

   (a) It is inferior and a gross complement for good 2.

   (b) It is inferior and a gross substitute for good 2.

   (c) It is normal and a gross complement for good 2.

   (d) It is normal and a gross substitute for good 2.

   (e) None of the above

2. Suppose that a farm has two inputs, a tractor and a tractor driver. Which of the following should be taken into account for the economic cost of a tractor:

(I) The cost of the rent for the tractor.	(II) The wage of a tractor driver.
(III) The missed revenues from using the tractor for something else.	(IV) The productivity of the tractor.

   (a) only (I).

   (b) (I) and (II).

   (c) (I) and (III).

   (d) (I), (II), and (III).

   (e) (I), (II), (III), and (IV).

3. Suppose that a firm has a single input, x, and has a production function given by the following graph:
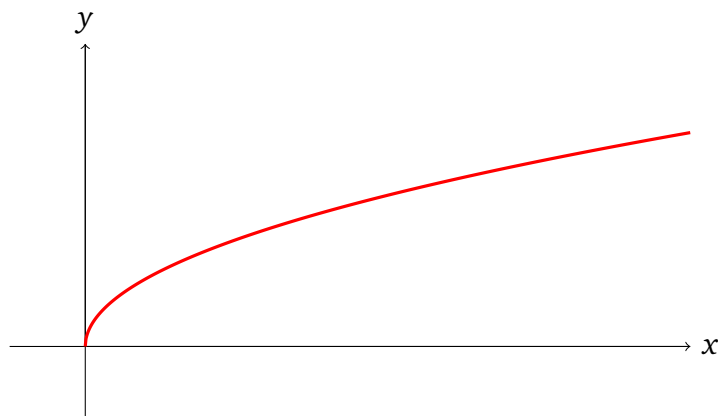
Which of the following is true?

(a) The production function has constant returns to scale everywhere.

(b) The production function has decreasing returns to scale everywhere.

(c) The production function has increasing returns to scale everywhere.

(d) This production function violates monotonicity.

(e) None of the above.

4. Suppose there is a good for which we have the demand function:

$$x(p, m) = \frac{3}{2p\,m}$$

In the demand function, $p > 0$ denotes the price of the good and m the relevant consumer's income. Which of the following statements about the good is correct?

(a) It is normal, and it is ordinary.

(b) It is normal, and it is a Giffen good.

(c) It is inferior, and it is ordinary.

(d) It is inferior, and it is a Giffen good.

(e) None of the above.

5. Suppose a firm produces its output using units of labor, L, and capital, K. The production function is:

$$f(L, K) = 2\,L\,K^{\frac{1}{2}}$$

Which statement is correct?

(a) One factor's marginal product is strictly decreasing, and the returns to scale are also decreasing.

(b) Both factors' marginal products are strictly decreasing, and the returns to scale are also decreasing.

(c) One factor's marginal product is strictly increasing, and the returns to scale are also increasing.

(d) Both factors' marginal products are strictly increasing, and the returns to scale are also increasing.

(e) None of the above.

6. Victoria can choose between the following three consumption bundles consisting of different amounts of good 1 (x_1) and good 2 (x_2): $A = (x_1 = 7, x_2 = 7)$, $B = (x_1 = 6, x_2 = 8)$, and $C = (x_1 = 8, x_2 = 7)$. We observe Victoria's behavior under three different scenarios. When the prices for goods 1 and 2 are $p_1 = 1$ and $p_2 = 4$, respectively, Victoria chooses bundle B. When the prices are $p_1 = 2$ and $p_2 = 5$, she chooses bundle C. And when the prices are $p_1 = 2$

and $p_2 = 3$, she chooses bundle A. We have no additional information about her income under the different scenarios. What can we say about Victoria's choices in terms of the Weak Axiom of Revealed Preference (WARP) and the Strong Axiom of Revealed Preference (SARP)?

(a) The WARP is violated, and the SARP is also violated.

(b) The WARP is violated, but the SARP is *not* violated.

(c) The WARP is *not* violated, but the SARP is violated.

(d) The WARP is *not* violated, and the SARP is also *not* violated.

(e) None of the above

7. Consider a market where demand depends strictly negatively on the price (downward-sloping demand function). On the other hand, supply is fixed and does *not* depend on the price. Suppose the government decides to implement a quantity subsidy $s > 0$ for each unit. Which statement is correct?

(a) Demanders benefit, and there is a deadweight loss.

(b) Demanders do not benefit, and there is a deadweight loss.

(c) Demanders benefit, and there is no deadweight loss.

(d) Demanders do not benefit, and there is no deadweight loss.

(e) None of the above.

8. Anna initially has 12 units of good 1 and 0 units of good 2. However, she has the opportunity to trade and get units of good 2 in exchange for units of good 1. For every 2 units of good 1 that she gives up, she can get 3 units of good 2. Denoting the amounts of units of goods 1 and 2 by x_1 and x_2, which inequality represents Anna's budget constraint?

(a) $2x_1 + 3x_2 \leq 12$

(b) $2x_1 + 3x_2 \leq 24$

(c) $3x_1 + 2x_2 \leq 12$

(d) $3x_1 + 2x_2 \leq 36$

(e) None of the above.

9. Suppose the market demand for a good is given by $D(p) = 20 - 2p$, where p is the price of the good. What can we say about the own-price elasticity of demand, $\epsilon(p)$, at a price of 4 (in terms of its absolute value)?

(a) Since $|\epsilon(p = 4)| = \dfrac{2}{3}$, demand is elastic.

(b) Since $|\epsilon(p = 4)| = 1$, demand is unit elastic.

(c) Since $|\epsilon(p = 4)| = \dfrac{3}{2}$, demand is inelastic.

(d) Since $|\epsilon(p = 4)| = 2$, demand is elastic.

(e) None of the above.

10. Suppose a firm has the following short-run total costs as a function of the level of output y:

$$c(y) = 2y^2 + 8y + 8$$

What is the firm's short-run supply function?

(a) $S_s(p) = 2p + 8$ if $p \geq 0$

(b) $S_s(p) = 2p + 8$ if $p \geq 4$

(c) $S_s(p) = 0.25p - 2$ if $p \geq 8$

(d) $S_s(p) = 0.25p - 2$ if $p \geq 16$

(e) None of the above.

Analytical Questions:

11. Albert receives utility from consuming units of good 1 (x_1) and units of good 2 (x_2). His preferences can be represented by the utility function $u(x_1, x_2) = 16\sqrt{x_1} + x_2$. The prices for goods 1 and 2 are given by $p_1 = 8$ and $p_2 = 2$, respectively, and Albert's income is $m = 100$. What is the optimal amount of good 2 that he consumes?

(a) $x_2^* = 34$

(b) $x_2^* = 39$

(c) $x_2^* = 44$

(d) $x_2^* = 49$

(e) None of the above.

Reasoning:

12. Leo likes to consume units of good 1 (x_1) and good 2 (x_2), but only when he has exactly 3 units of good 1 for every 2 units of good 2. Denote the prices for good 1 and good 2 as p_1 and p_2, respectively, and Leo's income as m. What is Leo's demand function for good 2?

(a) $x_2^*(p_1, p_2, m) = \dfrac{2m}{5p_2}$

(b) $x_2^*(p_1, p_2, m) = \dfrac{3m}{5p_2}$

(c) $x_2^*(p_1, p_2, m) = \dfrac{2m}{3p_1 + 2p_2}$

(d) $x_2^*(p_1, p_2, m) = \dfrac{3m}{2p_1 + 3p_2}$

(e) None of the above.

Reasoning:

13. Suppose a consumer has preferences over goods 1 and 2 that can be represented by the following utility function ($x_1 > 0$ stands for units of good 1 and $x_2 > 0$ for units of good 2):

$$u(x_1, x_2) = 3\ln(x_1) + 2\ln(x_2)$$

The consumer's income is $m = 100$. Initially, the prices for goods 1 and 2 are $p_1 = 4$ and $p_2 = 1$. Then, however, the price for good 1 falls to $p_1' = 3$. What is the income effect (for good 1) according to the Slutsky decomposition?

Due to the income effect, x_1 rises by. . .

(a) 0

(b) 3

(c) 6

(d) 9

(e) None of the above.

14. Every year, Leo spends his entire yearly income of $m = 40$ on consuming goods 1 and 2. His preferences can be represented by the utility function $u(x_1, x_2) = x_1^{1/3} x_2^{1/3}$, where x_1 and x_2 denote the respective amounts that he consumes of the two goods. The initial prices for goods 1 and 2 are $p_1 = p_2 = 2$, and there are no further costs. Now, however, the only supplier of good 2 decides that Leo will have to pay a fixed yearly fee if he wants to keep buying good 2 at the initial price of $p_2 = 2$. Otherwise, the new price for him will be $p_2' = 4$. What is the highest possible fee that Leo would be willing to pay?

   (a) $20\left(2 - \sqrt{2}\right)$

   (b) $20\left(\sqrt{2} - 1\right)$

   (c) $40\left(2 - \sqrt{2}\right)$

   (d) $40\left(\sqrt{2} - 1\right)$

   (e) None of the above.

15. Isabel's preferences over goods 1 and 2 can be represented by the utility function $u(x_1, x_2) = 2\ln(1 + x_1) + x_2$, where x_1 and x_2 denote the respective amounts that she consumes of the two goods. Good 2 is money spent on all other goods and therefore $p_2 = 1$. What is her reservation price for the fifth (discrete) unit of good 1, r_5?

(a) $r_5 = 2 - \dfrac{\ln(6)}{\ln(5)}$

(b) $r_5 = 2\ln\left(\dfrac{6}{5}\right)$

(c) $r_5 = 2 - \dfrac{\ln(6)}{\ln(5)}$

(d) $r_5 = 2\ln\left(\dfrac{6}{5}\right)$

(e) None of the above.

Reasoning:

16. Suppose there are exactly two consumers who are interested in buying units of a particular good. The inverse individual demand function of consumer 1 is $p_1(q) = 20 - 0.5q$, and the one of consumer 2 is $p_2(q) = 30 - q$. What is the slope of the market demand function, $D_M(p)$, at a price of $p = 10$?

(a) -5

(b) -3

(c) -1.5

(d) -0.5

(e) None of the above.

Reasoning:

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17. A firm produces its output using units of two input factors, x_1 and x_2. The production function is:

$$f(x_1, x_2) = 2x_1^{\frac{3}{5}} x_2^{\frac{1}{5}}$$

In this case, what is the *technical rate of substitution* (TRS)?

(a) $-\dfrac{x_2}{3x_1}$

(b) $-\dfrac{3x_2}{x_1}$

(c) $-\dfrac{3x_2}{5x_1}$

(d) $-\dfrac{5x_2}{3x_1}$

(e) None of the above.

Reasoning:

18. A firm uses the input factors x_1 and x_2 to produce output according to the following production function:

$$f(x_1, x_2) = \sqrt{2x_1 + 4x_2}$$

Which equation describes the isoquant through the point $(x_1 = 4, x_2 = 3)$?

(a) $x_2 = \dfrac{12}{x_1}$

(b) $x_2 = 6 - \dfrac{12}{x_1}$

(c) $x_2 = 5 - 0.5x_1$

(d) $x_2 = 11 - 2x_1$

(e) None of the above.

19. Suppose there are two firms, firm 1 and firm 2. They have the following individual short-run supply functions:

$$S_1(p) = \begin{cases} 0 & \text{if } p < 2 \\ 2p - 4 & \text{if } p \geq 2 \end{cases} \qquad S_2(p) = \begin{cases} 0 & \text{if } p < 11 \\ p - 11 & \text{if } p \geq 11 \end{cases}$$

The market demand as a function of the price p is $D(p) = 17 - p$. What is the short-run equilibrium price?

 (a) $p^* = 6$

 (b) $p^* = 7$

 (c) $p^* = 8$

 (d) $p^* = 9$

 (e) None of the above.

Reasoning:

20. Suppose a competitive firm produces its output using units of labor (L) and capital (K) according to the following production function:

$$f(L, K) = 5L^{\frac{1}{3}}K^{\frac{1}{2}}$$

Suppose the factor prices for labor and capital are given by w_l and w_k, and let p denote the price for the output good. What is the firm's (unconditional) factor demand function for labor?

(a) $L^*(w_l, w_k, p) = \left(\dfrac{125p^2}{12w_l w_k} \right)^3$

(b) $L^*(w_l, w_k, p) = \left(\dfrac{125p^3}{12w_l w_k^2} \right)^2$

(c) $L^*(w_l, w_k, p) = \left(\dfrac{25p^3}{6w_l w_k^2} \right)^2$

(d) $L^*(w_l, w_k, p) = \left(\dfrac{25p^2}{6w_l w_k} \right)^3$

(e) None of the above.

Reasoning:

21. Consider a competitive firm that produces its output using units of labor (L) and capital (K) according to the following production function:

$$y = f(L, K) = 4L^{\frac{1}{2}} K^{\frac{1}{3}}$$

The factor prices for labor and capital are given by w_l and w_k. What is the *conditional* long-run factor demand function for labor (conditional on the output level y)?

(a) $L^*(w_l, w_k; y) = \left(\dfrac{2w_k}{3w_l} \right)^{\frac{1}{3}} y$

(b) $L^*(w_l, w_k; y) = \left(\dfrac{3w_k}{2w_l} \right)^{\frac{1}{3}} y$

(c) $L^*(w_l, w_k; y) = \left(\dfrac{3w_k}{128w_l} \right)^{\frac{2}{5}} y^{\frac{6}{5}}$

(d) $L^*(w_l, w_k; y) = \left(\dfrac{3w_k}{128w_l} \right)^{\frac{1}{6}} y^{\frac{5}{6}}$

(e) None of the above.

22. A competitive firm produces its output using units of labor (L) and capital (K) according to the following production function:

$$y = f(L,K) = 2L^{\frac{1}{3}}K^{\frac{2}{3}}$$

Suppose the factor prices for labor and capital are given by $w_l = 1$ and $w_k = 4$. Further suppose that, in the short run, the firm's amount of capital is fixed to $\bar{K} = 3$. What is the firm's short-run cost function?

(a) $c_s(y) = \dfrac{y^3}{3}$

(b) $c_s(y) = \dfrac{y^3}{3} + 12$

(c) $c_s(y) = \dfrac{y^3}{72}$

(d) $c_s(y) = \dfrac{y^3}{72} + 12$

(e) None of the above.

Reasoning:

23. Consider a firm that has the following short-run total costs as a function of the level of output y:

$$c(y) = 2y^2 + 8y + 15$$

Suppose the firm operates in a competitive market for its output good where the equilibrium price is $p^* = 16$. What are the firm's short-run profits?

(a) $\pi_s = -7$

(b) $\pi_s = -3$

(c) $\pi_s = 0$

(d) $\pi_s = 8$

(e) None of the above.

Reasoning:

24. A firm has the following long-run costs as a function of output y:

$$c(y) = \begin{cases} 0 & \text{if } y = 0 \\ \frac{1}{2}y^2 + 18 & \text{if } y > 0 \end{cases}$$

After careful and accurate market research, the firm decides that it will participate in the competitive market for its output good (in other words: it will *not exit* the market). How much will the firm *at least* produce?

(a) 3

(b) 6

(c) 9

(d) 12

(e) None of the above.

25. Suppose there is a competitive market where demand as a function of the price p is given by $D(p) = 20 - 2p$. The supply function is given by $S(p) = 2p - 4$. The government decides to impose a quantity tax of $t = 2$ per unit. What is the resulting *deadweight loss*?

    (a) 0

    (b) 2

    (c) 14

    (d) 30

    (e) None of the above.

Permut: xx