考 試 科 目	微積分	所　別	智財所	考 試 時 間	3月7日(日)第一節

注意事項：1、請將算式以及推導過程臚列清楚。
　　　　　2、每題 **10** 分，注意時間的分配。

一、　請問，曲線 $y = x^{1.5}$ 在 x=0 至 x=4 之間的長度有多大？

二、　請求出以下微分方程的一般解：

$$\frac{d^2 y}{d^2 x} + 2\frac{dy}{dx} + y = 0$$

三、　$y = t^2 + 2, \quad u = 3t + 1$，求 $\frac{dy}{dx} = ?$

四、　把一粒石子投入水中，會產生一些半徑不斷增加的同心圓水波。若是其半徑增加率是 05 尺秒，則當圓形波的半徑是 4 尺時，圓面積的增加率是多少？

五、　試求 $y = x^2 - 6x + 5$ 與 $y = x - 5$ 兩條線所為區域的面積？

六、　試求 $\int_0^1 \int_{y^2}^{\sqrt{y}} (2 - x - y)dxdy$ 之值？

七、　已知 $y = \cot^4(2x)$，試求 $\frac{dy}{dx} = ?$

八、試求不定積分 $\int \frac{x^3 + 6x^2 + 3x + 6}{x^3 + 2x^2} dx = ?$

九、試求 $y = \sin x$ 在 $x = 0$ 到 $x = \frac{\pi}{2}$ 之間 y 的平均值？

十、何謂「微積分基本定理」？這定理的重要性何在？

備　　　註	試 題 隨 卷 繳 交

考 試 科 目	生命科學	所 別	智財所 401	考 試 時 間	3月7日(日)第1節

各位同學: 本科的的考題是考您的分析及推理能力,所以請您不要急,放鬆心情,盡您的能力回答下列各題 (共三題)。

第一題 (20 分):

2002 年春天,一個研究小組在美國羅德島州首府普羅維登斯(Providence)的布朗大學(Brown University),進行一次驚人的實驗,由一隻受過訓練的恆河猴玩電腦遊戲。遊戲的重點是用一個黃色的游標,追逐螢幕上隨機亂動的紅點,猴子不是用滑鼠或搖桿玩遊戲,而是用精神力量控制游標的方向。研究小組在這個實驗中,設法「偷聽」腦部規畫運動的區域,靠著植入腦部的微小電極,讀取猴腦細胞的信號,送進電腦,利用先進的統計技術解碼,這個小組可以即時把猴子的思想轉變成打電動遊戲的行動。這次發現具有重大意義 - 科學家可以透過電腦,連接在癱瘓病人身上,恢復病人跟環境的互動。展望未來,純粹靠思想指揮的義肢不再只是科幻小說的夢想。

這項特殊突破,背後的成員包括數學家、醫師、神經學家和電腦專家,他們在了解猴腦怎麼運作方面,都扮演重要的角色。研究結果在著名的科學學刊《自然雜誌》(Nature)刊出後,變成布朗大學有史以來大概最轟動的科學故事。

我們把不同領域交會的地方叫做異場域碰撞點(Intersection),而異場域覺碰撞所爆發出來的驚人創新,稱為梅迪奇效應(Medici Effect)。

請你在你人生學習過程中,舉出一個最令您覺得最有意義的梅迪奇效應,並請解釋為什麼有意義。

第二題 (30 分)

1999 年 MIT 教授梭羅著書立說之後,台灣各界業已確實理解當前面臨的是一個「知識經濟」的時代。傳統的代工型、薄利型、壓低成本型的產業模式,終究會落於人後。

2009 年二月台灣推動六大新興產業,各部會先後對生技、綠能、觀光、精農、醫療、文創六大產業提出了行動方案。一年下來,這些產業方案泰半都還在原地踏步;只能在「科技」面高談闊論,完全無法從「產業」面落實生根。 前述科技與產業的脫節,正是台灣推動新興產業所遇瓶頸的癥結所在。

備 註	試 題 隨 卷 繳 交

考試科目	生命科學	所別	智財所 4201	考試時間	3月7日(日)第1節

[接前面一頁]

台灣的科研實力一流，以全球各國在美國的專利權獲取數而言，2008年台灣的專利總數排名全世界第五、而人均專利數更是全球第一名。這麼輝煌的研發成就與研發實力，理應是我們發展知識經濟的核心關鍵。但是，台灣空有大筆的專利數，卻未能成功將這些專利知識轉化為有產業利益的收入，以至於知識歸知識，經濟歸經濟。以生技產業為例，台灣科學家經常能發表高水準的論文，刊在頂尖的學術期刊，但卻在全球每年數千億美元的製藥與醫材市場上鮮少斬獲，這也凸顯出研發成果與產業加值的斷層。

面對這樣的斷層，請您回答下面的問題：

1. 您認為我們的政府應該如何因應呢？
2. 假如您是一個科研工作者，您應該如何因應呢？
3. 假如您是一個業者，您應該如何因應呢？

第三題（50分）

商業周刊 2010-02-01（第 1158 期）的封面故事定名為 "誰？偷了我的血汗錢！"

這個故事的內容表示－10年來，台灣經濟成長近3成，上班族實質薪水卻倒退嚕，更要負擔7成以上政府綜合所得稅，是哪些不公平政策，加深貧富差距，偷了我們的血汗錢？

這個故事的結論認為關鍵成因是半世紀的扭曲政策，拉大薪資差距，賦稅優惠獨厚高科技業，故事引用張忠謀的說話："賦稅優惠獨厚高科技業"早就該廢止。故事中包括專家會診：4位經濟專家，6帖解方，全民均分成長果實照顧就業、鬆綁內需、停止使用「拋棄式」產業政策。

1. 請問何為台灣的 "高科技業"？ 高科技業為何有特別待遇？
2. 請問台灣的 "賦稅優惠" 為何？
3. 所有先進國家都鼓勵高科技業並稱之謂高科技知識經濟，鼓勵不遺餘力。請問台灣如何" 扭曲政策"？請以你的所知來說明。
4. 我相信你是高科技的學生，將來的高科技業者，你認為高科技業應有賦稅優惠嗎？請說明。如果你認為不應有賦稅優惠嗎？亦請說明。
5. 你認為我們政府的高科技"鼓勵" 政策做得對嗎？怎麼樣是正確的鼓勵？那些政策應該百尺干頭更進一步，那些政策應該改之？

備 註	試 題 隨 卷 繳 交

考 試 科 目	經濟學	所　別	商學院	考 試 時 間	3月7日（星期日）第一節

Multiple Choice (1.7 points each)　本科目之選擇題請在答案卡上作答

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

Mark each answer clearly with a No. 2 pencil on the Scantron form.

1. Which of the following would shift the demand curve for new textbooks to the right?
    (a) A fall in the price of paper used in publishing texts
    (b) A fall in the price of equivalent used textbooks
    (c) An increase in the number of students attending college
    (d) A fall in the price of new textbooks

2. Which of the following will NOT cause a shift in the supply of gasoline?
    (a) An increase in the wage rate of refinery workers
    (b) A decrease in the price of gasoline
    (c) An improvement in oil refining technology
    (d) A decrease in the price of crude oil

3. We observe that both the price of and quantity sold of golf balls are rising over time. This is due to
    (a) continual improvements in the technology used to produce golf balls.
    (b) increases in the price of golf clubs over time.
    (c) decreases in membership fees for country clubs with golf facilities.
    (d) more stringent professional requirements on the quality of golf balls requiring producers to use more expensive raw materials.

4. Mikey is very picky and insists that his mom make his breakfast with equal parts of cereal and apple juice – any other combination will end up on the floor. Cereal costs 4 cents per tablespoon and apple juice costs 6 cents per tablespoon. If Mikey's mom budgets $8 per month for Mikey's breakfast, how much cereal and juice does she buy?
    (a) 40 tablespoons each of cereal and juice
    (b) 80 tablespoons each of cereal and juice
    (c) 40 tablespoons of cereal and 75 tablespoons of juice
    (d) 100 tablespoons of cereal and 67 tablespoons of juice

5. Any risk-averse individual would always
    (a) take a 10% chance at $100 rather than a sure $10.

備　　　註	試 題 隨 卷 繳 交

(b) take a 50% chance at $4 and a 50% chance at $1 rather than a sure $1.

(c) take a sure $10 rather than a 10% chance at $100.

(d) take a sure $1 rather than a 50% chance at $4 and a 50% chance at losing $1.

6. A farmer uses K units of machinery and L hours of labor to produce Q tons of corn, with the following production function $Q = L^{0.5} + K^{0.75}$. This production function exhibits

   (a) decreasing returns to scale for all output levels.

   (b) constant returns to scale for all output levels.

   (c) increasing returns to scale for all output levels.

   (d) no clear pattern of returns to scale.

7. If a competitive firm's marginal costs always increases with output, then at the profit maximizing output level, producer surplus is

   (a) zero because marginal costs equal marginal revenue.

   (b) zero because price equals marginal costs.

   (c) positive because price exceeds average variable costs.

   (d) positive because price exceeds average total costs.

8. At the current level of output, long-run marginal cost is $50 and long-run average cost is $75. This implies that

   (a) there are neither economies nor diseconomies of scale.

   (b) there are economies of scale.

   (c) there are diseconomies of scale.

   (d) the cost-output elasticity is greater than one.

9. How are a firm's short-run and long-run average cost curves related?

   (a) SRAC is greater than LRAC, which forces the LRAC curve to be upward sloping.

   (b) SRAC and LRAC slope up or down together, but SRAC is always the steeper of the two curves.

   (c) The SRAC curve is tangent to and lies above the LRAC curve.

   (d) The LRAC curve just touches the SRAC curve at its minimum point.

10. A firm is currently producing 200 units of output using 60 hours of labor and 80 hours of capital. The marginal product of labor is 12 units of output per hour, and the marginal product of capital is 15 units of output per hour. If the wage rate is $6 per hour and the rental rate is $3 per hour, then

   (a) the firm's use of labor and capital is cost-efficient.

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(b) the firm should use more labor and less capital.

(c) the firm should use more capital and less labor.

(d) we cannot determine if the firm's use of inputs is efficient without more information.

11. There are three firms in Green Valley. Initially, each firm emits 4 units of pollution. The following table shows the total costs for each of three firms (A, B, and C) to eliminate units of pollution from their production processes. For example, for Firm A to eliminate one unit of pollution, it would cost $1, and for Firm A to eliminate two units of pollution, it would cost a total of $3.

	Firms		
Unit to be eliminated	A	B	C
One unit	1	4	4
Two units	3	8	9
Three units	6	12	15
Four units	10	16	22

Suppose the government wants to reduce pollution to 9 units, so it gives each firm 3 tradable pollution permits. Which of the following statement is true?

(a) Firm A will buy permit(s) from firms B and C.

(b) Firms A and B will buy permit(s) from firm C.

(c) Firm B will buy permit(s) from firms A and C.

(d) Firms B and C will buy permit(s) from firm A.

12. Consider a monopolist facing two consumers whose preferences for its product are given by the following demand curves: $P_1 = 20 - Q_1$ and $p_2 = 12 - 2Q_2$. The monopolist's fixed cost is equal to 0 and marginal cost is equal to 4. Suppose the monopolist can not tell the consumers apart. What is the maximum profit if the monopolist uses a two-part tariff pricing scheme?

(a) 32

(b) 64

(c) 128

(d) 144

13. A monopolistically competitive firm is currently producing 10 units of output. At this level of output the firm is charging a price equal to $10, has marginal revenue equal to $6,

has marginal cost equal to $6, and has average total cost equal to $12. From this information we can infer that

(a) the firm can increase its profit by producing less.

(b) the profits of the firm are negative.

(c) firms are likely to enter this market in the long run.

(d) the firm's fixed cost must be greater than 20.

14. It is commonly argued that national defense is a public good. Nevertheless, many weapons used by the R.O.C. military are produced by U.S. private firms. We can conclude that

(a) resources would be used more efficiently if the U.S. firms produced the weapons.

(b) resources would be used more efficiently if private firms provided national defense.

(c) weapons are rival in consumption and excludable.

(d) national defense is rival in consumption and excludable.

15. Some economists argue that a resale price maintenance agreement is not anti-competitive because

(a) suppliers are never able to exercise noncompetitive market power.

(b) if a supplier has market power, it can exert that power through the wholesale price rather than the retail price.

(c) retail markets are inherently noncompetitive.

(d) resale price maintenance prevents the retailers from competing on price.

16. A monetary expansion combined with an increase in government spending will cause

(a) an increase in output with ambiguous effects on the interest rate.

(b) a reduction in output with ambiguous effects on the interest rate.

(c) an increase in the interest rate with ambiguous effects on output.

(d) a reduction in the interest rate with ambiguous effects on output.

17. Which of the following event is most likely to occur when the interest rate increases?

(a) the money demand curve shifts to the right

(b) the money demand curve shifts to the left

(c) the price of bonds will fall

(d) the price of bonds will rise

18. The recent recession may increase the marginal propensity to save, which tends to cause

(a) an increase in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

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(b) a reduction in the multiplier and a given change in government expenditures to have a smaller effect on equilibrium output.

(c) an increase in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

(d) a reduction in the multiplier and a given change in government expenditures to have a greater effect on equilibrium output.

19. According to the theory of liquidity preference, which variable adjusts to balance the supply and demand for money?

(a) interest rate

(b) monetary base

(c) quantity of output

(d) price level

20. Which of the following events will trigger a rightward shift of the aggregate demand curve?

(a) an increase in the price level

(b) an increase in tax

(c) an increase in money supply

(d) an increase in the nominal wage

21. Without an accommodating monetary policy, a push by workers to get higher wages will cause

(a) hyperinflation.

(b) higher unemployment.

(c) cost-push inflation.

(d) demand-pull inflation.

22. If the government issues debt to the public to finance its spending, the monetary base will ＿＿＿＿＿＿ and the money supply will ＿＿＿＿＿＿.

(a) decrease; increase

(b) increase; increase

(c) increase; decrease

(d) not change; not change

23. If the expected path of one-year interest rates over the next five years is 5 percent, 6 percent, 8 percent, 9 percent, and 7 percent, then according to the expectations theory

today's interest rate on the five-year bond should be
(a) 4 percent.
(b) 5 percent.
(c) 6 percent.
(d) 7 percent.

24. If a bank has \$80,000 of checkable deposits, a required reserve ratio of 20 percent on these deposits, and it holds \$40,000 in reserves, then the maximum deposit outflow it can sustain without altering its balance sheet is
(a) \$20,000.
(b) \$30,000.
(c) \$40,000.
(d) \$25,000.

25. The most important advantage of discount policy is that the central bank can use it to
(a) control the money supply.
(b) punish banks that have deficient reserves.
(c) perform its role as lender of last resort.
(d) precisely control the monetary base.

26. The nominal exchange rate is the
(a) nominal interest rate in one country divided by the nominal interest rate in the other country.
(b) price of a good in one country divided by the price of the same good in another.
(c) rate at which a person can trade the currency of one country for the currency of another.
(d) the number of goods a person can trade for a similar good in another country.

27. If the direct nominal exchange rate, S, is domestic dollar per foreign currency, the domestic price is P, and the foreign price is p^*, the direct real exchange rate is defined as
(a) $(SP^*)/P$.
(b) $(SP)/P^*$.
(c) $P^*/(SP)$.
(d) $P/(SP^*)$.

28. If purchasing-power parity holds, then the value of the
(a) real exchange rate is equal to one.

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(b) nominal exchange rate is equal to one.

(c) real exchange rate is equal to the nominal exchange rate.

(d) real exchange rate is equal to the difference in inflation rates between the two countries.

29. Which of the following statements is incorrect for an open economy?

(a) A country can have a trade deficit, trade surplus, or balanced trade.

(b) A country that has a trade deficit has positive net capital outflow.

(c) Net exports must equal net capital outflow.

(d) National saving must equal domestic investment plus net capital outflow.

30. The People's Republic of China has had a large trade surplus in recent years. Which of the following is the most likely explanation of this surplus?

(a) China has a high rate of inflation, which reduces the value of its currency.

(b) China has a large supply of labor, so low wages give it a competitive edge.

(c) China has many trade barriers, which restrict the ability of other countries to sell their products in China.

(d) China has a large amount of saving relative to domestic investment.

Numerical/algebraic problems and short-essay questions

Please answer the following questions IN SEQUENCE. All questions may be answered in EITHER Chinese OR English.

1. Suppose the market for wine can be described by the following equations:

$$\text{Demand}: P = 60 - Q, \quad \text{Supply}: P = 2Q - 30,$$

where P is the price in dollars per bottle and Q is the quantity in millions of bottles.

(a) (4 points) What is the equilibrium price and quantity? Now suppose the government imposes a tax of $3 per bottle to reduce wine consumption and raise government revenues. What will the new equilibrium quantity of wine be?

(b) (4 points) Calculate the effects of the tax on consumer surplus, producer surplus and social welfare.

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2. (8 points) Customers attending baseball games at the local arena must pay for parking on the grounds and then pay for a ticket needed to enter the arena. If the arena manager knows that the customers' identical demands can be expressed collectively as $P = 25 - 0.000625Q$. How much of a parking fee could the management collect if the marginal cost of providing entertainment were a constant $MC = \$10$ per seat?

3. Consider a market where two firms produce a homogeneous good. The inverse market demand is given by $p = 24 - q_1 - q_2$ where q_1 and q_2 denote the quantities produced by firm 1 and 2, respectively. While there are no production costs incurred by firm 1, the cost function of firm 2 is given by

$$C_2(q_2) = \begin{cases} 0 & \text{if } q_2 = 0 \\ 49 & \text{if } q_2 > 0. \end{cases}$$

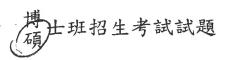Suppose that the firms set quantities simultaneously.
(a) (4 points) Draw the best response curves.
(b) (4 points) Find all pure strategy Nash equilibria.

4. During the recent financial turmoil, the U.S. M1 money multiplier kept slipping and it even dropped below 1 in the early 2009.
(a) (2 points) What are the likely causes of this historically low level of the money multiplier?
(b) (3 points) How would such a low money multiplier affect the effectiveness of the monetary policy applied by the Federal Reserve Bank?
(c) (3 points) Suppose you work for Paul Volcker, the Chair of the U.S. President's Economic Recovery Advisory Board, in the capacity of an economic advisor. Please use the AD-AS model and other models, if necessary, to explain how you would suggest the government to fight the recession.

5. Recently as a result of the Federal Reserve's actions to save the financial institutions and markets, the monetary base of United States has been exploding. However, the increase in the broader monetary aggregate such as M2 is much more moderate.
(a) (2 points) Please suggest reasons explaining the M2's moderate growth despite the dramatic increase in monetary base.
(b) (2 points) Suppose you are a bank with $100,000 in vault cash. When the central bank conducts open market operation to sell government bonds, you decide to use the $100,000 to purchase these bonds to earn interest. How would your action affect the monetary base?

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(c) (2 points) Or, you simply decide to put the $100,000 in the reserve account of your bank at the central bank. How would this action affect the monetary base?

(d) (2 points) Please comment on the following statement: "When reserves pay interest (as the Fed now does), the monetary base becomes an uninteresting economic statistic."

6. (a) (4 points) "Faster population growth might increase a country's GDP, but it makes everyone poorer." Is the above statement true, false, or uncertain, and why?

(b) (5 points) Can capital accumulation itself sustain growth in GDP per capita in the long term? Why or why not?

備　註	試 題 隨 卷 繳 交

考 試 科 目	民 法	所 別	智慧財產研究所 4201	考試時間	3 月 7 日(日) 第一節

一、 甲平日習慣以網路、電視郵購方式購物，收到宅配的商品後如不喜歡，即在廠商告知之鑑賞期內退貨、退款；某日甲到 S 通訊行繳費時看到蘋果牌手機，一時興起和店員議價後購買，但回家後覺得手機不好操作，遂於隔日將手機、配件、包裝盒等物帶回通訊行要求退換他牌手機或退款，不料遭店員稱實體通路販售物品和網路、電視郵購不同，甲無消費者保護法第 19 條第 1 項規定：「郵購或訪問買賣之消費者，對所受之商品不願買受時，得於收受商品後七日內，退回商品或以書面通知企業經營者解除買賣契約，無須說明理由及負擔任何費用或價款。」之解約權，拒絕退款或換其他廠牌手機給甲。請問甲是否有其他救濟的方法？（33%）

二、 A 女在今年元旦假期騎車停等紅綠燈時，發現前方運鈔車遺落一包麻布袋，搬回家後打開發現內裝新台幣（以下同）300 萬元現鈔，A 女依廂型車外所註記的保全公司名稱查詢，打電話請天一保全公司派人到家中取回麻布袋；之後 A 女和友人餐敘時聽朋友說其拾金不昧的行為，依民法第 805 條規定可以向天一保全公司主張拾得金額 3/10 的報酬；A 女欣喜若狂馬上到天一保全公司主張拾得人報酬請求權、請求給付 90 萬元的報酬，但天一保全公司表示 A 女沒有依法將拾得現鈔交存警察局，無須給付遺失物 3/10 報酬，只願給 A 女紅包 6 萬元，但 A 女堅持主張天一保全公司依法應給付 90 萬元、拒絕收紅包。請附理由回答下列問題：
   （一）民法物權編 98 年 1 月 23 日新修訂，有關遺失物拾得之處理、拾得人報酬請求權及取得遺失物所有權等規定，與舊法有何不同？（14%）
   （二）天一保全公司與 A 女各執一詞，究竟何人主張有理由？（20%）

三、 五年前發生阿里山森林火車翻覆意外，林務局賠償家屬新台幣（以下同）一億四千九百多萬元和解後，轉向列車長蘇銀福等四人求償，經嘉義地方法院民事庭判決認定小火車翻覆與蘇銀福等四人職務疏失有關，蘇銀福等四人應負連帶賠償責任共同分擔林務局賠償的和解金額，但蘇銀福在刑事判決確定前一個月病逝、溫福銘在前年服刑期滿出獄後服藥自殺，判決蘇銀福的太太及六名子女與溫福銘的太太及 12、15 歲未成年子女應繼承蘇銀福、溫福銘二人所負連帶賠償責任，各應林務局賠償三千多萬元；蘇太太、溫太太經熱心友人告知立法院為了避免社會長期存在此類「天上掉下來的債務」壓垮未成年子女的不公義，在 97 年 1 月修正繼承編施行法第 1 條之 1 第 2 項規定：「繼承在民法繼承編中華民國九十六年十二月十四日修正施行前開始，繼承人於繼承開始時為無行為能力人或限制行為能力人，未能於修正施行前之法定期間為限定或拋棄繼承，由其繼續履行繼承債務顯失公平者，於修正施行後，以所得遺產為限，負清償責任。」請問在民事上訴程序中，蘇太太及六名子女與溫太太及 12、15 歲未成年子女，可提出何種主張維護權益？（33%）

備 註	試 題 隨 卷 繳 交