本試卷總共有 3 個題組，共 24 個題目，請於答案卷中依順序清楚標明回答的題項

[題組 1] (34 分)

Q1-Q12 (34% in total), please fill out the blank fields and provide your explanations when instructed on the answer book.

IYKYK Corp. (hereafter also referred to as "*the Company*"), a firm aiming at profit maximization, originally produced 100% of its output, YK, in Country I. The *ITimes* surprisingly, reported yesterday, citing multiple government officials of Countries I and B, that

i. Country B will announce as early as this month a deal to lower reciprocal tariffs on Country I from 20% to 15%, aligning with the rates applied to South Korea and Japan.

ii. As part of the agreement, **IYKYK Corp.** is committed to relocate 50% the production capacity to Province of Brizona, Country B. Due to the exogenous constraints Brizona will be the large-scale manufacturing core of *the Company*.

Moreover,

- Production factors for YK: Labor (L) and Capital (K)
- Production in Country B has lower productivity than in Country I.

If **IYKYK Corp.**'s expansion plan materializes, the proportion of production within Country B is expected to increase significantly. The Country B government's policy of localizing the YK supply chain is also expected to gain momentum.

- Production Function: Assume a standard Cobb-Douglas technology: $Q = \theta K^{\alpha} L^{\beta}$.
- Productivity: Total Factor Productivity (TFP) in Country B is lower than in Country I ($\theta_B < \theta_I$). Namely, $\theta_B = \emptyset\theta_I, where\ 0 < \emptyset < 1$.
- Factor Costs:

  Wage rate per unit of YK in Country B is 1.4 times as much as that in Country I. Labor(ω):$\omega_B = 1.4\omega_I$

  Cost of capital per unit of YK in Country B is 1.2 times as much as that in Country I. Capital(γ): $\gamma_B = 1.2\gamma_I$
- Demand Elasticity: The absolute price elasticity of demand in Country B is half of that in Country I: $|\epsilon_B| = 0.5|\epsilon_I|$. Also, $|\epsilon_I| > 2$. *Namely,* **marginal revenue is positive** in both markets. Assume profit-maximizing behavior and oligopolistic competition in both markets.
- **Trade Costs (I to B)**:

  Shipping cost:10% of the selling price (P).

  Import service charge plus tariff: 20% of the selling price (P).

Q1. Derive how much price increases there could be over the original costs (price markup *percentage*) in Country I and Country B if $|\epsilon_I| = 2.2$.. I:_____%; B: _____%. 【Please show your calculation.】 **(3%)**

Q2. The Factor Intensity Effect. Given that IYKYK Corp. minimizes costs, analyze how the Capital-Labor Ratio (K/L) in the new plant in Country B compares to the original plant in Country I. Derive the specific numerical ratio. $(K/L)_B$ / $(K/L)_I$. = _____. 【Please show your calculation.】 **(3%)**

見背面

Q3. The Cost Shock Derivation. Assuming the productivity shock parameter $\emptyset = 0.65$. Also assume $\alpha = \beta = 0.5$ (Output elasticities for labor and capital are equal). The ratio of the Marginal Cost in Country B to Country I, MC_B/MC_I = _____ 【Please show your calculation.】 **(3%)**

Q4. Market Segmentation and Optimal Pricing. Now that *the Company* is constrained to relocate 50% of its production capacity to Country B. Assuming that the markets are segmented and that the customers are not able to conduct either arbitrage or parallel imports, derive the relationship between the optimal price in Country B (P_B) and Country I (P_A). $\frac{P_B}{P_A}$ = _____.

【Please show your calculation.】 **(3%)**

Q5. The *Make or Buy* Efficiency Threshold. Now assume instead that the markets are *not segmented* and *the Company is able* to produce in I and pay the trade costs (including shipping cost, service charge, and tariffs) to sell in B. SVP Dr. Bissy Chen is instructed by the CEO to analyze the economic rationale. Under the assumption from Question 3 that $\alpha = \beta = 0.5$, please help her calculate the Critical Productivity Threshold ($\emptyset^*$). Namely, if the actual productivity ratio $\emptyset$ drops below this threshold, it would have been cheaper (conceptually, ignoring the mandate) to produce in I and pay the trade costs (including shipping cost, service charge, and tariffs) to sell in B, rather than producing locally in B. $\emptyset$ = _____. 【Please show your calculation.】 **(3%)**

Q6. Profit Margin Erosion. Calculate the Lerner Index ($L = \frac{P-MC}{P}$) for both markets. L_I =_____; L_B =_____ 【Please show your calculation.】 **(3%)**

Q7. The Pass-Through Analysis. Suppose IYKYK Corp. decides to pass *all* cost increases to consumers. If the subsidy and tax policies of the two governments make the Marginal Cost in B exactly twice the Marginal Cost in I. Also assume instead that $|\epsilon_I| = 4$, calculate the exact price ratio. P_B/P_I. = _____. 【Please show your calculation.】 **(3%)**

Q8. Dr. Miyamoto, who is one of the only two members of the Compensation Committee of **IYKYK Corp.** who hold a doctoral degree, said, "The price rise of YK in Country B is proportional to the cost rise."

Dr. Brownian, who is one of the only two members of the Compensation Committee of *the Company* who hold a doctoral degree, said, "The price of YK in Country B increases in percentage faster than the percentage of the cost rise."

One of the only two Compensation committee members who hold doctoral degree, Dr. Miyamoto and Dr. Brownian, is a true expert in Economics. Which one of these two doctors is the true expert in Economics? _____ Why? 【Please show your calculation.】 **(3%)**

Q9. Senior manager Pecchucchini said, "CPI inflation *fell below* the National Bank of I's target. I expect National Bank of I, the central bank, to continue cutting interest rates, so YK's production should become more capital-intensive."

Senior manager Muggle said, "As major corporations in key economies *agree* to significant wage adjustments amid widespread strikes, global labor costs will decrease substantially."

Which one of these two aforementioned senior managers is the true expert in Economics? _____ Why? 【If you show your discussion, then there is no need to place your calculation in this cell.】 **(3%)**

接次頁

Q10. Now assume that the government *commanded* that output price is \$15, which is *not* under the profit-maximizing output condition, and that marginal product of labor is 6. If the wage rate is \$90, should the firm hire more labor in the perfectly competitive production factor market? _____. Explain. 【Please show your calculation.】 **(3%)**

Q11. Following Question 3, would there be Constant Returns to Scale (CRS), Increasing Returns to Scale (IRS), or Decreasing Returns to Scale (DRS) for *the Company* to produce YK in Country B? _____ Explain. **(2%)**

Q12. In five years, due to a *learning effect*, the marginal product of labor will increase by 50% and the marginal product of capital will increase by 25%.

Board member Shinobu said. "Because of such a learning effect, the technological change is labor-augmenting."

Board member Inosuke said, "If certain employees only seek out, receive, and remember information that aligns with their existing beliefs, automatically ignoring or filtering inconsistent evidence, they are subject to the sunk cost fallacy pertaining their learning."

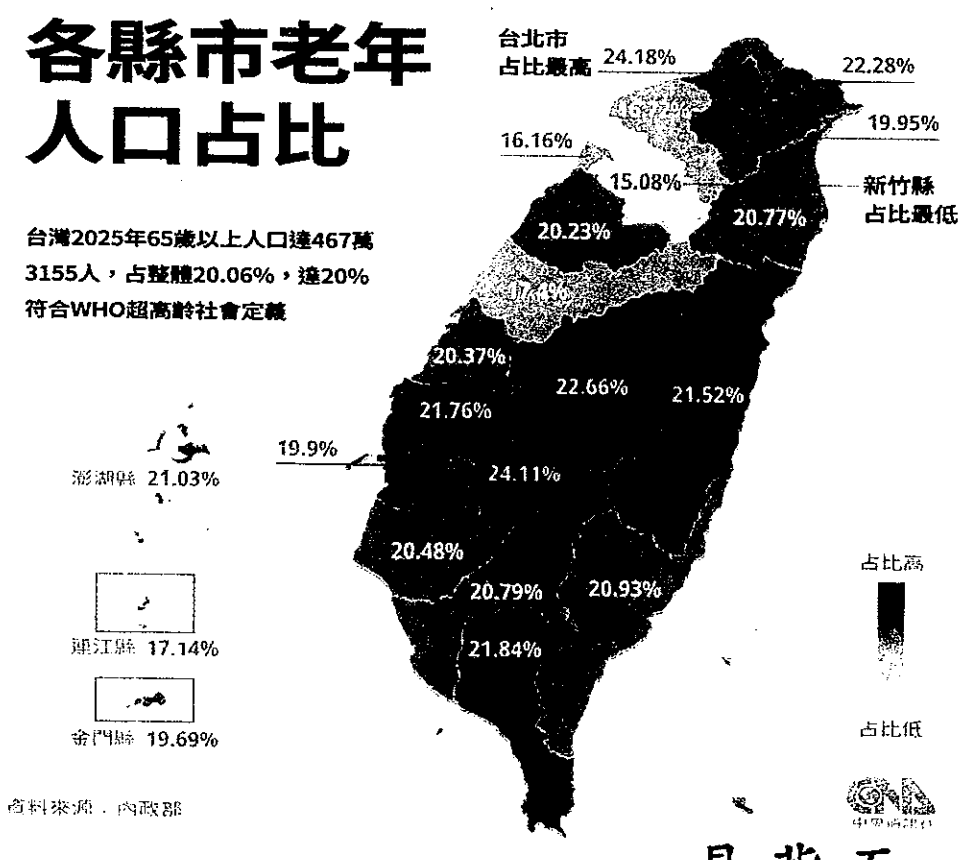
Which one of these two aforementioned board members is the true expert in Business and Economics? _____
Why? 【If you show your discussion, then there is no need to place your calculation in this cell.】 **(2%)**

[題組 2] (33 分)

Q13-Q17 (33% in total) are <u>essay questions</u>, please <u>provide your calculations and answers</u> on the answer book.

(一): (17%)

台灣人口的老化現象，2025 年正式超過國際認定門檻，一如西歐與東亞國家，正加重各個國家在社經議題的負擔；但台灣各縣市的老化速度，其實並不相同，有如下圖所顯示。



見背面

Q13. 請問，如果把行政區的劃分移除，概略切為五大區塊：大台北北北基，北區桃竹苗，中區的中彰投，南區的雲嘉、南高跟屏東，以及主幹山脈以東的宜蘭、花東，計算區域內的人口老化指標，還要取得那些資料來進行呢？ **(3%)**

Q14. 你所概略估算的跨區數值之間，有何變異特性呢？如何解釋跨縣市與跨區域，在老化程度的差異？展望十年後，人口老化在各區域的變化會否趨於一致呢？為什麼？ **(6%)**

Q15. 請另做成表格說明，就前述你所提出的差異成因，逐一比對其對不同區域的可能影響；請說明各個差異成因的在地衝擊，以及在十年後會趨緩或變得更嚴峻呢？ 此外，各成因所造成的社經負擔，於各區域的因應、自救之道，又該有何種的差別處置呢？ **(8%)**

(二): (16%)

Please think about the prevailing tendency for governments worldwide. Firstly, most advanced countries start to raise minimum wages and discourage the incoming immigrants. Also notice that most governments seem not to restraint in budget deficit for various reasons.

Q16. Explain your argument against the following statement by using Ricardian Equivalence Theorem: If the United States issues debt today, some of the tax burden to repay that debt in the future will fall on people who are not Americans. Since that future generations and foreigners as well are not represented in an ongoing political process, politicians could not be stopped into higher deficits. **(8%)**

Q17. A recent news release by the Cross-Border Workforce Management Division of the Ministry of Labor states that Taiwan is launching several new regulations related to foreigners working in this country, including new opening for the direct hiring of Foreign Skilled Workers. In essence, Taiwan plans to open up service sector to foreign nationals in 2026.

According to the Population Division of the United Nations Department of Economic and Social Affairs (UNDESA), the number of international migrants was 304 million in 2024, nearly doubled since the early 90's of the 20th Century, when there were an estimated of 154 million migrants. International migrants amount to 3.7 percent of the global population, compared to that of 2.9 percent in 1990. Female migrants constituted 48 percent of international migrants.

Notice that most immigration package normally comprised of two features: (1) A "guest worker" program that leads to an immediate jump in labor supply, as the manufacturing sector in Taiwan; (2) an immigration reform that may cause the rate of population growth permanently higher.

In the era of a big U-turn from past policy, as much as anti-immigration currently in the developed world, what makes Taiwan government so exceptional? Please sketch your answer about this regime change, in light of a Solow growth model. **(8%)**

[題組 3] (33 分)

Q18-Q21 (3% each question, 12% in total) are multiple-choice questions, please choose the best possible answer out of the choices from the list, and provide your answers with proper explanations on the answer book.

※ 注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

Consider a global market for high-capacity semiconductors. The Domestic Government is considering imposing a "Security Tariff" to protect its home market. A Foreign Exporter must decide whether to continue exporting to the Domestic market despite the tariff.

接次頁

The Foreign Exporter's production efficiency is private information: they are either Subsidized $(\mathbf{C_L})$ with probability $p = 0.4$ or Non-Subsidized $(\mathbf{C_H})$ with probability $1 - p = 0.6$. A subsidized firm has lower effective marginal costs.

The game proceeds in two stages:

Stage 1: The Domestic Government sets a tariff level $\tau \geq 0$ per unit. This acts as a commitment and carries a political "backlash cost" of $B(\tau) = r\tau$ (where τ represents the protectionist barrier) due to international trade relations.

Stage 2: After observing τ, the Foreign Exporter decides whether to Maintain Trade or Exit the Market.

- If the Exporter exits, the Domestic Government's industry gains a monopoly surplus: $W_D = (A - \tau)\tau - r\tau$ and the Exporter gets 0.
- If the Exporter maintains trade, they pay the tariff τ. They then engage in competition where the volume of Domestic supply is fixed at $q_D = K$. The Exporter chooses their export volume q_F to maximize: $\pi_F = (A - q_D - q_F)q_F - c_i q_F - \tau q_F - F$, where $c_i \in \{c_L, c_H\}$ and F is the fixed cost of maintaining a supply chain.

Based on the above information, please answer

Q18. Under the pressure of a trade war, the Foreign Exporter chooses their volume q_F based on their cost type and the imposed tariff. Given the Domestic supply q_D, what is the Exporter's optimal volume $q_F^*(\tau)$?

A) $q_F^* = \frac{A - q_D - c_i - \tau}{2}$

B) $q_F^* = A - q_D - c_i - \tau$

C) $q_F^* = \frac{A - c_i}{2} - \tau$

D) $q_F^* = \frac{A - 2q_D - c_i - \tau}{2}$

E) $q_F^* = \sqrt{A - q_D - c_i - \tau}$

Q19. To successfully force a Non-Subsidized $(\mathbf{C_H})$ exporter to exit the market, the Domestic Government must set τ such that the exporter's maximized profit is ≤ 0. If $A = 20, q_D = 4, c_H = 8, F = 4$, what is the minimum tariff τ required to force the $\mathbf{C_H}$ type to exit?

A) $\tau = 2$

B) $\tau = 4$

C) $\tau = 8$

D) $\tau = 1$

E) $\tau = 6$

Q20. In a Separating Equilibrium, the Domestic Government might set a high "punitive" tariff τ^* that satisfies $\pi_F(\tau^*, c_H) < 0$ but $\pi_F(\tau^*, c_L) > 0$. In this scenario, what is the observed outcome?

A) Both types of exporters exit, leading to total domestic isolation.

B) Both types of exporters maintain trade, rendering the tariff purely a revenue tool.

C) Only the Non-Subsidized **(C_H)** firm exits; the Subsidized **(C_L)** firm continues to export.

D) Only the Subsidized **(C_L)** firm exits because they fear further litigation.

E) The Domestic Government revokes the tariff after seeing any entry.

Q21. The Domestic Government seeks to maximize expected welfare $E[W_D]$. If the tariff is set high enough that only the Subsidized firm **(C_L)** can afford to stay in the market, while the Non-Subsidized **(C_H)** firm exits, which expression represents the Government's expected welfare? (Let W_{Mon} be welfare when the exporter exits and W_{Dup} be welfare when they stay).

A) $E[W_D] = p(W_{Dup}) + (1-p)(W_{Mon})$

B) $E[W_D] = (1-p)(W_{Dup}) + p(W_{Mon})$

C) $E[W_D] = p(A - q_D - q_F^*)q_D + (1-p)(A - q_D)q_D - r\tau$

D) $E[W_D] = W_{Dup} - W_{Mon}$

E) Both A) and C) are correct mathematical representations.

Q22-Q23 (7% each question, 14% in total) are <u>essay questions</u>, please <u>provide your calculations and answers</u> on the answer book

In the global market for high-capacity semiconductors, now let's consider that the Domestic Government and the Foreign Government are locked in a multi-period trade relationship. In each period t, they can choose to be Cooperative **(C)** (Low Tariffs) or Protectionist **(P)** (High Tariffs).

The stage game payoffs (Domestic, Foreign) are:

- Both Cooperate **(C, C):** $(5, 5)$ — Mutual prosperity.
- One Side Defects **(P, C):** $(8, 0)$ — The protectionist state gains market share while the cooperator loses.
- Both Defect **(P, P):** $(2, 2)$ — A destructive trade war.

Both players use a Discount Factor $\delta \in [0, 1]$, which represents the value they place on future payoffs. The Domestic Government employs a Tit-for-Tat strategy: it starts with cooperation and, in every subsequent period, mimics the Foreign Government's action from the previous period.

Q22. For the Foreign Government to prefer a lifetime of mutual cooperation over a one-time gain from defection (assuming Domestic Government is playing Tit-for-Tat), what condition must the discount factor δ satisfy?

Q23. If the Domestic Government switched from Tit-for-Tat to a Grim Trigger strategy (permanent defection after one betrayal), how would the required δ be for the Foreign Government to maintain cooperation?

接次頁

Q24 (7% in total) is an essay question, please provide your calculations and answers on the answer book

Let's suppose the Domestic Government has already imposed an initial tariff. Now, it must decide whether to Escalate (E) to a total trade embargo or Maintain (M) the status quo. The Foreign Government, facing domestic political pressure, must choose whether to Retaliate (R) with counter-tariffs or Acquiesce (A) and accept the new trade terms.

The payoffs (Domestic, Foreign) are structured as follows:

- If both Maintain (M, A), they receive $(4, 4)$.
- If the Domestic Government escalates and the Foreign Government acquiesces (E, A), the Domestic Government wins the trade war: $(10, 0)$.
- If the Domestic Government escalates and the Foreign Government retaliates (E, R), both suffer heavy losses: $(-5, -5)$.
- If the Domestic Government maintains but the Foreign Government retaliates (M, R), the Domestic Government looks weak: $(0, 6)$.

Q24. In a Mixed Strategy Nash Equilibrium, the Domestic Government escalates with probability p and the Foreign Government retaliates with probability q. What is the equilibrium probability q^* that the Foreign Government will retaliate, and what is the resulting expected utility for the Domestic Government?