考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

I、Multiple Choice (1 point each)

Identify the letter of the choice that best completes the statement or answers the question.

1. John has an income of $\$m$ per week. He consumes only two commodities, x and y. Let p_x be the price of x and p_y be the price of y. If he consumes more than $\bar{X}$ units of x per week, he can use coupons to buy the next Z units of x at a price of $p_x(1-s)$. If he buys more than $\bar{X}+Z$, he has to pay the full price p_x for additional units. His weekly income is greater than $p_x[\bar{X}+(1-s)Z]$. The maximum amount of x that he can buy per week is

   A. $\bar{X}+\frac{mZ}{p_x}$.
   B. $\frac{m+\bar{X}}{p_x}+Z$.
   C. $\frac{m}{p_x}+sZ$.
   D. $Z-\frac{(m+p_x)}{1-s}p_x$.

2. Professor Lin gives 3 midterm exams. Only the highest one counts. You are taking his course and have a 60 on your first exam. Let x_2 be your score on the second exam and x_3 be your score on the third exam. If you draw your indifference curves for scores on the second and third exams with x_2 represented by the horizontal axis and x_3 represented by the vertical axis, then your indifference curve through the point $(x_2, x_3) = (50, 70)$ is

   A. ⌉-shaped with a kink where $x_2 = x_3$.
   B. three line segments, one vertical, one horizontal, and one running from $(70, 60)$ to $(60, 70)$.
   C. a straight line, running from $(0, 70)$ to $(70, 0)$.
   D. an L-shaped curve with its point at $(50, 70)$.

3. Consider the utility function to be $\min\{x, yz\}$. The price of x is \$1, the price of y is \$4, and the price of z is \$4. Henri's income is \$20. How many units of x does Henri demand?

   A. 5
   B. 20/9
   C. 2
   D. 3

4. Suppose that the production function is $f(x_1, x_2) = (x_1^a + x_2^a)^b + c$, where a, b, and c are positive constants. For what values of a, b, and c does the firm have constant returns to scale?

   A. For any values of a if $b < 1$ and $c = 0$.
   B. For any values of a and c if $ab < 1$.
   C. For any values of a and c if $ab = 1$.
   D. For any value of c if $a < 1$ and $b < 1$.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

5. Roommate 1's utility function is $3X_1 + G$ and Roommate 2's utility function is X_2G, where G is their expenditures on the public goods they share in their apartment and where X_1 and X_2 are their respective private consumption expenditures. The total amount they have to spend on private goods and public goods is \$30,000. They agree on a Pareto optimal pattern of expenditures in which the amount that is spent on Roommates 1's private consumption is \$5,000. How much do they spend on public goods?
   A. \$1,000
   B. \$15,000
   C. \$7,999
   D. \$18,000

6. Consider a monopolistically competitive market in an economy moves from autarky to free trade. Which of the following statements is (are) correct?
(i) The domestic demand curve for a domestic firm will shift to the right.
(ii) The price elasticity of domestic demand that a domestic firm faces will increase in the absolute value.
(iii) The domestic firm's markup will decrease.
   A. Only (i)
   B. (i) and (ii)
   C. (ii) and (iii)
   D. (i) and (iii)

7. Which of the following curves is not affected by the existence of diminishing marginal product of input factors?
   A. The average fixed cost curve.
   B. The average variable cost curve.
   C. The marginal cost curve.
   D. The variable cost curve.

8. Suppose the shutdown point of a firm in a perfectly competitive market is that the market price is \$10. At the shutdown point, the average total cost of the firm is \$20. What is the average fixed cost?
   A. 5
   B. 10
   C. 15
   D. Need more information.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

9. The information in the table below shows the total demand for gasoline in a small urban market. Assume that each gasoline provider pays a fixed cost of $100,000 (per year) to operate in the market area and that the marginal cost of providing the gasoline to a household is zero.

Quantity	Quantity (per year)
0	120
3000	90
4000	80
5000	70
6000	60
7000	40
8000	30

Assume any agreement between two firms are not enforceable and two firms compete in quantity. What is the market price under the Nash equilibrium according to the table?

A. 80
B. 70
C. 60
D. 40

10. In a monopolistically competitive market, if the long run marginal cost curve intersects the long run marginal revenue cost curve and long run average cost curve when the marginal cost is $10 and $20 respectively, which of the following choices is a possible long run equilibrium market price?

A. 5
B. 10
C. 15
D. 21

11. How would a decrease in the frictional unemployment affect the long-run Phillips curve?

A. It would shift the long-run Phillips curve right.
B. It would shift the long-run Phillips curve left.
C. There would be an upward movement along a given long-run Phillips curve.
D. There would be a downward movement along a given long-run Philips curve.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

12. In the Unites States, the CPI was 80 in 1980 and is 300 today, then \$100 today purchases the same amount of goods and services as
   A. \$26.67 purchased in 1980.
   B. \$33.33 purchased in 1980.
   C. \$40.00 purchased in 1980.
   D. \$80.00 purchased in 1980.

13. If total spending rises from one year to the next, then which of the following could not be true?
   A. the economy is producing a smaller output of goods and services, and goods and services are selling at higher prices.
   B. the economy is producing a larger output of goods and services, and goods and services are selling at lower prices.
   C. the economy is producing a larger output of goods and services, and goods and services are selling at higher prices.
   D. the economy is producing a smaller output of goods and services, and goods and services are selling at lower prices.

14. You put money into an account that earns a 3 percent real interest rate. The inflation rate is 2 percent, and the tax rate on your interest income is 20 percent. What is your after-tax real rate of interest?
   A. 2.0 percent.
   B. 2.4 percent.
   C. 3.0 percent.
   D. 3.6 percent.

15. Time inconsistency will cause the
   A. short-run Phillips curve to be higher than otherwise.
   B. short-run Phillips curve to be lower the otherwise.
   C. long-run Phillips curve to be farther to the right than otherwise.
   D. long-run Phillips curve to be farther left than otherwise.

16. Which of the following policies should be used to close an inflationary GDP gap?
   A. A decrease in government purchases.
   B. An increases in taxes.
   C. A decrease in money supply.
   D. All of the above.

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	經濟學	系所別	商學院共同科	考試時間	2月3日(五)第二節

17. If a country has a current account balance of -\$120 and a capital and financial account balance of \$80, there will be ________ in official reserves of _____ .
   A. an increase; \$40.
   B. an increase; \$200
   C. a decrease; \$40
   D. a decrease; \$200

18. When the central bank in a country decreases the money supply, its
   A. price level rises and its currency appreciates relative to other currencies in the world.
   B. price level falls and its currency appreciates relative to other currencies in the world.
   C. price level falls and its currency depreciates relative to other currencies in the world.
   D. price level rises and its currency depreciates relative to other currencies in the world.

19. The Ricardo-Barro effect states that government deficits
   A. increase the equilibrium real interest rate, crowding out investment.
   B. decrease private saving, the equilibrium real interest rate and investment.
   C. increase private saving and have no effect on the equilibrium real interest rate and investment.
   D. decrease the equilibrium real interest rate and increase investment.

20. Suppose potential GDP exceeds real GDP in a short-run macroeconomic equilibrium. If aggregate demand does not change, then the
   A. short-run aggregate supply curve will shift rightward as the money wage rate decreases.
   B. short-run aggregate supply curve will shift leftward as the money wage rate increases.
   C. long-run aggregate supply curve will shift leftward as the money wage rate increases.
   D. long-run aggregate supply curve will shift leftward as the money wage rate decreases.

II、 Problems and Short-essay Questions

1. Consider the following utility function.

$$u(x_1, x_2) = \begin{cases} 3x_1 + x_2 & \text{if } x_1 > 2x_2, \\ \frac{7}{5}x_1 + \frac{21}{5}x_2 & \text{otherwise.} \end{cases}$$

   A. (7 points) Calculate the marginal rate of substitution.
   B. (6 points) (9,1) and (c,6) sit on the same indifference curve. What is the value of c?
   C. (7 points) Let m stand for the consumer's income. Please calculate the demand function as a function of p_1, p_2, and m.

備 註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	經濟學	系所別	商學院共同科	考試時間	2月3日(五) 第二節

2. Suppose Firm A is the only seller of Product A in a closed economy. The firm faces the following demand, marginal revenue, and marginal cost curves.

$$\text{Demand: } P = 70 - Q$$
$$\text{Marginal Revenue: } MR = 70 - 2Q$$
$$\text{Marginal Cost: } MC = 10 + Q$$
$$\text{Total cost: } TC = 210 + 10Q + 0.5Q^2$$

A. (4 points) Please calculate the efficient loss due to the monopoly.

Suppose the government of the economy decides to open the market to the world. The world price of Product A is \$30.

B. (4 points) How many units of Product A will the economy export or import in the short run?

C. (4 points) How many units of Product A will the economy export or import in the long run?

D. (8 points) In the long run, if the government wants to maintain that both the domestic producer and foreign importers coexist in the domestic market, the government should tax or subsidize the importers? What is the minimum value of the per-unit tax or the per-unit subsidy to achieve this goal?

3. Consider an economy where the representative consumer has a utility function $U = CF$ over clothing C and food F, and has an income of \$40.

A. (8 points) Suppose in year one (the base year), the prices of clothing and food are $p_C^1 = 2$ and $p_F^1 = 2$, respectively. What is the consumer's optimal consumption bundle? How much utility does the consumer receive from this bundle?

B. (6 points) Suppose in year two, the prices of clothing and food become $p_C^2 = 2.5$ and $p_F^2 = 10$, and the consumer's income increases in proportion to the consumer price index (CPI). What is the consumer's optimal consumption bundle?

C. (6 points) What is the minimum income in year two that enables the consumer to achieve the same level of utility as in year one? How much does the CPI overstate actual inflation due to the *substitution bias*?

4. In an economy, autonomous consumption expenditure is \$100 billion, investment is \$300 billion, and government expenditure is \$150 billion. The marginal propensity to consume is 0.90 and net taxes are \$150 billion. Exports are \$450 billion and imports are \$550 billion. Assume that net taxes and imports are autonomous and the price level is fixed.

A. (5 points) What is the value of consumption multiplier?

B. (10 points) Calculate the equilibrium aggregate expenditure.

C. (5 points) If government expenditure increases by \$200 million, what is the change in the economy's equilibrium real GDP?

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考 試 科 目	統計學	系 所 別	國際經營與貿易學系 國際經營組	考 試 時 間	2 月 3 日（星期五）第四節

For the first 4 questions, Q.1 ~ Q.4, please answer True, False, or Uncertain with explanation. NO points will be given to any answer without explanation.

1. Knowing the null distribution of a hypothesis test and the decision rule allow one to calculate the probability of type-I error and types-II error. (10%)

2. If $F_X(a) = F_Y(a)\ \forall a \in \Re$, where $F_X(\cdot)$ and $F_Y(\cdot)$ are cumulative distribution functions of X and Y respectively, then $X = Y$.(10%)

3. From the definition of probability, we know that $0 \le F_X(x) \le 1$ and $0 \le f_X(x) \le 1$, where $F_X(x)$ is the cumulative distribution functions of X, and $f_X(x)$ is the probability density/mass function of X. (10%)

4. If the joint probability distribution function of (X, Y) is

$$f_{X,Y}(x,y) = \begin{cases} xy + y, & \text{if } a < x < b, \text{ and } c < y < x; \\ 0, & \text{otherwise.} \end{cases}$$

then X and Y are not independent. (10%)

5. Assume the following probability density functions:

$$f_X(x) = \begin{cases} \frac{1}{4}x^3, & \text{if } 0 \le x \le 2; \\ 0, & \text{otherwise.} \end{cases}$$

$$f_{Y|X}(y \mid x) \sim U[-1, X],$$

U stands for a uniform distribution.

Compute the following

a. $E(X)$. (5%)

b. $\mathrm{VAR}(3X - 200)$. (5%)

c. $E(Y)$. (5%)

考試科目	統計學	系所別	國際經營與貿易學系 國際經營組	考試時間	2月3日（星期五）第四節

d. $\mathrm{VAR}(Y)$. (5%)

6. A manager interested in the relation between ages in years, x, and scores, y, of an aptitude test of his employees collects data tabulated below.

Employee	A	B	C	D	E	F	G	H	I
AGE x	25	20	20	19	19	19	17	16	16
SCORE y	69	53	50	55	53	48	50	53	46

where $\sum x^2 = 3309, \sum y^2 = 25633$ and $\sum xy = 9183$.

a. Based on these data, compute the intercept and slope terms of a fitted simple linear regression model of score (y) on age (x). (10%)

b. Now, suppose that you are told that C is the only employee to have experienced higher education and should be excluded from the sample. Recalculate the regression line without this person. (10%)

7. Three events A, B and C have probabilities $P(A) = 1/2, P(B) = 2/3$, and $P(C) = 1/4$, and $\overline{A}$, $\overline{B}$ and $\overline{C}$ are, respectively, the complements of A, B and C. Given that A, B and C are pairwise independent, i.e. A and B are independent; A and C are independent; and B and C are independent. Let $P(A \cap B \cap C) = q$, find probability of item a., b. and c. listed below in terms of q.

a. $P(A \cap \overline{B} \cap \overline{C})$, (5%)

b. $P(A \cap \overline{C} | A \cap \overline{B})$, (5%)

c. $P(A \cup B \cup C)$, (5%)

d. Also, find the maximum and minimum possible values of q. (5%)

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

國立政治大學 112 學年度碩士班招生考試試題

考試科目	微積分	系所別	國際經營與貿易學系	考試時間	2月3日(五)第4節

※**Show all calculations. Unjustified answers will receive no credit.**

1. Evaluate the following integrals:

   (a) $\int_1^2 \frac{1}{x^3+x^2}dx$ (b) $\int_1^e (\ln x)^2 dx$ (c) $\int_1^e \frac{\ln(x^3)}{x}dx$ (d) $\int_0^1 \sqrt{9-5x}dx$ (20%)

2. Find the derivative of $y = x^{x^x}$. (10%)

3. Use calculus to show that a sphere of radius R has volume $V = \frac{4}{3}\pi R^3$. (10%)

4. Evaluate the iterated integral $\int_0^2 \int_{2y}^4 \sin(x^2)\,dxdy$ (10%)

5. Find the absolute maximum and the absolute minimum of the function $f(x,y) = e^{-x^2-y^2}(x^2+4y^2)$ on the disk $x^2+y^2 \le 1$. (10%)

6. Find all values of x such that the power series

$$\sum_{n=1}^{\infty} \frac{3^n(x+1)^n}{\sqrt{n}}$$

   converges. (10%)

7. Evaluate the limit $\lim_{n\to\infty} \sum_{i=1}^{n} \left[\left(\frac{i}{n}-1\right)\left(\frac{i}{n}+1\right)\frac{3}{n}\right]$. (10%)

8. For what values of x is the function $f(x) = \int_1^x e^{t^2}dt$ concave down? (10%)

9. Find the slope of the tangent line to the curve $x^2+2xy-y^2+x=2$ at the point (1,2). (10%)

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

考試科目	國際經貿時事分析	系所別	國際經營與貿易學系/國際經貿法組	考試時間	2月3日(五)第2節

本試題共四題，第一題及第二題為申論題，第三提及第四題為評論題，每題25分（各子題12.5分）。請依考生所學專業知識與分析方法作答。

一、世界貿易組織（WTO）會員間之優惠性貿易協定，雖然違反最惠國待遇（MFN）原則，但依「關稅暨貿易總協定（GATT）」第24條或「服務貿易總協定（GATS）」第5條規定，於符合法律要件下，皆肯定其合法性。自杜哈回合談判陷入僵局，WTO規則制訂功能受阻後，WTO會員轉而簽署雙邊或區域自由貿易協定，除大幅減讓成員國間貨品關稅、開放服務市場外，更進而處理成員國境內之非關稅貿易障礙問題，納入更高標準的管理法規調和或合作之規定，如投資保障、競爭議題等，而稱為巨型或深度區域貿易協定，如我國申請加入的「跨太平洋全面進步夥伴協定（CPTPP）」即屬之。然美國2017年退出CPTPP前身之TPP協定後，於2021年提出「印太經濟架構（IPEF）」，並於2022年中啟動「臺美21世紀貿易倡議」，旨在因應地緣政治升溫，為加強與印太地區國家的經貿關係所提出的新型態貿易協定。試問：

（一）印太經濟架構與臺美21世紀貿易倡議的談判目標與主要內容為何？其與傳統自由貿易協定有何不同？對印太地區國家而言，是否加入此等經濟架構或貿易倡議之考量因素為何？

（二）印太經濟架構與臺美21世紀貿易倡議，是否或如何符合WTO有關自由貿易協定或經濟整合之規定？如為否定，美國擬納入之法規調和或合作等規定是否因此違反MFN原則？

二、歐盟於2022年底對中國所採限制立陶宛之貿易措施正式請求WTO成立爭端解決小組。本案緣起於2021年末，原產地為立陶宛或從立陶宛過境之貨品開始遇到進入中國海關之通關限制，此等限制措施包括：(1)中國海關中通關資訊系統出現錯誤訊息（無法顯示立陶宛）、(2)貨櫃持續卡在中國港口等待通關、(3)中國海關未適時處理或不理會通關之請求。除進口限制外，從中國出口到立陶宛的貨品亦面臨同樣在出口通關程序上的限制。此外，立陶宛企業陸續面臨無法取得中國金融機構之金融服務的困難。最後，立陶宛當局簽發的防疫檢疫證書所涵蓋的產品遭中國海關拒絕通關。例如：中國海關公布《符合評估審查要求的國家或地區輸華肉類產品名單》，增列從立陶宛啟運之牛肉，自2022年2月9日起暫停受理進口申報。試問：

（一）針對中國前開貿易限制措施，歐盟可以主張違反哪些WTO涵蓋協定下之貿易規範？

（二）歐盟在控訴程序上可能面臨的困難或挑戰為何？中國可能就歐盟控訴提出反駁的理由為何？

三、Trade and health: WTO response to the COVID-19 pandemic: Since the pandemic outbreak, WTO members have been working on a holistic approach in formulating a multilateral response to COVID-19 which takes into account the exceptional character of the current crisis — in terms of the loss of human lives and the economic and social challenges — and addresses current and future pandemics. To this end, members negotiated a framework which would guide the WTO's work and help to render the multilateral trading system more resilient and better prepared for futures crises. Drawing from three proposals from various delegations and a factual contribution from the Secretariat, members worked on the basis of one single document. The result was a Ministerial Declaration on the WTO response to the current and future pandemics, which members adopted as part of the outcomes of the 12th Ministerial Conference (MC12). The

考 試 科 目	國際經貿時事分析	系 所 別	國際經營與貿易學系/國際經貿法組	考 試 時 間	2 月 3 日(五) 第 2 節

Declaration calls on relevant WTO bodies to continue or initiate work on lessons learned and challenges experienced during the COVID-19 pandemic. Areas of focus will include export restrictions, food security, intellectual property, regulatory cooperation, services, tariff classification, technology transfer, trade facilitation, and transparency. A yearly stocktaking exercise will take place in the General Council up to the end of 2024. In parallel, the Ministerial Decision on the TRIPS Agreement, also adopted by members at MC12, provides a platform for members to work together to diversify vaccine production capacity. Members will have greater scope to take direct action over the next five years to override the exclusive effect of patents through a targeted waiver that addresses specific problems identified during the pandemic, especially facilitating and streamlining vaccine exports. Members also have greater clarity regarding related options open to them for pandemic response, including an array of emergency use measures. While all developing country members can benefit from the decision, developing country members with existing COVID-19 vaccine manufacturing capacity are encouraged to opt out. The TRIPS Council publishes a record of such binding commitments by members pledging not to avail themselves of this decision. Members also agreed that, no later than December 2022, they will decide on whether to extend the waiver to cover the production and supply of COVID-19 diagnostics and therapeutics. DG Okonjo-Iweala said these decisions “will make access to medical supplies and components more predictable in this pandemic, and in the next one.” The TRIPS waiver compromise “will contribute to ongoing efforts to deconcentrate and diversify vaccine manufacturing capacity, so that a crisis in one region does not leave others cut off,” she added. Recognizing the need to address the COVID-19 crisis through timely, accurate information, the WTO created a dedicated page on its website. It provides up-to-the minute trade-related information including relevant notifications by WTO members, the impact the virus has had on exports and imports and how WTO activities have been affected by the pandemic. The WTO has also been monitoring COVID-19 related trade-restricting and facilitating measures imposed by the Group of 20 leading economies (G20) as well as the WTO membership as a whole through its biannual trade monitoring reports.
[https://www.wto.org/english/thewto_e/minist_e/mc12_e/briefing_notes_e/bftrade_and_health_e.htm] 試問：

（一）WTO 如何因應處理 COVID-19 疫情有關之貿易問題？
（二）WTO 如何協助開發中會員取得 COVID-19 疫苗？

四、Joint Initiative on Services Domestic Regulation: On 2 December 2021, a group of WTO members adopted a Declaration concluding the negotiations on services domestic regulation, which were aimed at slashing administrative costs and creating a more transparent operating environment for service providers hoping to do business in foreign markets. The Declaration contains a set of negotiated disciplines that seek to ensure that measures relating to licensing requirements and procedures, qualification requirements and procedures, and technical standards with which services businesses need to comply to operate in other markets are clear, predictable, and transparent and do not unnecessarily restrict international trade. These disciplines are

考試科目	國際經貿時事分析	系所別	國際經營與貿易學系/國際經貿法組	考試時間	2月3日(五) 第2節

contained in a Reference Paper on Services Domestic Regulation. The reduction in trade costs from implementing the new disciplines could amount to USD 150 billion annually globally, with particularly important gains for financial, business, communications and transport services. The disciplines focus mainly on the transparency, predictability and effectiveness of procedures that businesses have to comply with to obtain authorization to supply their services. They apply to all sectors where participants have undertaken commitments in their schedules for trade in services, as well as to any other sectors that individual participants have designated. The Declaration also welcomes the schedules of specific commitments that participants have submitted. The objective is to incorporate the new disciplines as “additional commitments” in the schedules of specific commitments that members have, as WTO members, in the area of services. Services suppliers from all WTO members will be able to rely on these new commitments, which will apply on a “most-favoured nation” basis, meaning that they will benefit the entire WTO membership. Participants aim to submit their draft schedules for certification by December 2022, subject to the completion of any required domestic procedure. The participants intend to meet again regularly to discuss, among other things, the necessary steps related to the certification procedures. Participation in the meetings of the initiative is open to all WTO members and observer governments. The 70 governments currently participating in the outcome on services domestic regulation account for over 92.5 per cent per cent of world services trade. Timor-Leste – a WTO acceding country – is the first least-developed country to take part in the initiative. For the first time, a WTO negotiated text contains a provision on non-discrimination between men and women. The objective of this provision is to support women's economic empowerment and boost their participation in services trade. Participants further agreed to a maximum transitional period of seven years for developing countries that need more time to implement individual disciplines for specific services sectors. WTO members are free to regulate their services sectors to pursue their domestic policy objectives. The General Agreement on Trade in Services (GATS) recognizes that such regulations may adversely affect trade in services. The Reference Paper seeks to ensure that the process to obtain authorization to supply a service follows good regulatory practices and, thereby, does not constitute an unnecessary impediment to the business activity. The disciplines will provide a reference point for countries aiming to undertake regulatory reforms to improve the domestic business environment. The full implementation of the disciplines is expected to generate greater economic performance and substantial trade costs savings for all economies, while particularly benefitting small and medium-sized enterprises for which navigating regulatory procedures for services authorizations can be costly and complex.
[https://www.wto.org/english/thewto_e/minist_e/mc12_e/briefing_notes_e/bfservicesdr_e.htm] 試問：

（一）服務業國內規章共同倡議之主要規範內容為何？有何特色？

（二）參與共同倡議之會員如何落實談判結果之內容？有何效益？

備註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。