

元智大學 102 學年度研究所 碩士班 招生試題卷

系(所)別： 化學工程與材料 組別： 不分組-選考 A 科目： 科技英文 用紙第 1 頁共 3 頁
科學學系碩士班

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A. 請將下列摘錄英文句翻譯成中文

1. (6 %) Beginning in the 1980s and continuing into the 21st century, an inordinate amount of attention has been focused on *improvement of quality* in American industry. Much has been said and written about the Japanese "industrial miracle," which began in the middle of the 20th century. Much of the success of the Japanese has been attributed to the use of *statistical methods* and statistical thinking among management personnel.

2. (6 %) Polymers, also known as **macromolecules**, are built up of a large number of molecular units that are linked together by covalent bonds. Usually they represent organic compounds, containing carbon atoms together with hydrogen, oxygen, nitrogen, and halogens, etc. In this first chapter, we briefly survey the main characteristics of their chemical constitution and molecular architecture and introduce the notions employed for their description, using examples for the explanation.

3. (6 %) Interface science has changed significantly during the last 10–15 years. This is partially due to scientific breakthroughs. For example, the invention of scanning probe microscopy and refined diffraction methods allow us to look at interfaces under "wet" conditions with unprecedented accuracy. This change is also due to the greatly increased community of interfacial scientists.

4. (6 %) The unemployment rate across the eurozone hit a new all-time high of 11.8% in November, official figures have shown. This is a slight rise on 11.7% for the 17-nation region in October. The rate for the European Union as a whole in November was unchanged at 10.7%. More than 26 million people are now unemployed across the EU. For the eurozone, the number of people without work reached 18.8 million, the official European statistics agency said.

5. (6 %) Researchers say they have unlocked the genetic secrets of honey bees' high sensitivity to environmental change. Scientists from the UK and Australia think their findings could help show links between nutrition, environment and the insects' development. It could, they suggest, offer an insight into problems like Colony Collapse Disorder, a mysterious cause of mass bee deaths globally. The findings appear in *Insect Biochemistry and Molecular Biology*.

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6. (10 %) The researchers identified enzymes from online databases that carried out the reactions they were looking for, and then introduced the DNA for these enzymes into the cells. Working a step at a time, they built up a three-step pathway that allows the cyanobacteria to convert carbon dioxide into 2, 3 butanediol, a chemical that can be used to make paint, solvents, plastics and fuels. After three weeks growth, the cyanobacteria yielded 2.4 grams of 2, 3 butanediol per liter of growth medium -- the highest productivity yet achieved for chemicals grown by cyanobacteria and with potential for commercial development.

7. (10 %) Many industrial plants depend on water vapor condensing on metal plates: In power plants, the resulting water is then returned to a boiler to be vaporized again; in desalination plants, it yields a supply of clean water. The efficiency of such plants depends crucially on how easily droplets of water can form on these metal plates, or condensers, and how easily they fall away, leaving room for more droplets to form. The key to improving the efficiency of such plants is to increase the condensers' heat-transfer coefficient -- a measure of how readily heat can be transferred away from those surfaces, explains Nenad Miljkovic, a doctoral student in mechanical engineering at MIT. As part of his thesis research, he and colleagues have done just that: designing, making and testing a coated surface with nanostructured patterns that greatly increase the heat-transfer coefficient.

B. 請將下列摘錄中文句翻譯成英文

1. (7 %) 中文翻譯成英文時，為辭能達意翻譯正確，有些中文不能原封不動直接翻譯，要做適當的修飾與調整。

2. (7 %) 1869 年，門得列夫 (Dmitri Ivanovich Mendeleev) 發現化學元素的性質有一定的重複模式，因此創立了元素週期表。物理學家後來證實，這種重複模式源自原子的結構。

3. (7 %) 隨著時代變遷，台灣經歷經濟高度發展後，超時工作、人際與家庭疏離等文明病一一浮現；城市生活的成本逐年攀升、青年起薪過低，城市不再是遊子離鄉追逐夢想的唯一所在。

4. (7 %) 有些電力公司把太陽能或風力發電的過剩電力加以運用，例如把水抽往位於高處的水庫，需要時再讓水流下，帶動渦輪。其他可行的能源儲存方案，包括將壓縮空氣注入大型地下洞穴、加熱液體或熔融鹽類，需要時再產生蒸汽、帶動渦輪，或者給先進的電池充電等。

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5. (7%) 地球已不容許人類繼續排放二氧化碳到大氣中，但已排放的二氧化碳也不會消失，所有跡象顯示，二氧化碳濃度會持續升高數十年。儘管已開發和開發中國家大力支持再生能源，未來仍會繼續燃燒更多石油、煤和天然氣。

6. (7%) 近年來由於塑膠產品大量使用，帶給環境極大的負擔，因傳統化學合成塑膠不易腐壞、無法被自然環境中的微生物分解。為減少塑膠廢棄物對環境生態造成的危害，並面對枯竭的石油資源，生物可分解塑膠相關研究與開發越來越受重視。

7. (8%) 生物高分子最為人詬病的為其相對高成本及較差的機械性質與成型性如低強度、高密度、尺寸安定性不佳、易熱裂解、高氣體滲透率、吸水性、窄操作成型視窗(processing window)等。一般之改良方法有以共聚物，混練其他韌性高分子材料，或最簡單的添加各式大或小分子可塑劑(plasticizers)完成。近年來因奈米材料之發展，亦可將各式奈米無機材料摻混以改善前述不良性質。