Principles of Microeconomics – Final Exam [2022/1/7]

Note: You have 180 minutes (9:10am-12:10pm) to earn 138 points. Allocate your time wisely.

Part A (26%): Excerpts of "Q3'21 Was a Record Quarter for Foldable Smartphones, Samsung Enjoys a 93% Share per DSCC Report" (2020/12/31)[1]

Q3'21 was a record quarter for foldable smartphone shipments as expected, given the successful launch of the Samsung Galaxy Z Flip 3 and Z Fold 3 as revealed in DSCC's latest Quarterly Foldable/Rollable Display Shipment and Technology Report. How strong was it? "Q3'21 foldable smartphone shipments were larger than the previous four quarters combined and grew 215% Q/Q and 480% Y/Y to 2.6M phones. Samsung accounted for a 93% share of foldable smartphone shipments with Huawei #2 at 6%...(omitted)...For 2022, DSCC has raised its forecast to 17.5M foldable smartphones, now rising 132%, as Samsung expands its 2022 target, products/volumes delayed by the IC shortage move to 2022 and additional products are launched in 2022. DSCC's latest Quarterly Foldable/Rollable Display Shipment and Technology Report also reveals:

- Regional shipments for the Z Flip 3 and Z Fold 3 by quarter;
- Specifications of foldable smartphones expected to be released in the next 12 months from: Oppo, Honor, Huawei, Xiaomi, and Motorola...(omitted)

Suppose that only Samsung and Huawei can make the exact same foldable smartphones. They agree to produce 1.3 million phones each. They both could earn 500 million dollars doing so. If one of them produces 2 million phones instead, that firm would earn 600 million dollars, while the other only earns 400 million dollars. If they both produce 2 million phones, they would both earn only 450 million dollars.

1. (2%) Draw a payoff matrix to show how each firm's choice affects the outcome.
2. (4%) Do Samsung and Huawei have dominant strategies? What is the Nash equilibrium?
3. (2%) Is the equilibrium outcome good for the two firms? Why would the outcome end up like this?
4. (2%) Is this outcome good for the society as a whole? Explain.

With the development of technology, more and more companies can produce foldable smartphones. Because they try to stand out from others, they all have their own special functions.

5. (2%) Which market structure best describes this market? Perfect competition, monopoly, monopolistic competition or oligopoly?
6. (4%) Draw a graph and show at which price and quantity does the firm maximize profit.
7. (5%) If Huawei secures exclusive rights to semiconductors which are a key resource for producing foldable smartphones, how would the market structure change? Draw a graph and show how Huawei would determine quantity and price to maximize profit in this market.
8. (2%) Supposed that compared to other companies producing foldable smartphones, Samsung has the highest quality, which companies should advertise more? Why?
9. (3%) What are the benefits of the brand names of Samsung? List three examples.

Part B (33%): Excerpts of "Taiwan Mobile to take over Taiwan Star to boost 5G" (2021/12/31)[2]

Taiwan Mobile Co (台灣大哥大), the nation's second-largest telecom, yesterday said it would acquire Taiwan Star Telecom Corp (台灣之星), the nation's fourth-largest carrier, as the company aims to expand its customer

base, and boost efficiency and competitiveness in the local market. Taiwan Mobile aims to enlarge its spectrum of resources for greater economies of scale, the telecom said. It also looks to achieve earnings and net-worth growth, as well as better customer satisfaction, the company said. Taiwan Mobile, which had 7.11 million users as of the end of September, and Taiwan Star, which had 2.65 million users, would have a combined customer base of 9.76 million, the companies told a news conference in Taipei yesterday. That would be higher than the 9.12 million users Far EasTone Telecommunications Co (遠傳電信) and Asia Pacific Telecom Co (亞太電信) have through a business partnership, the firms said. Its combined customer base would come close to the 10.65 million users of Chunghwa Telecom Co (中華電信), the nation's largest telecom, they said...(omitted)...With the addition of Taiwan Star's 5G licenses, Taiwan Mobile would own 100 megahertz of the 3.5 gigahertz frequency band, which would help speed up its promotion of 5G services to corporate clients, Taiwan Mobile president Jamie Lin (林之晨) said. After the merger, Taiwan Mobile would terminate its 3G network and thousands of 4G base stations to avoid overlapping resources, which would help save significant amounts of energy, Lin said. Taiwan Mobile would respect all contracts customers signed with Taiwan Star and hopes to gain support from regulators, he said.

1. (3%) Assume Taiwan Star is a competitive firm. How does Taiwan star determine price and quantity to maximize profit? Explain.
2. (4%) When will a competitive firm decide to exit the market instead of shutting down? How low are prices now given Taiwan Star decides to exit and sell its assets to Taiwan mobile?
3. (2%) What are the benefits for the two telecom companies to merge in terms of revenue?
4. (2%) What are the benefits for the two telecom companies to merge in terms of cost?
5. (3%) Is the cost structure described in the article a natural monopoly? Is it necessary that a monopoly would arise under this cost structure? Why or why not?

Part B-2: Excerpts of "台灣大哥大併台灣之星開啓電信新時代 業者分析: 低價吃到飽將消失" (2022/1/3)[3]

...電信高層私下對中央社記者表示，當初遠傳牽手亞太電信時，台灣之星的存在就成爲「關鍵少數」；如今「台台併」從猜測到變成定局，揭示電信市場將由過去「三大兩小」邁向「新三國」的局面，也應證電信市場「分久必合」的宿命。...(omitted)...電信高層認爲，在目前三雄重新鼎立的狀況下，台灣電信低資費、便宜吃到飽的生態將不復見，「畢竟大家都經歷過 499 吃到飽殺價競爭的苦果」；雖然習慣低資費的消費者很難接受，但長久下來，是產業能回歸「價值」、跳脫「價格」發展的契機，形成產業健康循環，消費者也能從更多的加值服務獲得良好體驗，應該正向看待。...(omitted)

Consider the pricing game played between the top 3 telecom companies, CHT, FET and Taiwan Mobile, in which each starts with 10 million users and can maintain high monthly fees or cut prices.

6. (4%) How would market shares change if one firm cuts its price while the other two firms maintain high monthly fees? What if two firms cut prices while the last one does not? Explain.
7. (2%) What would happen to market shares if all three firms cut prices?
8. (2%) Draw the (3D) payoff matrix, or carefully state all possible payoffs under each strategy profile.
9. (4%) Do the firms have dominant strategies? What is the Nash equilibrium of this game?
10. (4%) Is the equilibrium outcome good for the firms? For the society as a whole? Explain.
11. (3%) Do you think reality will unfold according to the article's prediction that "low price all-you-can-eat plans will phase out"? Why or why not?

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[3] By 江明晏, CNA: https://www.cna.com.tw/news/firstnews/202201030083.aspx

Part C (17%): Excerpts from "上一篇文章談到找工作刷題的問題…" (洪士灝臉書 2021/12/29)[4]

…刷題求職這個奇怪的現象，主要是因爲美國一些賺大錢的大公司(e.g. FAANG)，需要增聘大量的資訊科技人才，所想出來的便宜之計。美國有一大堆大學和研究所，大部分不用寫論文只要修課就可以碩士學位，有些人大學就很厲害不唸研究所就在找工作，甚至一堆非資工系的畢業生衝著高薪也來湊熱鬧，再加上原本在公司的工程師忙到沒有時間看履歷、面試，因此人資部門在這種情況下只好用考試的方式來過濾來求職者。見怪不怪的人都知道，這些公司爲了搶人，願意給出非常高的薪水，以至於新進的員工的薪水不斷提高，甚至高過於較資深的工程師。在高薪的吸引之下，當然有很多人會努力去刷題來提高錄取的機會，這是典型資本主義的運作方式。

這幾年台灣的公司有樣學樣，因爲要大舉招募資訊人才，所以也搞刷題—反正考試本來就是我們固有的文化，大夥兒熟到不行，從小考到大、身經百戰的學生們似乎也沒在怕的，或是說，認命地接受了這件事情，就當作多一場考試而已。…(omitted)…我們不斷強調，資訊工程有太多 coding 之外的東西，但是這些公司藉由刷題所放出來的訊息，造成大眾膚淺地把 coding 能力放大解讀、神級化。而且，連他碩士論文做什麼都不在乎，是不是代表這家公司不在乎創新和解決問題的能力呢？另一方面，有些晶片設計公司和系統廠常常問我有沒有會某某專業的學生，有時還會嫌刷題進去的人不好用、欠缺某些知識技能，甚至質疑「學校都不敎這些嗎」？弔詭的是，問歸問、講歸講，還是繼續要來求職者刷題… 這些公司眞的知道自己在做什麼嗎?…

1. (3%) Which type of asymmetric information occurs on the CS job market? Hidden action or hidden characteristics? Are firms solving this problem on their own? Explain.
2. (3%) Explain how "problem set cramming (刷題)" could serve as a screening device to separate good candidates from the rest?
3. (3%) Explain how college education could serve as an alternative signal to identify good candidates.
4. (5%) List three other screening/signaling devices that could achieve similar separation. Describe the requirements needed for devices to identify good candidates.
5. (3%) Is problem set cramming an efficient choice if several devices are available? Why or why not?

Part D (24%): The Presidential Election of National iDaiwan University Revisited

The presidential election of National iDaiwan University, not to be confused with National Taiwan University, has a two-phase "run-off" voting rule. Since it did a controversial job last time, the following alternative "preferential voting rule" was proposed：「投票時所有候選人列名於同一張選票，由出席委員就所有候選人依偏好排序投票。投票後先計算所有候選人之第一偏好選票，得票數超過出席委員半數者爲校長當選人。若未有候選人得票數超過出席委員半數，依下列方式重覆計票直至有候選人獲得過半選票：(一)淘汰得票數最低之候選人。(二)將前款候選人所得選票，計入下一偏好候選人之得票。」 What would have been the outcome of the last election had they adopted this rule of single transferable vote? The last election had five candidates, Walter, May, Ray, Chung, and Hsien. The recruiting committee had 21 voters, and their preferences are listed below:

Voter Type	# of voters	1st choice	2nd choice	3rd choice	4th choice	5th choice
Type X	6	Chung	Hsien	Ray	Walter	May
Type Y	7	May	Walter	Chung	Hsien	Ray
Type Z	8	Walter	May	Ray	Hsien	Chung

First suppose everyone voted sincerely, i.e. according to their true preferences.

1. (2%) Who would be eliminated in the first round of vote-counting? How many votes would be transferred?
2. (2%) Who would be eliminated in the second round? How many votes would be transferred?

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[4] https://www.facebook.com/shihhaohung/posts/6793679174007846

3. (4%) Repeating this process, who would win under the proposed preferential voting rule?
4. (3%) Could Type X voters gain by deviating from sincere voting while others vote sincerely? Explain.
5. (3%) Could Type Y voters gain by deviating from sincere voting while others vote sincerely? Explain.
6. (3%) Anticipating the above results, is sincere voting a Nash equilibrium? Explain.

Now consider the follow new set of preferences for the committee:

Voter Type	# of voters	1st choice	2nd choice	3rd choice	4th choice	5th choice
Type X	7	Chung	Hsien	Ray	Walter	May
Type Y	7	May	Walter	Ray	Chung	Hsien
Type Z	7	Walter	May	Ray	Hsien	Chung

7. (3%) Who would win if everyone votes sincerely? Explain.
8. (2%) Does this explain why the proposal may not be adopted?
9. (2%) Explain why this is not surprising according to Kenneth Arrow.

Part E (38%): Excerpts of "'Walmart Draws Anger In China Over Xinjiang" (Wall Street Journal, 2021/12/28)[5]

...The northwestern Chinese region of Xinjiang, home to millions of mostly Muslim minorities, has become a geopolitical flashpoint and an ethical dilemma for U.S. multinationals doing business in China. The Biden administration has accused the Chinese government of engaging in genocide against religious minorities in the region. Last week, President Biden signed the Uyghur Forced Labor Prevention Act into law, following its near-unanimous passage in Congress. The law bans all imports to the U.S. from the region unless companies can certify that such products are free from forced labor. China has rejected allegations of genocide and forced labor, describing their policies in the region as aimed at preventing terrorism and protecting national security...(omitted)...Walmart, for its part, was dragged into the controversy on Friday after users wrote on domestic social-media platforms—including Weibo, a Twitter-like microblogging service, and Zhihu, a Quora-like question-and-answer forum—that they were unable to find products typically sourced from Xinjiang on online stores operated by Walmart and Sam's Club China. Sam's Club is Walmart's members-only wholesale retail chain. Some users posted that online customer service agents had told them such products, including red dates and apples, were out of stock. A U.S.-based Walmart spokesperson declined to comment. The Wall Street Journal found no Xinjiang product listings on Walmart and Sam's Club's China e-commerce stores. However, a visit to a Walmart store in Beijing's central business district on Saturday found red dates sourced from Xinjiang still stocked on its shelves...(omitted)...Since Walmart's sourcing of Xinjiang products began attracting attention online, competitors including Alibaba Group Holding Ltd.'s Hema supermarket chain swooped in to take a swipe at the U.S. retailer. Most conspicuously, Carrefour SA, whose more than 200 stores in China are owned by Suning.com, a domestic online retailer, shared a post on Friday carrying the hashtag "Carrefour Xinjiang Fine Goods Festival," with pictures of Xinjiang-sourced products on its store shelves. The social-media post on Carrefour's official Weibo account included nine photos of apples, walnuts and cotton socks and hand towels for sale on its store shelves, with bright yellow labels reading: "I come from Xinjiang." A spokesman for Carrefour in France referred a request for comment to Suning, which didn't respond to an email sent to its board secretary.

1. (12%) Draw a supply-demand diagram to analyze the effect of banning imports from Xinjiang without forced-labor-free certifications. How is equilibrium price, quantity, consumer surplus, producer surplus and total surplus of the US market affected?
2. (4%) Who is gaining in the US due to the ban? Who is losing? Do the gains outweigh the losses? Explain.

3. (2%) If China is indeed subsidizing exporters by allowing forced labor, who bears the burden of this policy?
4. (3%) Judging from Carrefour's campaign, which market structure is this? Perfect competition, monopoly, monopolistic competition or oligopoly? Is product differentiation increased or decreased? Explain.
5. (13%) How does Carrefour's campaign affect the demand for its products? Draw a graph to illustrate the effect on equilibrium price, quantity, consumer surplus, producer surplus and total surplus of China.
6. (4%) In the long run, will Carrefour be earning positive economic profit? Is there deadweight loss? Explain why there may not be an easy way to the government to intervene in this market.

Translation for Part B-2: "台灣大哥大併台灣之星開啓電信新時代 業者分析: 低價吃到飽將消失"(2022/1/3)
...A telecom executive privately told CNA that when FET acquired Asia Pacific Telecom, Taiwan Star became the "critical minority." Now since it merged with Taiwan Mobile, the telecom market would shift from "big 3 plus 2 small" to the "new era of three kingdoms," proving that the telecom market "reunites after long separation." ...(omitted)...The executive believes that under the current big-3 situation, low price all-you-can-eat plans will phase out. "After all, we all experienced the NT$499 all-you-can-eat price war and its aftermath." Though it is difficult for consumers accustomed to low fees to accept it, the new normal in the long run is an opportunity for the industry to be back on track and refocus on "value" instead of "price." We should be view it positively since more value-added services lead to good consumer experience.

Translation for Part C: Excerpts from "上一篇文章談到找工作刷題的問題..." (洪士灝臉書 2021/12/29)
The strange phenomenon of "problem set cramming" is mainly a cheap solution big US companies (like FAANG) have come up, since they need to hire a lot of IT talent. There are a lot of universities and research institutes in the United States and most of them don't require you to write a thesis, leaving course-taking the only requirement to get a master's degree. Some people are very good in college and don't go to graduate school, and non-CS graduates join the market looking for higher salaries. Since engineers in big companies are too busy to review resumes and conduct interviews, HR departments are forced to use exams to screen job applicants. Everyone knows that these companies are willing to offer high salaries to grab the best people, resulting in increasing starting salaries, which could be even higher than senior engineers. Attracted by high salaries, people will work hard on problem set cramming to improve their chances. This is how capitalism works. In the past few years, Taiwanese companies have copied this practice since they also have to recruit a lot of IT talent—after all, exams are part of our culture, and people are very familiar with it in their student lives. People are unafraid, or accept the fate, of yet another exam...(omitted)...We kept emphasizing that CS is not only coding, but the signal these companies send through problem set cramming is over-emphasizing coding abilities. In fact, a company that doesn't care about master's thesis content likely doesn't care about innovation and problem-solving abilities. On the other hand, IC design/ODM/OEM companies often ask me if there are students with specific skill sets, and sometimes complain that problem set cramming candidates are incapable, lack the knowledge, or even question why we don't teach them this or that. But they still keep hiring those who do well in problem set cramming... Do they really know what they are doing?...

Translation for Part D: The Presidential Election of National iDaiwan University Revisited
"Committee members report their ranking for all candidates. Then, votes of the most preferred candidate are aggregated, and the candidate who receives more than half of the votes is elected. If no candidate receives more than half of the votes, vote-counting shall be conducted repeatedly in the following manner until one candidate receives more than half of the votes: (1) Eliminate the candidate(s) with the least number of votes. (2) Voters of the eliminated candidate(s) now vote for the next-preferred candidate."