考 試 科 目	經濟學	系所別	國貿、企管 風管、科管	考試時間	2月5日(五) 第二節

Multiple Choice (1 point each)

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

1. When a country allows trade and becomes an exporter of a good,
    A. everyone in the country benefits.
    B. everyone in the country loses.
    C. the gains of the winners exceed the losses of the losers.
    D. the losses of the losers exceed the gains of the winners.

2. Inefficiency in monopolistically competitive markets can be identified with
    A. their similarities to perfectly competitive markets.
    B. not having the ideal number of firms in the industry.
    C. a first-best equilibrium, where price is equal to marginal cost.
    D. government programs that effectively regulate price.

3. When a farmer is making a long-run decision of whether or not to exit an industry, the cost of land
    A. will be considered as part of the farm's fixed cost.
    B. is treated differently than the cost of machinery.
    C. is not considered a sunk cost.
    D. is irrelevant to the strategic decision.

4. Economists compute the price elasticity of demand as
    A. the percentage change in the price divided by the percentage change in quantity demand.
    B. the percentage change in the quantity demanded divided by the percentage change in price.
    C. the change in quantity demanded divided by the change in the price.
    D. the percentage change in the quantity demanded divided by the percentage change in income.

5. Suppose you like banana cream pie made with vanilla pudding. Assuming all other things are constant, you notice that the price of bananas is higher. How would your demand for vanilla pudding be affected by this?
    A. It would decrease.
    B. It would increase.
    C. It would be unaffected.
    D. There is insufficient information given to answer the question.

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	國貿、企管 風管、科管	考試時間	2月5日(五)第二節

6. Jack's Hotdogs is a small street vendor business. The owner is trying to get a better understanding of his costs by categorizing them as fixed or variable. Which of the following costs are most likely to be considered fixed costs?

    A. the cost of ketchup

    B. the cost of hotdog buns

    C. wages paid to workers who sell hot dogs

    D. the cost of bookkeeping services

7. After watching a movie, Alan chooses not to watch a second and goes for a walk instead. Economists could explain his choices using the concept of

    A. budget constraints.

    B. diminishing marginal utility.

    C. income effect.

    D. substitution effect.

8. The tragedy of the commons is the

    A. undersupply of a public good due to people not wanting to pay for a publicly common good.

    B. disappearance of certain markets due to the lack of willingness to pay by individuals, leading to collective misfortune.

    C. depletion of a common resource due to individually rational but collectively inefficient over-consumption.

    D. notion that common resources are generally under consumed and therefore not produced by suppliers due to artificially low demand.

9. The more firms there are in a market, the

    A. larger will be the price effect of one firm's output decision.

    B. smaller will be the price effect of one firm's output decision.

    C. more collusion is likely to happen.

    D. price effect must outweight the output effect.

10. Ethan enjoys buying books and going to the movies. He has income of $150 to spend on these two goods each month. The price of a book is $15 and the price of going to the movies is also $15. He currently consumes four books and six movies a month. If the price of a book increases to $20, then,

    A. the substitution and income effects would both predict Ethan would consume more of both goods.

備　　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

B. the substitution and income effects would both predict Ethan would consume less of both goods.

C. the substitution effect would predict Ethan would consume more books and less movies, and the income effect would predict he would consume less of both.

D. the substitution effect would predict Ethan would consume less books and more movies and the income effect would predict he would consume less of both.

11. The rise of the price of imported goods
   A. will directly affect GDP deflator.
   B. will directly affect CPI.
   C. will directly affect both GDP deflator and CPI.
   D. will not directly affect both GDP deflator and CPI.

12. What is not a possible reason if a government prints money to stimulate the economy, but the unemployment rate keeps the same?
   A. Nationals are fully rational.
   B. There are no menu costs.
   C. The money multiplier is greater than 1 but smaller than 2.
   D. The short-run Phillipe curve is a vertical line.

13. Country A only has 5 people. The current unemployment rate is 25%. Which statement of the followings is wrong?
   A. There is no discourage worker.
   B. One of them might be a full-time student.
   C. Two of them have no jobs and are seeking for jobs.
   D. There is one discouraged worker.

14. Which policy of the followings is not a possible solution for the rising housing prices?
   A. Central banks sell government bonds through open market operations.
   B. Central banks cut the discount rate.
   C. Central banks raise the reserve requirements.
   D. Central banks set a mortgage cap.

| 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	國貿、企管 風管、科管	考試時間	2月5日(五)第二節

15. The marginal propensity of saving in Country A is 0.5. Currently, the country is suffered from COVID-19 and the government gives 3000 local dollars to every national. Suppose due to this policy, each national can help to increase money supply 2000 local dollars through the fractional-reserve banking system. What is the reserve ratio for Country A?
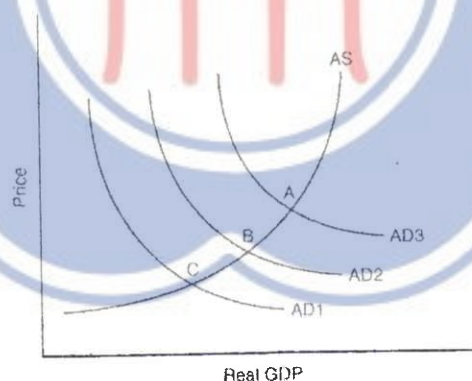
    A. 20%

    B. 30%

    C. 40%

    D. 50%

16. Stagflation occurs when

    A. real GDP increases and price levels decrease.

    B. real GDP decreases and price levels decrease.

    C. unemployment and price levels increase.

    D. nominal GDP decreases and price levels increase.

17. The multiplier effect will be greater on aggregate demand if

    A. there is no increase in the price level.

    B. both aggregate demand and aggregate supply increase.

    C. both aggregate demand and aggregate supply decrease.

    D. aggregate demand increases and aggregate supply decreases.

18. According to the preceding diagram, the economy is at equilibrium at Point A. Choose the best fiscal policy most appropriate to control demand-pull inflation.

    A. Decrease aggregate demand by increasing taxes.

    B. Increase aggregate demand by decreasing taxes.

    C. Decrease aggregate supply by increasing taxes.

    D. Increase aggregate demand by increasing government spending.

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	國貿、企管 風管、科管	考試時間	2月5日(五)第二節

19. The crowding out effect may be avoided if

   A. the government pursues a contractionary fiscal policy.

   B. the government destroys a percentage of the money supply.

   C. the government issues new money.

   D. A and C.

20. A disadvantage of a floating exchange rate is that

   A. trade may worsen due to a nation's depreciation of its currency.

   B. tariffs cease to be effective.

   C. exports decrease.

   D. imports decrease.

Problems and Short-essay Questions

Please answer the following questions IN SEQUENCE. All questions may be answered in either Chinese or English.

1. Let the inverse demand function of good x in a country be $P_x = 5 - D_x$, where P_x is the price of x and D_x is the quantity demanded. The quantity supplied is Q_x and the inverse supply function is $P_x = 3 + Q_x$. Answer the following questions.

   A. (4 points) Derive the equilibrium price under autarky.

   B. (8 points) Suppose the country is small. The price of x in the international market is 3. Will the country import or export x? Calculate the quantity of export or import.

   C. (8 points) Calculate the consumer and producer surplus under autarky and trade. Measure the gains from trade in terms of surplus.

2. The inverse market demand curve for a final good is $p = 100 - Q$ and the marginal cost of supplying labor is $MC_L = 40$. Each unit of output requires half unit of labor, L, and no other factor. That is, $Q = 2L$.

   A. (4 points) If the factor market is perfectly competitive and the output market is a monopoly, what are the equilibrium quantity and price in both factor and output markets?

   B. (10 points) If both the factor and output markets are a monopoly, what are the equilibrium quantity and price in these two markets? How much profit does each firm make?

   C. (6 points) Show that a vertical merger of the upstream and downstream monopoly increases profit and benefits consumers.

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	國貿、企管 風管、科管	考試時間	2月5日(五)第二節

3. Country A's Phillips curve can be written as:

$$u = u_{natural} = 0.5(\pi - x),$$

where u is the unemployment rate, u_n is the natural unemployment rate, and π is the current inflation rate. Please answer the following questions in detail.

  A. (5 points) What does x stand for?

  B. (5 points) Suppose Country A's structural unemployment rate is 3%, frictional unemployment rate is 2%, and cyclical unemployment rate is 1%. Please calculate the inflation rate, given x equals 1%.

  C. (5 points) Following (B), suppose Country A announces to set an 3% inflation target in the coming year. Under the assumption of rational expectation and other things remaining the same, what will the current unemployment rate change?

  D. (5 points) Following (C), suppose the government does not want to hurt the investment and the current nominal interest rate is 4%. What is the ideal nominal interest rate in the coming year?

4. Imagine an open economy in which Ricardian equivalence holds. This economy has a budget deficit of 50, a trade deficit of 20, and investment of 100.

  A. (6 points) Define Ricardian equivalence.

  B. (7 points) What is the level of private savings in this economy?

  C. (7 points) If the budget deficit rises to 70, how are private savings affected?

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	微積分	系 所 別	科智所科管組	考 試 時 間	2 月 5 日（五）第 2 節

以下各題，每大題十分；請依序回答，並寫明計算的程序。

1. 試求以下極限值：

   (1) $\lim\limits_{n \to \infty} 8n(\sqrt{n^2 + 1} - n)$

   (2) $\lim\limits_{y \to 0} (1 + 2y)^{1/y}$

2. 某速食店發現其每天套餐銷售的獲利方程式為 $P(x, y) = -0.006x^2 - 0.005y^2 - 0.002xy + 14x + 12y - 300$ ，其中 x 為招牌套餐每天的銷售數量，y 為精緻套餐每天的銷售數量，目前招牌套餐和精緻套餐每天的銷售量分別為 1000 份和 1500 份，請估算當招牌套餐每天銷售增加至 1050 份，而精緻套餐每天銷售減少至 1450 份時，該店每天的獲利會改變多少？

3. 某慈善機構的年募款率預測為 $t\sqrt{2t^2 + 1}$ 百萬元，t 為從現在起算的年份，請計算該機構於兩年後所累積增加的募款有多少？(單位為百萬元，請四捨五入計算至小數點後第二位)

4. 某製衣廠商估算，當生產 x 件大衣時，其邊際營收為每件 $200x^{-1/2}$ 元，而此時的邊際成本是每件 0.4x 元。如果生產 25 件大衣時，該廠商的獲利為 2000 元，那麼當生產 64 件大衣時，該廠商的獲利會是多少？

5. 某國家目前外籍醫護人員的比例為 30%，經估算每十年的成長率為 $R(t) = 5e^{1/(t+1)}$ ，t 代表從現在起算每十年，請計算十年後該國外籍醫護人員的比例會是多少？

6. 求 $\int \ln(\sqrt{1-x} + \sqrt{1+x})\, dx$ 之方程式。

7. 如果 $z = x^2 y - \sqrt{y}$ ，而 $x = e^{2t}$ 且 $y = \cos t$ ，請問 $\frac{dz}{dt}$ 的方程式？

8. 求 $y^2 = x^2(1 - x^2)$ 曲線所包圍之面積。

9. 某廠商的生產函數為 $Q(X, Y) = 100X^{3/4}Y^{1/4}$ ，其中 X 為資本額，單位是萬元；Y 是勞動力，單位是工時。若每月的資本額在 10 萬元到 12 萬元之間變動，而每月的勞動力在 2700 至 3200 工時之間變動，試求該廠商每月之平均產量。(請四捨五入計算至小數點後第二位)

10. 市場上某商品的需求量為 D(t)，每件價格為 P(t)，其需求方程式為 $D(t) = 48 - P(t) + 2P'(t)$ ，其中 t 為時間，而該商品於市場的供給量為 S(t)，每件價格亦為 P(t)，其供給方程式為 $S(t) = 30 + 2P(t) + 3P'(t)$ ，當市場達到均衡時，即需求量等於供給量，假設在 t=0 時，每件商品價格為 10 元，則其均衡價格之方程式為何？若 $t \to \infty$ ，則每件商品價格是多少？

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	管理個案分析	系 所 別	科管智財所	考 試 時 間	2 月 5 日（五）第 2 節

一、　　名詞定義：（20%）
　　本所的所名中包含以下四個名詞，請就您的理解寫下定義。
1、什麼是「科技」(Science and Technology)？
2、什麼是「創新」(Innovation)？
3、什麼是「智慧財產」(Intellectual Properties)？
4、什麼是「管理」(Management)？

二、　　名詞應用：（20%）
1、請問政治大學商學院有在研究「科技」嗎？學生能進行哪些「創新」呢？

2、為何您要來政治大學商學院學習「科技與創新管理」？
　　「科技與創新管理」跟「智慧財產」有何關係？

三、　　個案分析（60%）
　　林三益品牌創立於 1917 年，至今已超過百年歷史，目前負責執掌家業、拓展「LSY 林三益」彩妝刷具產品線的，是第四代傳人林昌隆。畢業退伍後，林昌隆正式進入公司，從業務工作做起，當時他便發現，原來現在的學生已經不寫書法了，毛筆需求量變少，銷售額也隨之銳減，即使他再怎麼認真跑業務，書店、文具店還是揮揮手跟他說：「我們不需要！」，一再被拒絕，曾讓林昌隆一度陷入挫折，但他內心不甘於此，於是開始思索：「什麼是毛筆？林三益除了做毛筆，還能做什麼？」積極尋求轉型，林昌隆不給自己任何設限，他笑說：「在我開始思考『毛筆』的定義後，只要看到有毛的東西就覺得是自己的機會。」後來，他想到毛筆可以由大變小，做成指甲彩繪筆或是各式各樣的彩妝刷具，於是林三益就這樣，從筆墨專家搖身一變成為跨足彩妝界的刷具品牌，而這個全新的產品線，就叫「LSY 林三益」。「做彩妝刷具的 LSY 和做毛筆的林三益可以視為是企業體的概念，LSY 擷取林三益製筆時的毛料經驗，應用在彩妝刷具上，以材質解決消費者化妝的需求。」品牌商品從書寫毛筆轉變為彩妝刷具、清潔洗臉用的刷具，甚至敷面膜的矽膠筆，使用材質也從原本的動物毛延伸到各式人造毛，林昌隆做的不只是產品線的拓展，更是對「林三益」整個品牌的重新定義；而在他努力突破舊有框架的同時，也面臨隨之而來的新挑戰——「我們對材料了解，但對使用者的習慣卻不一定了解。這個刷具得直接使用在皮膚上，所以不是我們說好就好，是要消費者覺得好才是好。」。

　　從最懂毛料的林三益，變成最懂消費者的林三益。LSY 商品的背後，有林三益百年毛料、製筆經驗做後盾，但光是跟消費者說「我們的刷具是用很好的毛料做的」還不夠，為了更貼近實際使用需求，LSY 在開發過程中會先做出幾款刷具請彩妝師試用，「只要彩妝師告訴我們這支刷子太軟或太硬，或者刷起來刺刺的不舒服，我們就知道在材料上或結構上該如何調整，重複這個過程直到產品達到最佳狀態。」因為深知做出消費者真正想要的產品才是最重要的事，於是林昌隆也開始調整和消費者溝通的重點，不再只強調「LSY 是專業的刷具品牌」，而是「LSY 是最懂你的刷具品牌」，將定位明確後，和消費者的距離似乎又拉

考 試 科 目	管理個案分析	系 所 別	科管智財所	考 試 時 間	2 月 5 日(五) 第 2 節

近了一些。要成為最懂消費者的品牌，聆聽消費者的聲音變得格外重要。林昌隆說，LSY 成立之初曾遇到消費者問：你們為什麼沒有刷具袋？你們的刷具要用什麼洗？一開始難免冒出「我們就只是賣刷具的，為什麼一定要有刷具袋、清洗液」的念頭，但轉個念頭、正視消費者提出的問題後，反而讓林昌隆看清楚——「消費者是在告訴我們他的需求在哪裡。」於是 LSY 成立第二年後，便開始固定參加美容展，和消費者面對面接觸，聆聽他們的想法和問題。林昌隆解釋：「這是很重要的碰撞過程，也是情感交流的管道。林三益在毛料方面的專業是品牌的基本功，也是支撐企業的力量，但我希望林三益是以人為核心的企業，重視消費者的聲音、滿足消費者的需求，這才是真正的價值。」對 LSY 來說，買賣不只在當下，也不只是產品本身，販售的同時還必須做到完整的周邊服務，包括教育消費者正確的清潔保養方式，甚至是提供化妝美容的相關資訊等等。

　　作為 LSY 負責人，林昌隆希望品牌和自己的個性一樣活潑、多元，並且讓更廣大的消費者認識林三益，因此，近年來多方嘗試各種合作，包括偶像劇置入、和超商通路開發聯名商品等，每一次都是為經驗值加分的新體驗。回憶起七年多前，第一次和 Hello Kitty 的聯名合作，林昌隆表示：「那次真的讓我印象深刻，雖然開發過程中，對方都很尊重我們的產品專業，但後來在做刷具包時，被來回打槍好幾次，因為當刷具都擺進去後，包包會鼓起來，會使得 Hello Kitty 鬍鬚的弧度變得不好看！」讓林昌隆學到——原來很多事情必須對自己再更要求一點，因為當你對自己的要求高一點、做得再好一點，最終呈現的結果消費者會感受得到，也會直接反映在銷售數字上。

（擷取自：點讀華山 384 品牌經營 69 Apr 09, 2019 林三益翻玩毛筆定義，創造品牌新價值）

請問：

1、「LSY 林三益」這個企業有哪些「科技」？有哪些「智慧財產」？

2、「LSY 林三益」推出彩妝刷具這種產品是「創新」嗎？(符合您對創新的定義嗎？)
　　如果是，這種創新需要做研發（Research and Development, R&D）嗎？需要什麼新知識？

3、「LSY 林三益」是製造產品的廠商，為何要在意「消費者體驗」？這跟創新有何關係？

4、作為 LSY 負責人，您認為林昌隆發揮了哪些「管理者」的功能？這需要哪些知識與能力？

5、您能從本研究所學到這些知識與能力嗎？能學到哪些？如何學？

6、基於「LSY 林三益」目前的實力，如果您是它的負責人，您會帶領它進行什麼樣的創新？
　　為了進行這樣的創新，這個企業需要做哪些預備活動？

備　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。