Industrial Economics – Special Period Exam: Solution Key

ISEG Lisbon

2025/26

Part 1 – Multiple Choice (answers)

Question	1	2	3	4	5	6	7
Answer	b	c	b	b	b	b	b

Brief justifications:

1. **(b)** If the SSNIP test starts from a price already at the monopoly level, even weak substitutes look attractive to consumers, so a further price rise appears unprofitable and the market is mistakenly judged to be too wide — making a dominant firm look non-dominant (the DuPont/cellophane error).

2. **(c)** Charging different prices to identifiable groups, with no resale between them, is third-degree price discrimination. (First-degree prices each individual; second-degree uses self-selection over quantity/quality.)

3. **(b)** Informative advertising lowers search costs and makes consumers aware of alternatives, which tends to raise demand elasticity and competition; persuasive advertising builds loyalty and lowers elasticity.

4. **(b)** A higher discount factor (more patience) raises the present value of future collusive profits relative to the one-shot deviation gain, so collusion is easier to sustain. (Impatience, a larger deviation profit, or one-shot interaction all make it harder.)

5. **(b)** The Areeda-Turner test treats price below cost as presumptively predatory; since marginal cost is hard to observe, regulators use average variable cost as the proxy, so pricing below AVC is presumed predatory.

6. **(b)** Setting the per-unit wholesale price equal to the upstream marginal cost (combined with a fixed fee) removes the upstream margin, so the retailer faces the true marginal cost and prices at the integrated-monopoly level. A linear wholesale price above marginal cost keeps the double markup and banning vertical contracts does not help, so "all of the above" is incorrect.

7. **(b)** Critical mass is the minimum adoption level beyond which expectations become self-fulfilling and adoption grows toward the high-adoption equilibrium.

Part 2 – Analytical Exercises

Exercise 1 – Stackelberg Competition and Commitment

(a) Firm 2 maximizes $\pi_2 = q_2(12 - q_1 - q_2)$. FOC: $12 - q_1 - 2q_2 = 0$, hence

$$q_2 = BR_2(q_1) = \frac{12 - q_1}{2}.$$

(b) Substituting the follower's reaction into firm 1's profit:

$$\pi_1 = q_1\left(12 - q_1 - \frac{12 - q_1}{2}\right) = q_1\,\frac{12 - q_1}{2}.$$

FOC: $\dfrac{12 - 2q_1}{2} = 0 \Rightarrow q_1^* = 6$. Then $q_2^* = \dfrac{12 - 6}{2} = 3$, so $Q = 9$ and $P = 12 - 9 = 3$. Profits: $\pi_1^* = 6 \cdot 3 = 18$ and $\pi_2^* = 3 \cdot 3 = 9$.

(c) Cournot: each firm chooses $q_i = \dfrac{a - c}{3} = \dfrac{12}{3} = 4$, so $Q = 8$, $P = 4$ and $\pi_i = 4 \cdot 4 = 16$. The leader earns $18 > 16$ (better off than under Cournot); the follower earns $9 < 16$ (worse off). This is the first-mover advantage.

(d) The leader profits from producing *more* than its Cournot quantity only because the follower, observing this output, responds by producing less. If firm 1 could revise q_1 after firm 2 moved, it would prefer to fall back to its own best response (a smaller quantity), so the threat to flood the market would not be believed. The large output is therefore credible only if it is observable and sunk/irreversible before the follower chooses (e.g., installed capacity).

Exercise 2 – Price Competition with Differentiated Products

(a) Since $\partial q_1/\partial p_2 = +1 > 0$, a higher rival price raises a firm's own demand: the goods are *substitutes*.

(b) Firm 1 maximizes $\pi_1 = p_1(12 - 2p_1 + p_2)$ (marginal cost is 0). FOC: $12 - 4p_1 + p_2 = 0$, hence

$$p_1 = BR_1(p_2) = \frac{12 + p_2}{4}.$$

(c) By symmetry $p_1 = p_2 = p$: $4p = 12 + p \Rightarrow 3p = 12 \Rightarrow p^* = 4$. Quantities: $q^* = 12 - 8 + 4 = 8$; profits: $\pi^* = 4 \cdot 8 = 32$ for each firm.

(d) Prices are *strategic complements*: the reaction function is upward-sloping ($\partial p_1/\partial p_2 = 1/4 > 0$), so a higher rival price leads the firm to raise its own price.

Exercise 3 – Market Structure, Concentration, and a Merger

(a) $C_4 = 40 + 30 + 15 + 10 = 95\%$.

$$H = 40^2 + 30^2 + 15^2 + 10^2 + 5^2 = 1600 + 900 + 225 + 100 + 25 = 2850.$$

Since $2850 > 1800$, the industry is *concentrated*.

(b) Merging C (15%) and D (10%) creates a 25% firm; the shares become $40, 30, 25, 5$.

$$H_{\text{post}} = 40^2 + 30^2 + 25^2 + 5^2 = 1600 + 900 + 625 + 25 = 3150.$$

$$\Delta H = 3150 - 2850 = 300 \,\big(= 2\, s_C\, s_D = 2 \cdot 15 \cdot 10\big).$$