TR2202

NATIONAL UNIVERSITY OF SINGAPORE

EXAMINATION FOR THE DEGREE OF BACHELORS WITH A MINOR IN TECHNOPRENEURSHIP
(Semester II : 2002-03)

TR2202 – TECHNOLOGICAL INNOVATION

April 2003 – Time Allowed: 3 Hours

INSTRUCTIONS TO CANDIDATES

1. This examination paper contains **THREE (3) Questions**. You must answer **ALL THE QUESTIONS.**

2. The total score for this examination is 100 marks. Question 1 comprises 50 marks; Questions 2 and 3 comprise 25 marks each.

3. You will be rewarded for writing answers that are thoughtful, creative and concise.

4. This is an open book examination. Students are allowed to bring in any books and any amount of notes. Students were told beforehand to bring in copies of all five case studies discussed during the semester.

QUESTION 1: (50 Marks)

Answer all parts of this question!

Question 1a (10 marks)
For many years, portable CD players were the rage among teenagers. However, a new dominant design has emerged for music "on-the-go": the portable MP3 player. Examples include the Nomad by Creative Technologies, Yepp by Samsung and iPod by Apple. Over 200 different models of MP3 players are on sale at websites such as amazon.com and cnet.com, including those produced by Sony, Nike, Archos, Toshiba, iRiver, Iomega, and other companies.

The Utterback model predicts that many firms will exit from an industry after the emergence of a dominant design. Do you expect the same thing to happen in this case? Why or why not?

Question 1b (20 marks)
You have devised a new kind of gas mask. When placed over their heads, it can protect people against infectious diseases and many of the dangerous substances used during chemical warfare. As such, your invention has potentially important healthcare and military applications. The secret of your success lies in the use of a living bacterial film, which is embedded into the material used for making the gas masks. When exposed to dangerous chemicals, this special bacterium reacts to neutralize the undesirable substances. The chemical reaction is previously unknown, and you stumbled upon it as part of your undergraduate research project at NUS, under the supervision of Professor Ramashurthee. You are now thinking of commercializing the invention.

Discuss how you would use patents, copyrights, trade secrets or other measures in order to protect your intellectual property.

Question 1c (20 marks)
The use of product platforms can help companies to achieve economies of scale and to use their scarce resources more effectively.

However, product platforms might also have a detrimental effect on the motivation of scientists and engineers. Why is this so, and how might you overcome the problem? Use examples to illustrate your answer.

--- END OF QUESTION 1 ---

Question 2: (25 Marks)

You are having tea with your classmates at the Grinning Gecko café when your friend Wanmin suddenly rushes in, waving a newspaper article.

WanMin: "Ni Hao! Guess what I just found out? China is launching a new computer CPU chip that will rival Intel's Pentium processor. It is called the Dragon Chip."

Tommy: "Here, let me see that…" (he grabs the newspaper article). "Wow! It will run almost all of the usual software that currently uses Intel or AMD chips. It is being developed by a group of seven major companies in China. Also, the Chinese government has pledged to support the chip, especially for defense purposes, because they are worried about depending too much on foreign technology. It will save them a lot of money because this chip will be a lot cheaper than the Intel ones."

Erika (exchange student from Finland): "I heard that using this chip, they have already developed a full-fledged web server. Instead of Microsoft Windows, it runs Linux, which was created by my countryman Linus Torvalds. Their web server has been tested extensively and is very stable."

Rani: "It won't work. Intel will sue them for stealing their intellectual property."

WanMin: "No… according to the news, this computer chip is built using original and independent research performed by the Chinese Academy of Science. They didn't copy any Intel technology at all. Hmmm… still, I wonder whether this Chinese group can protect its intellectual property."

Rani: (picking up the news article) "Oh, look here it says the Dragon CPU will only run at 300Mhz, and has the performance level of a Pentium 2 CPU. Who will bother to buy that? Even my notebook computer runs a Pentium 4 running at 1800Mhz. The Dragon chip is two generations behind!"

Ismail: "I agree with Rani. Besides, I don't see how the Chinese can commercialize this technology since Intel already has all the manufacturing, distribution and marketing capabilities. And surely there must be strong network externalities in this industry, so people are probably locked-in to using Intel."

Your friends look at each other in confusion. Then, realizing that you have taken TR2202, they turn to you, eagerly awaiting your views.

--- END OF QUESTION 2 ---

Question 3 (25 Marks)

Instructions: for this question, you are encouraged to refer to the Harvard case study on ***Millennium Pharmaceuticals (A)****, which you brought into the examination hall.*

Millennium Pharmaceuticals uses alliances and joint ventures as the way it commercialises breakthroughs in biotechnology.

- What are the advantages and disadvantages to Millennium of pursuing this strategy? (10 Marks)

- How should it manage its relationships with the various companies listed in Exhibit 7 of that case study? (20 marks)

- END OF PAPER -