考 試 科 目	經濟學	系 所 別	商學院共同科	考 試 時 間	2月 7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. Suppose Ethan increases his working hours when obtaining higher hourly pay. Which of the following statement(s) is (are) correct?

(i) Leisure could be an inferior good to Ethan.

(ii) Leisure could be a normal good to Ethan.

(iii) Leisure could be a Giffen good to Ethan.

    A. (i) and (iii)

    B. (ii)

    C. (i) and (ii)

    D. (i), (ii), and (iii)

2. Which of the following statement(s) is (are) correct when a government imposes tax on a good?

(i) When supply is perfectly inelastic, imposing tax on consumers creates zero deadweight loss.

(ii) When demand is perfectly elastic, imposing tax makes the market price of the good unchanged.

(iii) When supply is perfectly elastic, and demand is perfect inelastic, imposing tax makes the market equilibrium quantity unchanged.

    A. (i) and (iii)

    B. (ii)

    C. (i) and (ii)

    D. (i), (ii), and (iii)

3. Which of the following statement(s) is(are) correct?

(i) A monopoly firm can increase its revenue by raising the price when demand is perfectly inelastic.

(ii) When marginal cost is zero and demand is linear, a monopolistic competitive firm will produce at the midpoint of the demand curve.

(iii) A perfect competitive firm produces at the point that price elasticity of demand equals one.

    A. (i) and (iii)

    B. (ii)

    C. (i) and (ii)

    D. (i), (ii), and (iii)

備　　註	一、作答於試題上者，不予計分。 二、試題請隨卷繳交。

4. Assume Ethan's preference on two goods, X and Y, follows typical assumptions in Economics. His budget constraint is $2X + 4Y = 20$, and his optimal consumption bundle is $(2, 4)$. Which of the following consumption bundles is possible to give the same utility level to Ethan as $(2, 4)$?

    A. (3, 7)

    B. (5, 2.5)

    C. (0.5, 4)

    D. (1, 7)

5. Town A has only three residents. They are deciding whether to spend $ 450 to provide a public good. The public good will only be provided when all of three residents agree to do it. The value of the public good to each resident is:

Resident A	Resident B	Resident C
i	ii	iii

What is a possible bundle of (i, ii, iii) that this public good will be provided?

    A. (0, 0, 460)

    B. (100, 150, 130)

    C. (120, 150, 160)

    D. (140, 140, 140)

6. When marginal cost exceeds average total cost,

    A. average fixed cost must be falling.

    B. average fixed cost must be rising.

    C. average total cost must be rising.

    D. average total cost is falling.

7. If a firm in a competitive market increases production and its marginal revenue remains positive, raising production will

    A. be profitable.

    B. cause the firm to incur loses.

    C. leave profit unchanged.

    D. It is impossible to tell from the information provided.

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7日(五) 第二節

8. When a natural monopoly exists, it is

    A. always more cost effective for two or more private firms to produce the product.

    B. never more cost effective for two or more private firms to produce the product.

    C. always more cost effective for government owned firms to produce the product.

    D. never more cost effective for one firm to produce the product.

9. If identical products are sold by firms participating in a market, the market is

(i) perfectly competitive.

(ii) an oligopoly.

(iii) monopolitically competitive.

    A. (i) or (ii)

    B. (ii) or (iii)

    C. (i) or (iii)

    D. (i) only

10. A profit-maximizing firm in a monopolistically competitive market is characterized by which of the following?

    A. Revenue is always maximized along with profit.

    B. Average revenue exceeds marginal revenue.

    C. Marginal revenue exceeds average revenue.

    D. Average revenue is equal to marginal revenue.

11. Every year more and more purchases are made with credit cards on the Internet. Given this trend, all else equal, we would expect:

    A. the money demand curve to shift outward.

    B. the money demand curve to shift inward.

    C. a downward movement along a fixed money demand curve.

    D. an upward movement along a fixed money demand curve.

12. As a result of a decrease in the value of the dollar in relation to other currencies, American imports decrease and exports increase. Consequently, there is a(n):

    A. increase in short-run aggregate supply.

    B. decrease in the quantity of aggregate output supplied in the short run.

    C. increase in aggregate demand.

    D. decrease in the quantity of aggregate output demanded.

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 7 日 (五) 第二節

13. The money demand curve is:

A. downward-sloping because the opportunity cost of holding money is inversely related to the interest rate.

B. downward-sloping because the opportunity cost of holding money rises as the interest rate rises.

C. downward-sloping because the opportunity cost of holding money rises as the interest rate falls.

D. upward-sloping because the opportunity cost of holding money rises with the interest rate.

14. An example of the frictionally unemployed is a(n):

A. autoworker who is temporarily laid off because of a decline in sales.

B. geologist who is permanently laid off from an oil company due to a new technological advance.

C. worker at a fast-food restaurant who quits work and attends college.

D. real estate agent who leaves a job in Texas and searches for a similar, higher paying job in California.

15. Suppose that in year 1 an economy produces 100 baseballs that sell for $3 each and 75 pizzas that sell for $8 each. The next year the economy produces 110 baseballs that sell for $3.25 each and 80 pizzas that sell for $9 each. Using year 1 as the base year, the growth rate of real GDP from year 1 to Year 2 is:

A. 10%.

B. 7.8%.

C. 19.7%.

D. 8.8%.

16. Suppose the economy is in long-run equilibrium. Concerns about pollution cause the government to significantly restrict the production of electricity. At the same time, taxes fall. In the short-run

A. real GDP will rise, and the price level might rise, fall, or stay the same.

B. real GDP will fall, and the price level might rise, fall, or stay the same.

C. the price level will rise, and real GDP might rise, fall, or stay the same.

D. the price level will fall, and real GDP might rise, fall, or stay the same.

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 7 日（五）第二節

17. Critics of stabilization policy argue that

A. "animal spirits" must be offset by active monetary policy.

B. active monetary policy is necessary for steady economic growth.

C. the lag problem ends up being a cause of economic fluctuations.

D. active fiscal policy is required for steady economic growth.

18. Which of the following contains a list only of things that decrease when the budget deficit of the U.S. increases?

A. U.S. net exports, U.S. domestic investment, U.S. net capital outflow

B. U.S. supply of loanable funds, U.S. interest rates, U.S. domestic investment

C. U.S. imports, U.S. interest rates, the real exchange rate of the dollar

D. U.S. interest rates, the real exchange rate of the dollar, U.S. domestic investment

19. If purchasing power parity holds, then if the price of a basket of goods in the U.S. rose from $1,000 to $1,200 and the price of the same basket in Poland rose from 6,400 Polish zloty to 8,000 zloty, then

A. the nominal exchange rate would be unchanged and the real exchange rate would appreciate.

B. the U.S. dollar would appreciate and the real exchange rate would stay the same.

C. the nominal exchange rate would be unchanged and the real exchange rate would depreciate.

D. the U.S. dollar would depreciate and the real exchange rate would be unchanged.

20. Imagine the U.S. economy is in long-run equilibrium. Then suppose the value of the U.S. dollar decreases. At the same time, people in the U.S. revise their expectations so that the expected price level rises. We would expect that in the short-run

A. real GDP will rise and the price level might rise, fall, or stay the same.

B. real GDP will fall and the price level might rise, fall, or stay the same.

C. the price level will rise, and real GDP might rise, fall, or stay the same.

D. the price level will fall, and real GDP might rise, fall, or stay the same.

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	1 月 7 日(五) 第二節

Problems and Short-essay Questions

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

1. Assume a government imposes a tax on the market of good A. The total tax revenue is \$500, and the quantity demanded is 100. Further, the demand is linear and has a slope of $-\frac{1}{5}$. The supply equation is $Q^S = 2P$.

 A. (4 points) What is the price that consumers pay after the tax?

 B. (4 points) What is the demand equation?

 C. (4 points) What is the size of the deadweight loss of the taxation?

 D. (4 points) What is the tax burden of consumers?

 E. (4 points) Additionally, assume the government imposes this tax to deal with externality efficiently. What is the size of the externality per output unit? Is this externality positive or negative?

2. Consider an endowment economy (an economy without production). The utility function of each consumer is $U = D_x^{1/2} D_y^{1/2}$, where D_x and D_y represent demand of x and y respectively. The endowment of x is 20 units and that of y is 30 units. Answer the following questions.

 A. (5 points) Show that the utility function is homothetic.

 B. (5 points) Derive the demand of x relative to y as a function of p_x/p_y where p represents price.

 C. (5 points) Derive the equilibrium level of p_x/p_y.

 D. (5 points) Suppose there is another economy, where consumers have the same utility function but both the endowment of x and y is 30 units. Derive the equilibrium level of p_x/p_y under free trade.

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 7 日(五) 第二節 |

3. Given the following information: bank deposits 350, currency-to-deposits ratio 0.20, required reserve ratio 0.15,

A. (15 points) solve for the monetary base level, the level of bank reserves, and the money supply level in this economy.

B. (5 points) Suppose there is a sudden rise in the currency-to-deposits ratio, from the original level of 0.2 to a new level of 0.4. If everything else remains unchanged, find the level of monetary base needed to keep money supply fixed at the same level.
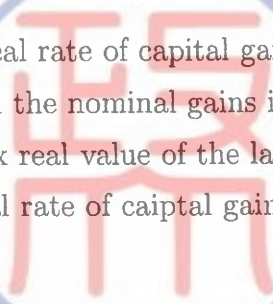
4. One example of how inflation discourages saving is the tax treatment of capital gains. Suppose that someone bought a parcel of land for \$2,000 in 1980 when the price index equaled 100. In 2018, the person sold the land for \$13,000, and the price index equaled 500. The tax rate on nominal gains was 20 percent.

A. (5 points) Find the before-tax real rate of capital gains.

B. (5 points) Compute the taxes on the nominal gains in terms of 2018 prices.

C. (5 points) Compute the after-tax real value of the land in terms of 1980 prices.

D. (5 points) Find the after-tax real rate of caiptal gains.

考 試 科 目	微積分	系所別	科智所(科技管理組)	考試時間	2月 7日(五) 第二節

以下各題，每題十分；請依序回答，並寫明計算的程序。

1. 廠商生產 x 個產品的總成本是 $C(x) = x^3 - 6x^2 + 13x + 18$。請問邊際成本最小的時候產量是多少？

2. 如果 $y = \frac{(2x^2+3)^3}{(3x+4)^4}$。請問 $\frac{dy}{dx}$ 的方程式？

3. 如果 $x^3 - xy + y^3 = 2$。請問 $\frac{dy}{dx}$ 的方程式？

4. 市場需求曲線 $Q = Q(P)$ 是價格 P 與需求量 Q 的關係，需求的價格彈性是
   $E = -\frac{dQ/Q}{dP/P}$ ，請問需求的價格彈性為常數 0.5 的函數形式為何？

5. 求定積分 $\int_1^2 \frac{2x-1}{x^2-x+2} dx$ 的值。

6. 已知 Ln(2) = 0.69315，請以泰勒展開式估計對數 Ln(8.01) 的數值到小數點以下第 5 位。

7. 求不定積分 $\int x^3 e^{3x} dx$ 的方程式。

8. $f(x,y) = xyln(x^2 + xy)$, $f_{x,y} = \frac{\partial}{\partial x}\left(\frac{\partial f}{\partial y}\right)$, 請問 $f_{x,y}(1,1) =$?

9. 已知某廠商有兩個工廠生產相同的產品，產量分別是 x 和 y，總成本是
   $C(x,y) = \frac{x^2}{8} + \frac{y^2}{4} + 180$。請問廠商如果要生產 9000 單位的產品，要如何生產才能讓總成本最低？

10. 求 $y = x^3, x = -2, x = 2$ 與 x 軸所圍成的區域面積。

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	科技管理與智慧財產研究所／科技管理組	考 試 時 間	2 月 7 日(五)第 2 節

一、 數位轉型 (digital transformation) 是這兩年熱門的議題。數位轉型反映的是持續創新,藉由結合數位科技,從營運流程、企業文化、顧客體驗等,成為一個以顧客價值與體驗為核心,真正轉型成一個不斷創新、提升效能的組織。儘管科技在數位轉型中扮演著重要角色,但亦有專家提醒,科技是手段,而不是目的;也就是說,數位轉型並非僅是運用科技在營運管理上,而是將數位化完全融入組織的 DNA 中。若你/妳是連鎖社區型民生消費零售通路「美廉社」的營運長 (CEO),你/妳會如何在美廉社進行數位轉型?(20%)

二、 Google 先前被內部員工爆料,Google 曾欲進行一項「蜻蜓」(Dragonfly) 計畫,主要是以針對中國市場的現狀,打造符合中國境內內容審查原則的搜尋引擎服務。然而,在 2019 年中因受到外界及員工的反彈而宣告停止。若你/妳是 Google 的高階主管,在此狀況下,你/妳會放棄中國市場嗎?為什麼?你/妳會怎麼做?(20%)

三、 臺灣首波 5G 釋照競標自 2019 年 12 月起,由中華電信、遠傳電信,台灣大哥大、亞太電信、台灣之星五大電信業者廝殺角逐,總標金在 2020 年 1 月初即破千億元新台幣,超過國家通訊委員會 (NCC) 的底標兩倍之多,尤其其中 3.5GHz 頻段之取得價格創下世界紀錄,這是因為 3.5GHz 為 5G 的主流頻段,擁有表現最佳的供應鏈支持,且覆蓋範圍和容量間可取得良好的平衡。然而,除了競標 5G 執照外,未來得標的電信商仍需大量成本建置相關基礎設備,而消費者關心的資費方案也可能會因為投資成本過高需隨之調整;也因此,主管機關亦曾呼籲業者需更理性、冷靜地投標。請根據上述事實,分析以下問題 (60%):

1. 五大電信業者在想什麼?為何願意出高價得標?他們看到了什麼利益?

2. 若你/妳是得標之電信業者 CEO,你/妳打算做什麼讓利益極大化?

3. 若你/妳是未得標的電信業者 CEO,你/妳打算怎麼做避免在 5G 議題上失去競爭優勢?

備 註	一、 作答於試題上者,不予計分。 二、 試題請隨卷繳交。