國立政治大學九十一 學年度研究所博碩士班入學考試命題紙 第全一頁

考試科目	產業經濟學	所別	科管所	考試時間	5月25日(上)午第一節 星期六 下

答題請儘量輔以圖表或方程式來說明

一、（20%）需求函數與供給函數是如何由生產函數及效用函數推導出來的？

二、 (30%)

（1） 在經濟學中，如何定義「技術」及「技術進步」？

（2） 全自動紡紗機，半自動紡紗機及手動紡紗機可以同時是最有效率的技術嗎？爲什麼不是？爲什麼是？

（3） 請分別由 X—無效率 及 交易成本的觀念來說明「管理」的必要性。

三、(30%)

（1） 請解釋以下名詞：（18%）
進入障礙，套牢，轉換成本，網路外部性，規模經濟，搭售

（2） 微軟一再投入重金以更新並擴充 WINDOW 系統軟體的功能，甚至要把 IE 瀏覽器也納入系統軟體的一部份。請用以上名詞解釋微軟採取這種策略行爲的原因。（12%）

四、(20%)政府一定要介入科技發展嗎？請用經濟學的推理方式來分析。

備考	試題隨卷繳交

考試科目	科技管理文獻評析	別	科管所	考試時間	5月25日上午第2節 星期六(下) 12:20~17:00

一、On the Innovation Treadmill　(30 %)

1. 寫 300 字以內的中文摘要，涵蓋此一報導的要點。 10%
2. 寫出 5 個英文關鍵字，亦即在做那些相關研究時應可收尋與參考到這篇文章。 10%
3. 此文對你所了解的「科技管理」有什麼啓發？ 10%

On the Innovation Treadmill

-Standard R&D Formula Is No Longer as Effective

By Gardiner Harri

April 22 2002

The Asia Wall Street Journa

Why Drug Makers Are Failing to Find New Blockbusters

In laboratories around the world, scientists on the hunt for new drugs are coming up dry. Patents on one blockbuster drug after another are expiring. Managed-care companies are successfully pushing patients away from high-priced new drugs and toward cheap generics.

The $400 billion-a-year drug industry is suddenly in serious trouble. After nearly a decade of double-digit growth, highflying stocks, and some of the world's loftiest profit margins, one big company after another is taking a beating. Analysts estimate that combined profits at the U.S.'s top nine drug makers grew by less than 1% in the first quarter.

Victims include industry giants **Bristol-Myers Squibb** Co., **Merck** & Co., **Eli Lilly** & Co., **Schering-Plough** Corp. and **Bayer AG**, nearly all of which have lost sales of many of their old standbys to low-cost generic drug manufacturers. Merck has seen its shares slide more than 40% since the start of 2001. Lilly reported last week that its profits dropped 22% in the first quarter. Schering-Plough is facing the loss at the end of this year of most of the sales of Claritin, which last year provide more than half of its high-profit U.S. drug sales. **GlaxoSmithKine** PLC could be the next to feel the pinch: It is expected to lose patent protection next year on four drugs with nearly $3.9 billion in annual U.S. sales.

Consumers stand to benefit in the short term, as best-selling drugs such as heart-burn remedy Prilosec, allergy treatment Claritin and antibiotic Cipro become available in cheaper generic versions. But,in the longer term, the newest treatments promise to get more expensive, as the industry invests more in research and development and gets less out of it. Meanwhile it will continue routine price increases on its existing drugs.

The likely outcome is worsening battles among the drug industry, managed-care companies, and federal and state governments over drug prices. Increasingly, the newest drugs are only slightly better than older, much cheaper medicines. Nonetheless, the industry's growing blitz of consumer advertisements drives patients to demand them.

The industry's latest flare of distress is coming from Bristol-Myers, which has spent $16.5 billion on R&D since 1990 without producing a single new star of its own. In the past few months, three of the New York-based company's biggest-selling drugs-Taxol for cancer, BuSpar for anxiety and Glucophage for diabetes-have lost most of their sales to generic competitors. BristoMyers thought it had lined up potential replacements, but so far it has been disappointed.

Days before Christmas, federal regulators refused even to consider the application to market a cancer drug produced by Bristol-Myers's partner, ImClone drug produced by Bristol-Myers, **ImClone**

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日上午 第5節 13:20-17:00 星期六(下)

Systems Inc. And last month, Bristol-Myers researchers reported that their studies of the company's new blood-pressure pill, now under review by the U.S. Food and Drug Administration, found the drug less effective than expected.

Partly as a result, Bristol-Myers has warned that its earnings this year will be only about half those of last year, when it reported income from continuing operations of $ 4.74 billion on revenue of $ 19.09 billion. Since 1999, Bristol-Myers shares, which were down 25 cents at $ 32.47 in 4 p.m. New York Stock Exchange composite trading Friday, have lost about two-thirds of their value. Last week, Bristol-Myers fired its chief financial officer, and its CEO is on notice from the board that he has to shape up.

Slower Lab Productivity Weighs on Drug Industry

The industry is caught in a gap between an old way of developing drugs that is increasingly tapped out, and a new way that isn't yet bearing a lot of ffuit. For decades, drug makers have focused R&D efforts on enzymes, chemicals that serve as catalysts for most of the body's functions. Cholesterol drugs Lipitor, Zocor and Pravechol, for instance, work by inhibiting an enzyme in the liver that the body needs to make cholesterol.

But there is a growing sense among researchers that many of the body's major enzymes have already been fully exploited. "I think there are a limited number of enzymes that you can target in some systems, and many of those targets have already been dealt with, "Peter Kim, deputy chief of Merck's research operations, says.

For long-term relief, industry executives are looking to gene hunting. They hope to discover the genetic roots of most chronic diseased and use that knowledge to devise novel treatments. But they generally don't expect to see any big payoffs from the new technology until the end of the decade.

"People got way too excited about the genome being unlocked, "Fred Hassan, chaiman and chief executive of **Pharmacia** Corp., says. "Five to 10 years from now, it might help our product flow. On the meantime, the industry is going to go through rough times."

One sign of the industry's growing desperation for new products is the rising price drug makers are willing to pay for discoveries made outside their labs. In 1992, Bristol-Myers licensed the best cancer drug of the day, Taxol, for a 0.5% royalty. Last year, it licensed Erbitux, one of many good cancer prospects, for an upfront investment of $2 billion, plus a 60% royalty. (Erbitux is the drug that federal regulators later refused to consider.)

The pharmaceutical industry has survived hard times before. And while its fortunes have declined, it is still producing profits. Moreover, demographics in the U.S continue to favor the industry's long-term growth. Prescription-drug spending by Americans tends to increase sharply with age. But much of that growing market is likely to be served by cheap generics.

Brand-name drug makers have come under increasing pressure from generics since 1984, when Congress passed the Hatch-Waxman Act, creating the modern generic-drug industry. The law reduced the amount of testing generic-drug makers had to do in order to market their products. Those requirements previously had presented such a hurdle to generics that branded drugs often continued to post strong sales for decades after their patents expired.

But within a year of the bill's passage, nine of the industry's 20 best-selling drugs had new generic rivals. Suddenly, pharmaceutical giants found themselves facing precipitous sales declined after their drugs lost patent protection, rather than a long, slow tapering off.

The Hatch-Waxman law put the drug industry on an innovation treadmill. If its labs didn't produce new products, the companies would eventually collapse, as generics snatched away their sales.

At first, the industry adjusted to this new reality with one of its most well-worn tools: price increases. Since there were few large medicine buyers back then, the industry could raise prices almost at will. If a patent expired on one of a company's drugs, it could jack up prices on its others.

"All through the 1980s, a lot of the industry's growth came from price increases," Raymond V. Gilmartin, chairman and chief executive of Merck, says.

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日上午第1,2,3節 星期六(下) 13:20-17:20

The rise of managed health care in the early 1990s changed all that. In 1990, most drugs were bought with consumers' out-of-pocket money. Now, most drugs are bought by huge purchasers like managed-care health plans. If drug companies don't offer discounts, they lose sales to a competitor's pills; hefty price increases have become less common. As the decade progressed, managed-care companies became increasingly adept at holding down costs by promoting generics. Many hired pharmaceutical-benefit managers, such as Merck's Merck-Medco unit, which used phone banks to press doctors to approve switches from name-brand drugs to generic equivalents.

In August 2000, when Merck lost its patent on Vasotec, a blood-pressure drug, the drug's sales dropped two-thirds within three months. When Lilly's antidepressant Prozac lost its patent in August 2001, generics stole 80% of the drug's new pre-scription sales within two months, according to Atlanta-based marker researcher NDC Health, Lilly was surprised by the drug's breathtaking collapse. Merck-Medco, meanwhile, boasted of its success in switching patients to generic Prozac.

The collapse of Prozac was a landmark for another reason. Through the 1980s and 1990s, when a branded drug lost its patent, sales of branded competitors often improved. When Tagamet lost its patent in 1993, for example, sales of other branded heartburn pills soared, even though they cost many times the price of generic Tagamet.

The reason: doctors get most of their information about drugs from drug-company salespeople and are accustomed to prescribing the pills that are pitched to them. By contrast, generic companies, which operate on razor-thin margins, can't afford to send legions of salespeople to doctors' offices.

Now, doctors largely prescribe drugs approved by patients' insurers to avoid patient complaints and harassing calls from managed-care pharmacists. As a result, the balance has shifted toward generics. In 1986, less than a quarter of prescriptions were filled by generic pills. Last year, it was nearly half. Prozac's main competitors are **Pfizer** Inc.'s Zoloft, Glaxo SmithKline's Paxil and **Forest Laboratories** Inc.'s Celexa. Each drug works in a similar way. With a generic version of Prozac available for pennies per pill, there is little scientific reason for doctors to prescribe Zoloft, Paxil or Celexa unless the patient is already on one of those drugs or has tried Prozac and found it didn't work. Marketers for each company nonetheless are fighting for their drugs, but managed-care formularies favor generic Prozac.

That wouldn't matter so much if drug companies' labs were producing innovative new therapies. But, these days, launches of breakthrough drugs-such as Novartis AG's Gleevec, brought out last year to wide acclaim because it led to the recovery of some near-death leukemia patients-are few and far between.

Last year, the drug industry spent $30 billion on research, more than three times what it spent in 1991, according to Pharmaceutical Research and Manufacturers of America, a Washington-based trade group. But the industry launched just 24 new drugs last year-half the number it did in 1996. According to a 2001 study by Tufts University, Boston, Massachusetts, it now costs about $802 million to discover and develop a new drug, 2 1/2times what it did in 1987, in inflation-adjusted terms.

One of the subtler causes of the major drug labs' slowing productivity is that there are already so many good drugs on the market. Heart disease, for example, is the nation's biggest killer and a potentially profitable area for drug discovery because patients typically take the same heart drugs for years. But cholesterol pills already available-Lipitor, Zocor, Pravachol, Lescol- can safely cut a patient's cholesterol levels by as much as 45%., a remarkable accomplishment.

Similarly, to treat high blood pressure, doctors have an entire arsenal at their disposal-diuretics, beta blockers, angiotensin-converting enzyme inhibitors, angiotensin II receptor antagonists and calcium-channel blockers. All attack the condition in a different way. Many of them are available in generic versions. That means a new drug would have to be extraordinarily effective in order to find a market, especially at a premium price.

Many of the industry's most productive labs have managed to remain so by frequently launching drugs that are only slightly better than those already on the market. Then they charge a premium for these incremental improvements.

AstraZeneca PLC is among the drug makers pursuing that strategy. The London-based company will soon lose U.S. patent protection on its huge-selling heartburn drug, Prilosec. Last year, in an attempt to hang on to some of Prilosec's $6 billion in annual sales, AstraZeneca launched Nexium.

備考	試題隨卷繳交

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日上午 第3節 13:20 17:00 星期六(下)

Now, it is feverishly trying to convert Prilosec users to the new medication. But Mexium is at best 3% better than Prilosec in curing one form of heartburn, according to a company-sponsored test. That means managed-care companies will have to decide whether to pay a lot more for Nexium's small measure of superiority once generic versions of Prilosec hit the market in coming months.

This year AstraZeneca says it plans to launch a new cholesterol pill called Crestor that may be slightly more effective than those already available. Whether managed care will pay a premium for the pill once generic versions of competitors' Pravachol and Zocor reach the market in 2006 is uncertain.

"Drugs like Nexium are a desperate attempt to save sales from nearly identical drugs losing patents," says Sharon Levine, associate executive director of Kaiser Permanente, the big California health-maintenance organization. "Generics ate a real value."

AstraZeneca declined to comment.

Many executives and industry watchers believe the dearth of big new drugs will force the industry to consolidate further. But Robert Temple, a top FDA official who oversees many new drug applications, says consolidation has been one of the chief causes of the industry's diminishing lab productivity. "I can't believe that when you take two or three companies all frantically producing drugs and put them together that they produce as many drugs,' he says.

備考	試題隨卷繳交

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日上 星期六 下午第 13:20~17:00 節

二、從創新到使用 （30％）

1. 請用 300 字的英文摘要表達這三個題綱內容。 15%
2. 請分別說明你同意或不同意這三個題綱，為什麼？ 15%

從創新到使用

十道兼容並蓄的技術史史學提綱

◉ 大衛．艾傑頓(David Edgerton)／文　方俊育、李尚仁／譯

提綱八：發明與創新很少導致使用，而使用經常導致發明與創新。

喬治．巴舍拉(George Basalla)注意到「任何主要的現代發明……幾乎都可以找得到替代技術。新奇的事物產量巨大，成堆的相關創新事物等著人擇取，滿足我們任何的慾望、需求與古怪念頭。」（註六四）長久以來，社會丟出來的創新很多，實際上使用或可能使用的則很少。重要的推論是，大多數的技術受到「抗拒」，而且必然如此。（註六五）然而，絕大多數關於發明與創新的研究，都是那些傳播成功的技術。（註六六）對創新的研究甚且還偏好那些躍進的變遷，那些日後才證明是巨大而根本的創新，那些由科學所衍生的創新以及那些新的創新組織（innovating organizations, 譯按：例如大學或產業的研發機構）所產生的創新。（註六七）創新研究因此系統性地偏重於未來的表現，我們研究的是那些後來取得成功的創新，那些日後取得主導地位的創新組織的史前史(pre-history)，著重那些成為後世典型的科學－技術關係（science-technology relations）。研究發明，常可見到對發明家的天真描述，「是走在時代的前面」。舉一個例子。十九世紀晚期之創新的研究集中在「有科學基礎」(science-based)的有機化學、電學與非常早期的工業研究實驗室。實際上，十九世紀晚期的創新集中於其他領域，而且主要源自個人的成果。（註六八）發明的活動顯然不是為未來所形塑的，而是為過去與現在所形塑。創新在過去與現在，都不局限於「新」產業：「舊」工業仍在創新：二十世紀看到了紡織業，鋼鐵，造船與印刷業的創新。大約在一九○○年，工業研究實驗室為創新做出了一點小貢獻，即使到了今天，研發（R&D）也只是創新的來源之一。再者，產品大部分的改變都是漸進的。例如，忽視汽車，飛機的設計，將導致對二十世紀技術變遷的錯誤印象。（註六九）

一個有用的問題是，現有的技術用途與使用的技術如何影響創新呢？實際上，很多對創新的闡述，都或顯或隱地藉助關於使用的說法來討論創新。例如，許莫克勒(Schmookler)研究專利所取得的結果顯示，專利申請活動反映了使用的技術的變化。（註七○）其他關於創新的解釋，則強調使用的技術之小變化的累積。（註七一）創新的路線依賴(path-dependence)已是近來著作的重要主題：就此觀點來看，實際使用的技術以及因使用而來的特定問題強烈影響了創新。（註七二）正是因為這些技術已被接受的事實，導致研發的努力集中在其上。（註七三）「瓶頸」或「戰線缺口」(reverse salients)（譯按："Reverse salient,"「戰線缺口」為技術史家 Thomas P. Hughes 探討電力技術系統的建立的專論 Networks of Power (1983) 中提出的分析概念，用來取代常見的技術發展「失衡」或「瓶頸」等比喻。根據Hughes的解釋，這個軍事名詞指的是軍事前線中一個大致連續的戰線上少數落後的突出部分。這個名詞在一次大戰中變得家喻戶曉，因為著名的凡爾登戰役起因於德軍試圖填補他們的戰線缺口。科技系統的擴張從來不是協調一致的，在朝向既定目標前進時，如果某個部分落後了，「戰線缺口」出現了，則整個系統的擴張都會受到拖累，直到大量的人力物力投入填補這個缺口。舊的兩個比喻中，「失衡」暗示著「平衡」——一種單純的物理狀態，「瓶頸」則在形狀上太抽象了。而「戰線缺口」的譬喻則能夠包含複雜糾纏的多元因素：個人，群體，物質力量，歷史影響，以及意外，等等。Hughes, 1983: p. 79）都是因使用的情況所引起，有人認為漸進的與激進的創新活動都以為焦點。此外，經由「從做中學」與「從使用中學」，使用本身導致了使用效率的增加。（註七四）這提醒了我們，不應將所有的改變歸因於機器與製程（processes）。專門技術或竅門（know-how）不必然是具體的（embodied，譯按：改變不必然具體表現在新的發明，新的機器或新的製程上面）。

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日上午 星期六 第 節

提綱九：正如我們不應混淆創新與使用的技術，我們也不應混淆知識的變遷與知識的使用。

創新史之所以過度強調早期工業研發(R&D)的歷史的另一個理由，是我們以爲既有的創新知識只有透過研究實驗室(research laboratory)才首次爲人運用到工業上。我們傾向於認爲研究實驗室是科學與工業兩者之間的橋樑，甚且普遍把科學知識與技術知識等同於研究(research)。有一位科學史與醫學史的史家甚至明確主張：「人們常認爲科學是個知識體（a body of knowledge）。然而反思下所得的結論是：這絕非（科學）的真實本質。歷史已不斷證明，科學的知識體在停止發展之後，很快就不再成其爲科學了，……，科學意指著知識的生產（knowledge making）。任何不再成長，不再繼續生產的學說體系（body of doctrine），就喪失其科學屬性。」〔強調部分爲原文所加〕（註七五）既有文獻強烈偏好探討受僱於研究機構的科學家與技術研究員，而忽視從事其他型式工作的像是教學、例行測試，管理，保養等等。（註七六）尹克斯特(Inkster)正確地強調，不能根據國家對研究的投入來推斷這個國家的技術能力。（註七七）人們之所以認爲科學知識與技術知識具有創新的本質，是由於科學知識史與技術知識史事實上根本不是知識的歷史，更因爲是知識創新的歷史，〔知識〕邊界推移的歷史，但卻不是整體知識領域的歷史。現代將知識變遷等同於知識本身，不僅大大曲解了過去的知識，也曲解了現在的知識。科學與技術，在過去與現在都是知的方法（ways of knowing），而不必然是創造新知識或新事物的方法。即使十九世紀晚期以來的這段時期，創新在科學與技術上非常重要，乃至例行的一部分，創造（creating）也仍只是知識（knowing）當中的一小部份罷了。（註七八）

這些觀點不僅對研究技術使用很重要，對研究創新本身亦然。早在研究實驗室創立之前，技術的使用很早就已經與正式的知識(formal knowledge)結合。試想工程師與醫生的例子。這樣的結合明顯延續了下來：例行性分析，保養，修理等等，皆非僅是不學無術者的工作而已。更有甚者，把在一個領域建立已久已被實行的知識，移轉到另一個新的領域，（就新領域的觀點而言）在創新活動中扮演了重要角色，雖然從另一個角度來看，也可將其稱爲移轉（transfer）。我們還可以更進一步的論證，創新不但需要依賴現有的知識，也有賴在創新的過程中對現有知識作主動的乃至常規性的利用，例如，測試新產品與新製程的效能與安全性之標準程序，而這些新產品與新製程可能都是透過長久建立的例行程序所創造出來的。我們這裡要指出以下幾項活動的重要性，亦就是「發明的發明」，「發明的工業化」與「創新的常規化」(routinisation)，以及指出那從未被普遍討論過的弔詭現象(paradox)：沒有創新者的創新(innovation without innovators)。

提綱十：以創新爲中心(innovation-centred)與以知識爲中心(knowledge-centred)的技術敘述，是二十世紀文化的核心。

技術，科學或知識的創新中心觀點已經深刻地建制化了。當政府制定科技政策時，是爲研究與創新制定政策，而不是爲整體的科學與技術制定政策。〔政府〕大力投入收集與創新相關的資料，例如與研發相關的統計資料。相較之下使用的技術之資料，乃至於技術傳播的資料都很單薄。只有一些事物——如電話的數量——有官方資料（有些國家，像是英國，看電視是需要執照的，因此會有電視機的統計數字）。不然，傳播與使用就純屬市場調查的領域。使用中的技術(technique-in-use)就不再是科技，而變成車子，飛機，水，電等等：成了日常生活當中的平淡無奇的設備。

我們要如何解釋技術史研究領域特別強調新穎（novelty）呢？最近，卡羅．派賽爾論稱這是因爲這些研究是由白人中產階級（還可附加一項，北美洲的）男性所撰寫的。然而，對白人中產階級男性而言，〔他們對技術的〕主要經驗也還是使用，而不是創新。（註七九）喬治．巴薩拉將其原因歸爲①先驅（antecedent）的佚失或遭到隱瞞；②將發明家視爲英雄——特別是民族英雄——的想法之出現，導致刻意忽視發明的先例，特別是外國的先例。此外，專利制度是導致過度稱許個人貢獻的進一步誘因；與③過份強調技術是導致社會與經濟革命性變革的重要原因。（註八〇）巴薩拉指出，強調創新有其歷史特定性。而更明確的則是麥克勞(MacLeod)所看到的，在十九世紀走到四分之三的年代時，英雄式的發明家是圍繞著專利權的重大爭議而給放安置到英國人的集體意識當中。（註八一）大衛．奈(David Nye)研究美國對技術的態度時注意到，美國人從歌頌實際已經存在的機器，轉變爲只歌頌最新的技術以及未來的技術。到了一九三〇年代晚期，針對大眾的想像力而設計的技術展覽會，其內容都是大企業的研究實驗室所提出而尚未實現的計畫。（註八二）技術玩具的歷史證明了一個類似的過程，在兩次大戰之間的玩具反映的是現有的〔技術〕物件；到了一九五〇年代，玩具〔的主題〕則是新穎的，偏好尚未應用的技術。（註八三）

保羅．大衛(Paul David)提出了這種未來主義(futurism)的政治性意義：

> 全心投入於未來是一種可以理解的趨向，喜訴到了大多數人類想像與性投注在自身所處物質環境的期望，而由原始資源日漸提高的分配與財富所會引起的公開衝突。〔全心投入於未來〕可能是現代工業民主國家長期以來的功能性反應，試圖轉引社會能量遠離有關重新分配〔財富〕的鬥爭，而將之導向合作征服科學「無窮的邊疆」……（註八四）

他繼續論到，「技術幻想」的結果，導致技術一社會變遷的歷史性分析的匱乏，而缺乏新技術爲何沒能改變現狀。布萊恩．溫斯頓

考試科目	科技管理文獻評析	所別	科管所	考試時間	5月25日 星期六 下午 第13:20~17:00節

(Brian Winston)曾經寫到「身為一個專業實務工作者與教師，我從一九七〇年代起逐漸察覺到所謂技術變革勢不可擋的修辭說法，與我專業生涯的實況有所差距。認定電影這項技術早該為錄影帶所取代的時候從事電影製作與教學工作，激發了我一個重要想法：變遷的發生要比一般所料想的還要緩慢」。（註八五）大衛．諾伯(David Noble)注意到，技術的討論常以未來即將發生徹底變革的斷言為中心。他想要說明的是，儘管（新技術的出現，新的科學進展）承諾了革命性變革，舊秩序卻依然固我。「每一次重要的科學進展似乎都預示了一個全新的社會即將來臨」，他說，「結果卻見證了產生這項科學進展的舊秩序的活力與韌性。」這是一個「奇怪的狀態，動態可觀的社會卻走不出去」。歷史學家一項重要工作，是對「沒有變遷的變遷」(change without change) 提出解釋。（註八六）

未來導向的革命修辭，已成為討論技術的主導模式。這一個奇怪的特徵卻未受到充分地討論：大致而言這套革命修辭是一成不變而從不與時俱進的：從不自我革命。（註八七）不同的技術一直允諾著相同的光明新未來。好例子之一，是保證要帶來世界和平的各種技術，排起來是長得驚人的一大串。運輸與交通通訊技術，從鐵路、汽船到收音機與飛機以及現在的網際網路，都承諾要使世界變小，使全人類團聚一堂，從而確保永久和平。同樣地，破壞性的技術也被認為可以帶來和平巨大的[illegible]，諾貝爾發明的炸藥、轟炸機以及原子彈都有非常大的破壞力，也都被認為會迫使世界達成和平。為了令人信服，這些論證必須否認其歷史，而且否定到驚人的地步。一九四五年中期，轟炸機不再當成是維護和平的技術：原子彈取代了轟炸機的位置，又提出類似原有的構想論調，甚至還有系統地遺忘非常晚近的歷史乃至遺忘現在，而使得我們對於非常晚近的過去一無所知，從而對新技術之新穎(novelty) 提出完全錯誤的說法，而讓人以為新技術以前所未有的新方式挑戰了人性，使我們不斷受到「文化落差」(cultural lag) 之累。當我們想到資訊技術時，我們忘記了電報系統、電話、收音機與電視機。基因工程的作用也呈現得好像與動植物育種或遺傳學徹底不同。

三、整合研究計劃　（40％）

1. 從上兩篇文獻中各粹取出 2-3 相關的概念，根據這些概念提出 3 個「研究問題」或 hypotheses (假設/命題)。　10%
2. 擬一個研究架構，涵蓋上述的概念及研究問題，並說明各操作性的研究變數。　10%
3. 設計一個研究方法(包括研究對象)，可以確實回答這些問題或驗證這些 hypotheses。　10%
4. 此一研究設計的限制與對台灣的意涵。　10%

備考	試題隨卷繳交