題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276

共 7 頁之第 1 頁

本試卷總共有 3 個題組，共 31 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-Q11 (34% in total), please **fill out the blank fields** and **provide your explanations when instructed** on the answer book.

Tobio Corporation, a company in Neverland, is the sole producer of Hycu all over the world and has the production function for year t as follows.

$$Q_t = A\, E_{t-1}^{\alpha}\, K_t^{\beta}\, L_t^{\rho}\, S_t^{\omega},$$

where $E, K, L,$ and S are the quantity of four different production factors. From Years 2028 to 2030, to produce Hycu, the cost function identified by Tobio Corporation is $C_p = 60Q + 3Q^2$

The economic growth in Neverland, is expected to slow down. Tobio Corporation firmly believe the following forecast measures issued by Neverland Bureau of Economic Research (NBER) regarding the annual disposable income per capita in Neverland.

Year	2031	2041	2051
Disposable income per capita	$100	$132	$162

NBER estimated that (1) the annual disposable income per capita for Years 2027 to 2032 would constantly be $100 and (2) the annual disposable income per capita for Years 2050 to 2055 will constantly be $162.

A FANNG firm has been the major customer for Hycu. Its procurement contracts specify that if any cybersecurity event emerges during the year, Tobio needs to compensate the customers an expected value of $600 annually for the damage. The probability of making such compensation payment is 50%. The probability of making no compensation payment is also 50%.

Senior manager Pecchucchini said, "One of the most serious competitive disadvantage of our company is its ESG underperformance." The process for manufacturing of product Hycu will inherently create pollution, causing the neighboring society to bear additional external costs. Until the end of Year 2030, the external cost function is $C_e = 12Q$. Effective on Jan. 1, Year 2031, nevertheless, the Federal government of Neverland requires Tobio Corporation to bear the total costs of external pollution. Namely, the Company needs to internalize costs that were originally borne by outside parties since then.

Tobio Corporation (hereafter also referred to as "*the Company*") always manages to identify the total production that maximizes its profits.

Q1. Anshin Insurance Co., which is a risk-neutral insurance provider, aims to win a bid regarding the cybersecurity liability insurance contract with Tobio Corporation. Specifically, Anshin Insurance Co. plans to insure Tobio Corporation the full compensation for damages due to pollution. Specifically, there would be neither any co-payment by Tobio Corporation nor any maximum amount payable upon the occurrence of negative event(s).

Despite that cybersecurity insurance is increasingly becoming essential for all companies as the risk of cybersecurity attacks against applications, devices, networks, and users grows, the cybersecurity insurance market in Neverland has been perfectly competitive. The incremental annual general and administrative expense for Anshin to handle the case for Tobio Corporation is $500. Calculate the fair cybersecurity liability insurance premium for Anshin Insurance Co. *Show your calculation.* (3%)

見背面

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276

共 7 頁之第 2 頁

Q2. Suppose instead that in the cybersecurity insurance market in Neverland, all the insurance companies have substantial monopoly power. Would Anshin Insurance Co. propose to charge more money, as compared with your answer to **Q1**, to Tobio Corporation on its cybersecurity insurance policy? *Explain.* **(3%)**

Q3. The industry demand function for Hycu is $Q_D = 80 - P + 3I - 0.01I^2$, where P is the Price of Hycu; I is annual disposable income per capital in Neverland. Calculate price P^* for Hycu that maximizes the profit of Tobio Corporation in Year 2030. *Show your calculation.* **(3%)**

Q4. Calculate quantity Q^* for Hycu that maximizes the profit of Tobio Corporation for Year 2031. *Show your calculation.* **(3%)**

Q5. How much is the income elasticity of demand for Tobio Corporation in Year 2031? *Show your calculation.* **(3%)**

Q6. Compute the value of Lerner Index for Tobio Corporation in Year 2031. *Show your calculation.* **(3%)**

Q7. The marginal product of real capital 【MPK】 is the incremental increase in total production that results from one unit increase in real capital while keeping all other inputs constant. There exists a fairly small probability that the local government would impose the company a flat license tax of $1,000 regardless of its total product during the year. How much would be the Company's marginal cost in Year 2031 if such license tax is imposed? Why? **(3%)**

Q8. How much would be the Company's optimal quantity supplied; Q^*, in Year 2031 if the local government *does* impose the company a license tax of $1,000? Why? **(3%)**

Q9. Suppose that Neverland government imposes a price ceiling $P_{max} = \$270$ on Hycu. How much would be the *change* in consumer surplus resulting from the price ceiling in Year 2031? How much would be the supply shortages or surpluses resulting from the price ceiling in Year 2031? Why? **(3%)**

Q10. Dr. Miyamoto, who is one of the only two audit committee members who hold a doctoral degree, said, "Hycu will remain a normal good in Year 2041 but will become an inferior good in Year 2051."

Audit committee member Dr. Brownian, who also hold a doctoral degree, said, "Hycu will remain a normal good in Year 2041 but will become a luxury good in Year 2051."

One of the only two audit 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? 【If you show your discussion, then there is no need to place your calculation in this cell.】 **(3%)**

Q11. After Year 2032, at which level of I, the annual disposable income per capita in Neverland, would Q_D begin to *decrease* with I? *Show your calculation.* **(4%)**
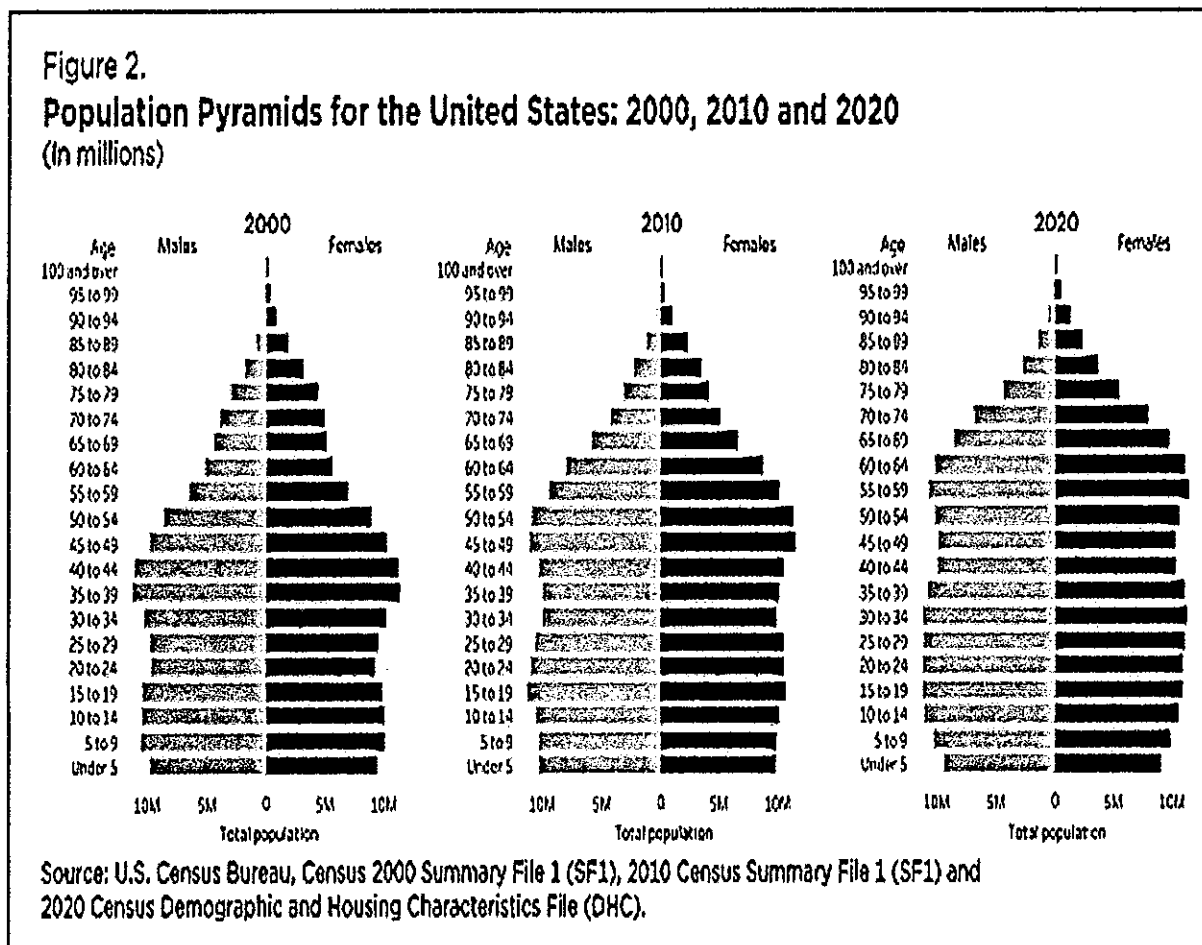
接 次 頁

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276
共 7 頁之第 3 頁

[題組 2] (33 分)

Q12-Q21 (33% in total) are <u>essay questions</u>, please <u>provide your calculations and answers</u> on the answer book.

（一）： **(16%)**

以下的人口金字塔分布圖，是美國人口統計局普查的資料所做整理；每五歲的等分級距，其寬度則顯示分齡層級內的男、女性別人數。請仔細觀察、比對、推估，和回答以下幾個問題：

Figure 2.
Population Pyramids for the United States: 2000, 2010 and 2020
(In millions)

Source: U.S. Census Bureau, Census 2000 Summary File 1 (SF1), 2010 Census Summary File 1 (SF1) and 2020 Census Demographic and Housing Characteristics File (DHC).

Q12. 以 2000 年的金字塔圖為例，於各年齡層內的男、女人數差異，究竟是男多、女少？約當？或是女多、男少呢？於本圖形內的 35 到 49 歲層級，主要是哪一年代出生的呢？到 2020 年的人口普查時，他們會被歸類到哪一年齡層內？男、女人數的相對變動，跟年齡層高低有一定關係在嗎？ **(3%)**

Q13. 以 2020 年的金字塔圖為例，請將上述分佈圖改以 15 歲做層級別，推估從 0 歲到 74 歲之間，各層級人口數；請計算粗分層內的人數加總，以及繪出以粗分別的人口金字塔圖。 **(4%)**

Q14. 比對這三張人口金字塔圖，就你所看到的態樣和變動，所謂「金字塔」還是本圖像的合適比擬嗎？為何有如此不同於原本詞彙的結果出現呢？上述美國人口跨年代的分布與變動關係，就你的觀察可以改用甚麼樣的類比、或描述，會更貼近上述圖形的經年變化與其所顯示出的特性呢？ **(3%)**

Q15. 晚近美國的最低薪資提升了許多，但無論新就業的提供或是偏低的失業率，均顯示經濟復甦與成長動能，頗佳。但矛盾的卻是：美國勞動參與率，則從 2000 年的高峰，67.3%，下降到目前的 62.5%，大抵維持住！根據上述的年齡層分布，舉凡就業特性的改變與一般人在各個生涯階段的選擇安排，美國勞參率從最高峰的逐步下降，有可能被解釋嗎？為什麼會有如此的關聯性出現呢？ **(3%)**

Q16. 主要的東亞經濟強國，在 21 世紀都面臨出生率急遽下降的挑戰；反之，美國社會則約略維持新生兒的孕育意願。然則年齡別的消費與人口組成的差異，尤其對總體經濟的影響，則有不同的特性與偏重出現。請問在可預見

見背面

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276
共 7 頁之第 4 頁

的將來，東亞國家與美國的消費動能之於全球經濟榮枯，無論在引領方向與成長帶動的力道上，或將有何種的分歧呢？而彼此進行的調整，尤其對特定產業與投資形成，在總體效益上或將有何種差別呢？ **(3%)**

（二）： (17%)

由諸總體相關函數所建構的虛擬經濟體，請重組其關係式並回答以下問題：

消費函數，$C = 380 - 1*r + 0.9*(Y - T),$
投資函數，$I = 90 - 2*r,$
稅負函數，$T = 60 + 0.2*Y,$
政府支出，$G = 100,$
淨進出口，$NX = 150 - 0.25*Y,$
實質貨幣需求，$(M/P)_d = 0.2*Y - 4*r,$
實質貨幣供給，$Ms/P = 200$

Q17. 請彙整和推導總體函數的關係、其對應的乘數效果並繪圖敘明；承上整理，請計算達成均衡之下的 r（利率）和 Y（總體所得）。 **(4%)**

Q18. 如果該經濟體決定擴大政府支出規模，五成，請計算並繪圖敘明所達成新均衡下，消費變動與投資變化，以及 r（利率）和 Y（總體所得）。 **(4%)**

Q19. 就上述的總體模型，如果要將實質所得帶回到原本 **Q17.**的均衡水準，純從貨幣政策做對應，該如何著手進行呢？
(3%)

Q20. 自新冠疫情以來，各主要國家紛紛擴大政府支出，會否造成價格水準的長期衝擊呢？會否造成所得不均度的惡化與在跨世代之間的所得重分配發生呢？為什麼？ **(3%)**

Q21. 金融市場與全球投資人，非常關切美國聯準會(Federal Reserve System，Fed)的政策態度；然則，全球央行各有其法定責任，介於這兩者的思考與各國關切，不盡然相同。在各方關切而造成的政治拉鋸，為什麼必然發生呢？隨著美國川普總統的就職上任後，你有何預期評估呢？ **(3%)**

接 次 頁

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276
共 7 頁之第 5 頁

[題組 3]（33 分）

Q22-Q25 (3% each question, 12% in total) are <u>multiple-choice questions</u>, please choose the best possible answer out of the choices from the list, and <u>provide your answers</u> on the answer book.

How many really suffer as a result of labor market problems? This is one of the most critical yet contentious social policy questions. In many ways, our social statistics exaggerate the degree of hardship. Unemployment does not have the same dire consequences today as it did in the 1930's when most of the unemployed were primary breadwinners, when income and earnings were usually much closer to the margin of subsistence, and when there were no countervailing social programs for those failing in the labor market. Increasing affluence, the rise of families with more than one wage earner, the growing predominance of secondary earners among the unemployed, and improved social welfare protection have unquestionably mitigated the consequences of joblessness. Earnings and income data also overstate the dimensions of hardship. Among the millions with hourly earnings at or below the minimum wage level, the overwhelming majority are from multiple-earner, relatively affluent families. Most of those counted by the poverty statistics are elderly or handicapped or have family responsibilities which keep them out of the labor force, so the poverty statistics are by no means an accurate indicator of labor market pathologies.

Yet there are also many ways our social statistics underestimate the degree of labor-market-related hardship. The unemployment counts exclude the millions of fully employed workers whose wages are so low that their families remain in poverty. Low wages and repeated or prolonged unemployment frequently interact to undermine the capacity for self-support. Since the number experiencing joblessness at some time during the year is several times the number unemployed in any month, those who suffer as a result of forced idleness can equal or exceed average annual unemployment, even though only a minority of the jobless in any month really suffer. For every person counted in the monthly unemployment tallies, there is another working part-time because of the inability to find full-time work, or else outside the labor force but wanting a job. Finally, income transfers in our country have always focused on the elderly, disabled, and dependent, neglecting the needs of the working poor, so that the dramatic expansion of cash and in-kind transfers does not necessarily mean that those failing in the labor market are adequately protected.

As a result of such contradictory evidence, it is uncertain whether those suffering seriously as a result of labor market problems number in the hundreds of thousands or the tens of millions, and, hence, whether high levels of joblessness can be tolerated or must be countered by job creation and economic stimulus. There is only one area of agreement in this debate—that the existing poverty, employment, and earnings statistics are inadequate for one their primary applications, measuring the consequences of labor market problems.

Q22. Which of the following is the principal topic of the passage?

(A) What causes labor market pathologies that result in suffering

(B) Why income measures are imprecise in measuring degrees of poverty

(C) Which of the currently used statistical procedures are the best for estimating the incidence of hardship that is due to unemployment

(D) Where the areas of agreement are among poverty, employment, and earnings figures

(E) How social statistics give an unclear picture of the degree of hardship caused by low wages and insufficient employment opportunities

Q23. Which of the following proposals best responds to the issues raised by the author?

(A) Innovative programs using multiple approaches should be set up to reduce the level of unemployment.

(B) A compromise should be found between the positions of those who view joblessness as an evil greater than economic control and those who hold the opposite view.

見背面

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276
共 7 頁之第 6 頁

(C) New statistical indices should be developed to measure the degree to which unemployment and inadequately paid employment cause suffering.

(D) Consideration should be given to the ways in which statistics can act as partial causes of the phenomena that they purport to measure.

(E) The labor force should be restructured so that it corresponds to the range of job vacancies.

Q24. The conclusion about the number of people who suffer as a result of forced idleness depends primarily on the point that

(A) in times of high unemployment, there are some people who do not remain unemployed for long

(B) the capacity for self-support depends on receiving moderate-to-high wages

(C) those in forced idleness include, besides the unemployed, both underemployed part-time workers and those not actively seeking work

(D) at different times during the year, different people are unemployed

(E) many of those who are affected by unemployment are dependents of unemployed workers

Q25. Which of the following, if true, is the best criticism of the author's argument concerning why poverty statistics cannot properly be used to show the effects of problems in the labor market?

(A) A short-term increase in the number of those in poverty can indicate a shortage of jobs because the basic number of those unable to accept employment remains approximately constant.

(B) For those who are in poverty as a result of joblessness, there are social programs available that provide a minimum standard of living.

(C) Poverty statistics do not consistently agree with earnings statistics, when each is taken as a measure of hardship resulting from unemployment.

(D) The elderly and handicapped categories include many who previously were employed in the labor market.

(E) Since the labor market is global in nature, poor workers in one country are competing with poor workers in another with respect to the level of wages and the existence of jobs.

Q26-Q28 (10% in total) are essay questions, please provide your calculations and answers on the answer book

Two firms are trying to force each other out of business and have started a price war. In each period $t = 0, 1, 2, ...,$ the firms simultaneously choose between fighting (F) and quitting (Q). Quitting is irreversible and yields payoff 0 from that period onward. If both firms fight, they get payoff $-c$ per period. The game ends as soon as one of the firms quit and then the other firm receives a monopoly profit p per period from that period onward (including the period when the other firm quits). The players discount their costs and profits with discount factor δ. Assume that the firms are not liquidity constrained and can keep fighting forever.

Q26. Consider a strategy profile $s1\ (t) = F$ for all t and $s2\ (t) = Q$ for all t. Is the profile a subgame perfect equilibrium? **(3%)**

Q27. Find a subgame perfect equilibrium where both players stop with the same constant probability in each period. **(3%)**

Q28. Now, consider the same game but when Firm 2 observes the action taken by Firm 1 before taking its own action. Please construct a subgame perfect equilibrium where Firm 1 randomizes in every period and Firm 2 randomizes if Firm 1 fights. Which firm gets a larger expected payoff in that equilibrium? **(4%)**

接 次 頁

題號： 276
科目： 經濟學(F)
節次： 6

國立臺灣大學 114 學年度碩士班招生考試試題

題號：276
共 7 頁之第 7 頁

Q29-Q31 (11% in total) are <u>essay questions</u>, please <u>provide your calculations and answers</u> on the answer book

Two live music venues, Amadeus and Backstage, are located nearby each other and each has a loyal clientele, estimated to be 100 people per night for Amadeus and 50 for Backstage. Both venues must decide whether or not to hire a famous musician, that will attract more clients than usual if the other venue does not do so as well. Amadeus can hire for one night the pianist Szpilman, and Backstage can hire the singer Lizza. If Amadeus hires Szpilman and Backstage doesn't hire anyone, Amadeus will get 40 extra clients and Backstage will lose 10. Similarly, if Backstage hires Lizza while Amadeus doesn't hire anyone, then it will get 50 extra clients, while Amadeus loses 30. Finally, if both venues hire famous musicians (that is, Amadeus hires Szpilman, and Backstage hires Lizza) then they will get 20 and 10 extra clients respectively. The benefit of each client is 10 dollars for Amadeus and 20 dollars for Backstage. Denoting N and L the prices of hiring Szpilman and Lizza respectively, we have that $200 < L < 400$ and $200 < N < 400$.

Q29. Please represent this game, and determine what will be the Nash equilibria in pure strategies, depending on the values of N and L. **(3%)**

Q30. Both venues now consider adding to their previous options a new alternative: an open bar. If only one of them introduces an open bar it will get all of the clients, regardless of whether or not the other bar has live music. If both venues have an open bar, the clients will stay in their preferred venue. The cost of an open bar is 200 dollars for Amadeus and 100 dollars for Backstage. Please find the rationalizable strategy profile for this new game. **(4%)**

Q31. Suppose now that both venues consider competing not just one night, but indefinitely, and that running an open bar has been banned by the health authorities of the local government. For which values of intertemporal discount rate δ is it possible to find a subgame perfect Nash equilibrium in which both venues decide not to hire any musicians when $L = N = 300$? Write the strategies that allow this equilibrium. **(4%)**

試題隨卷繳回